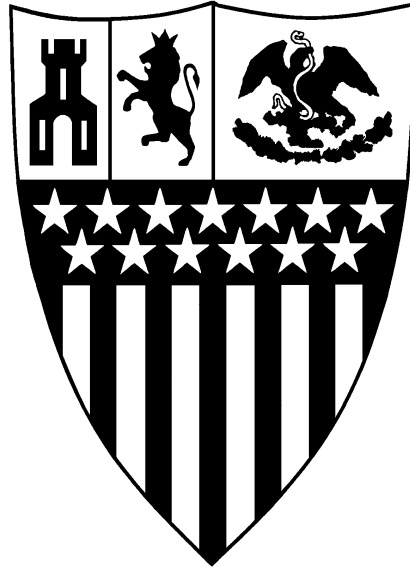


Set # _____

City of Santa Fe, New Mexico



“REQUEST FOR BIDS”

BID '16/31/B

**CITY OF SANTA FE WATER DIVISION
HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C**

BIDS DUE:
April 12, 2016
2:00 P.M.
PURCHASING OFFICE
CITY OF SANTA FE
2651 SIRINGO ROAD – BUILDING “H”

BIDDING / CONTRACT DOCUMENTS

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DIVISION O - BIDDING & CONTRACT REQUIREMENTS

PRE-BID INFORMATION
ADVERTISEMENT FOR BIDS
INVITATION FOR BID
INSTRUCTIONS TO BIDDERS
INFORMATION AVAILABLE TO BIDDERS
BID FORMS
SUPPLEMENTS TO BID FORMS
AGREEMENT FORMS
BONDS, CERTIFICATES, AND NOTICES
GENERAL CONDITIONS OF THE CONTRACT
SUPPLEMENTARY CONDITIONS

CITY OF SANTA FE
CAPITAL IMPROVEMENTS PROGRAM

ADVERTISEMENT FOR BIDS

SEALED BIDS FOR: INVITATION FOR BID NO. '16/31/B
CIP PROJECT 3039C
CITY OF SANTA FE WATER DIVISION
HOSPITAL TANK REPLACEMENT PROJECT

TO BE OPENED AT: PURCHASING OFFICE
2651 SIRINGO ROAD, BUILDING H
SANTA FE, NEW MEXICO 87505
(505) 955-5711

TIME: 2:00 P.M. LOCAL PREVAILING TIME

DATE: April 12, 2016

ADDRESSED TO: CITY PURCHASING OFFICER
CITY OF SANTA FE
2651 SIRINGO ROAD, BUILDING H
SANTA FE, NEW MEXICO 87505

Bids will be received until the above time, then opened publicly at the Purchasing Director's office or other designated place, and read aloud. BIDS RECEIVED AFTER THE ABOVE TIME WILL BE RETURNED UNOPENED.

Bidding Documents may be obtained (**CD format at no cost**) at the Sangre De Cristo Water Division offices, located at 801 W. San Mateo Road, Santa Fe, New Mexico 87505. Bidding Documents may also be obtained (**purchased**) at the office of the Engineer, Souder, Miller & Associates, located at 2904 Rodeo Park Dr. East 100, Santa Fe, NM 87505, upon **non-refundable** payment of \$200.00 for each complete set. No refunds will be made upon return of Bid Documents; the City encourages recycling. An electronic version of the document may be downloaded from the following web site: <http://www.santafenm.gov/bids.aspx> Please note that if you do download the Bid Document and do not notify Eric Ulibarri at the Water Division in writing, by email at elulibbarri@ci.santa-fe.nm.us you risk not being notified of any changes or addenda. However, all changes and addenda's will be posted on the same web page and it will be the contractors responsibility (prior to bidding) to ensure he/she has the most current changes and addenda. The City will not be responsible for any issues arising from missed communications due to downloaded Bid Documents.

Bidding documents are also available at the following plan rooms:

Builders News
3435 Princeton, NE
Albuquerque, NM 87107

Construction Reporter
1609 Second, NW
Albuquerque, NM 87102

F. W. Dodge
1615 University Blvd., NE, Ste. 1
Albuquerque, NM 87102

CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B

ADVERTISEMENT FOR BIDS+

BID NO. '16/31/B

Bids for the Contract will be presented in the form of a unit price bid. The bidder shall bid all items listed. Award will be made to the responsible bidder providing the lowest total base bid. Bidder shall include in the signed documents their license(s) and classification(s).

Bid security, made payable to the City of Santa Fe, the "Owner", in the amount of 5% of the proposal sum shall be submitted with the Bid. Bid security shall be in the form of a Bid Bond issued by Surety licensed to conduct business in the State of New Mexico, or by certified check. The successful Bidder's security shall be retained by the Owner until the Contract is signed; the other Bidders' security shall be returned as soon as practicable. Failure or refusal by the successful Bidder to enter into Contract with the Owner will constitute Liquidated Damages in favor of the Owner. The bid shall also include a signed "Non-Collusion Affidavit of Prime Bidders", signed "Certificate of Non-Segregated Facilities", a signed "Certificate of Bidder Regarding Equal Employment Opportunity", a Subcontractor's Listing and; if applicable, a Local Preference Application. The project is subject to the New Mexico Department of Workforce Solutions, Minimum Wage Rates for the State of New Mexico. Such wage rates are bound into the Contract Documents. The successful Bidder shall, upon notice of award of contract, secure from each of his Subcontractors a signed "Non-Collusion Affidavit of Subcontractors".

The Owner reserves the right to reject any and all Bids, to waive technicalities, and to accept the Bid it deems to be in the best interest of the City of Santa Fe.

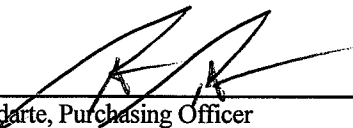
Contracting services are required for the Hospital Tank Replacement Project. The work is designated as City of Santa Fe Project, Hospital Tank Replacement Project. The work consists of, but is not limited to demolition of an existing 4MG water tank and construction of a new dual compartment 4MG pre-stressed, post-tensioned water storage tank and retaining walls, landscaping, storm drainage and tank controls, in accordance with the drawings, specifications, and other contract documents. The Hospital Tank is located near the intersection of St. Michaels Drive and Old Pecos Trail, in Santa Fe, NM. The 4MG tank site is located under the existing tennis courts west of the intersection of Calle Medico and DVR Way.

Contractor shall be responsible for any and all permits, fees, and State and City inspections associated with the construction.

The City of Santa Fe is an Equal Opportunity Employer and all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation or national origin. The successful Bidder will be required to conform to the Equal Opportunity Employment Regulations.

Bids will be received by the City of Santa Fe and will be delivered to City of Santa Fe, Purchasing Office, 2651 Siringo Road, Bldg. H Santa Fe, New Mexico 87505 until 2:00 P.M. local prevailing time, April 12, 2016. Any bid received after this deadline will not be considered.

ATTEST:



Robert Rodarte, Purchasing Officer
City of Santa Fe, New Mexico

Received by the Santa Fe New Mexican on: 03/03/16
To be published on: 03/09/16

Received by the Albuquerque Journal on: 03/03/16
To be published on: 03/09/16

*CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B*

BID SCHEDULE

- | | | |
|----|---|---|
| 1) | ADVERTISEMENT: | March 9, 2016 |
| 2) | ISSUANCE OF BID PACKET: | March 9, 2016 |
| 3) | MANDATORY PRE-BID CONFERENCE:
This pre-bid conference shall be
attended by the Bidding Contractors | March 16, 2016
Water Division – 2 nd Floor
801 W. San Mateo Road
Santa Fe, New Mexico, 87505 |
| 4) | BID SUBMITTAL DEADLINE: | April 12, 2016 |
| 5) | OPENINGS OF BIDS RECEIVED: | April 12, 2016
2:00 PM local prevailing time
City of Santa Fe – Purchasing Division
2651 Siringo Road, Bldg. H
Santa Fe, New Mexico 87505
(505) 955-5711 |
| 6) | RECOMMENDATION OF AWARD: | |
| | PUBLIC UTILITIES COMMITTEE: | April 25, 2016 |
| | FINANCE COMMITTEE: | May 2, 2016 |
| | CITY COUNCIL: | May 11, 2016 |

DATES OF CONSIDERATION BY PUBLIC WORKS/CIP AND LAND USE COMMITTEE, FINANCE COMMITTEE AND CITY COUNCIL ARE TENTATIVE AND SUBJECT TO CHANGE WITHOUT NOTICE.

INSTRUCTIONS TO BIDDERS (SECTION 00100)

1.0 DEFINITIONS AND TERMS

- 1.1 Terms used in these Bidding Documents which are defined in the Conditions of the Contract for Construction (General, Supplementary, and other conditions) have the meanings assigned to them in those Conditions.

2.0 EXAMINATION OF BIDDING DOCUMENTS AND SITE

- 2.1 Before submitting a Bid, each Bidder must (a) examine the Bidding Documents thoroughly, (b) visit the site to familiarize himself with local conditions that may in any manner affect cost, progress, or performance of the work, (c) familiarize himself with Federal, State, and local laws, ordinances, rules, and regulations that may in any manner effect cost, progress, or performance of the work, and (d) study and carefully correlate the Bidder's observations with the Bidding Documents.
- 2.2 On request, the City of Santa Fe, the "Owner", will provide each Bidder access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of his Bid.
- 2.3 The lands upon which the work is to be performed, rights-of-way for access thereto, and other lands designated for use by the Contractor in performing the work are identified in the Bidding Documents.
- 2.4 The submission of a Bid will constitute an incontrovertible representation by the Bidder that he has complied with every requirement of this Section and that the Bidding Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the work.

3.0 BIDDING DOCUMENTS

3.1 COPIES OF BIDDING DOCUMENTS

- 3.1.1 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Invitation may be obtained from the Owner (unless another issuing office is designated in the Invitation for Bid). The deposit, if any, will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good and complete condition within ten (10) calendar days after opening of Bids.
- 3.1.2 Complete sets of Bidding Documents shall be used in preparing Bids; the Owner assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 3.1.3 The Owner, in making copies of Bidding Documents available on the above terms, does so only for the purpose of obtaining Bids on the work and does not confer a license or grant for any other use.

3.2 INTERPRETATIONS

- 3.2.1 All questions about the meaning or intent of the Bidding Documents shall be submitted to the Purchasing Officer in writing. Replies will be issued by Addenda provided to all parties recorded by the Owner as having received the Bidding Documents. Questions received less than seven days prior to the date for opening of Bids will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

3.3 SUBSTITUTE MATERIAL AND EQUIPMENT

The Contract, if awarded, will be on the basis of material and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute of “or-equal” items. Whenever it is indicated in the Drawings or specified in the Specifications that substitute an “or-equal” item of material or equipment may be furnished or used by the Contractor if acceptable to the Owner, application for such acceptance will not be considered by the Owner until after the “effective date of the Contract.” Application to utilize substitute material or equipment shall be made to the Owner's Representative in writing, stating the request and the justification. If the substitution is accepted, the agreement between Contractor and Owner shall be documented in writing.

3.4 ADDENDA

- 3.4.1 Addenda will be provided to all who are known by the Owner to have received a complete set of Bidding Documents.
- 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.
- 3.4.3 No Addenda will be issued later than four days prior to the date for receipt of Bids, except an addendum with drawings or Request for Bids or one which includes postponement for the date for receipt of Bids.
- 3.4.4 Each Bidder shall ascertain, prior to submitting the Bid, that the Bidder has received all Addenda issued, and shall acknowledge their receipt in the Bid.
- 3.4.5 The City reserves the right to not comply with these time frames if a critical addendum is required or if the proposal deadline needs to be extended due to a critical reason in the best interest of the City of Santa Fe.

4.0 BIDDING PROCEDURES

The person or persons opening the bids will adhere to the following procedure and check for the following:

- 4.0.1 Bid – Name of the Bidder and the Number of the Bidder's New Mexico Contractor's License with a check for proper signatures.
- 4.0.2 Bid Bond.
- 4.0.3 Non-Collusion Affidavit of Prime Bidder.
- 4.0.4 Submittal, acknowledgement of Addenda, if any.
- 4.0.5 Properly executed Bid Form.
- 4.0.6 Certification of Equal Employment Opportunity
- 4.0.7 Certification of Non-segregated Facilities.
- 4.0.8 Subcontractor's Listing (as applicable).
- 4.0.9 Bidder's Qualifications Form

TWO COMPLETE COPIES OF THE BID SUBMITTAL ARE REQUIRED

If any of the above requirements have not been met, the bid shall be disqualified and considered a non-responsive bid. Any disqualified bids will not be read.

4.1 FORM AND STYLE OF BIDS

- 4.1.1 Bids shall be submitted on forms identical to the form included with the Bidding Documents.
- 4.1.2 All blanks on the Bid Form shall be filled in by typewriter or manually in ink.
- 4.1.3 Where so indicated by the makeup of the Bid Form, sums shall be expressed in both words and figures, and, in case of discrepancy between the two, the amount written in words shall govern.
- 4.1.4 Any interlineations, alteration, or erasure must be initialed by the signer of the Bid.
- 4.1.5 All requested Additive or Deductive Alternate Bids shall be Bid. If no change in the Base Bid is required, enter "No Change."
- 4.1.6 Where there are two or more major items of work (identified as "Bid Lots") for which separate quotations are requested, the Bidder may, at his discretion, submit quotations for any or all items, unless otherwise specified. Additionally, the Bidder may submit a lump sum price for all lots for which the Bidder has submitted separate quotations.
- 4.1.7 Each copy of the Bid shall include the complete name of the Bidder and a statement that the Bidder is an individual, a sole proprietor, a partnership, a corporation or joint venture. The Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the applicable New Mexico Certificate of Incorporation number or Certificate of Authority number. The Bid shall include the current Contractor's license number and type, and the current Contractor's preference number. A Bid submitted by an agent shall have a current Power of Attorney attached certifying the agent's authority to bind the Bidder.
- 4.1.8 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form).
- 4.1.9 The address, to which communications regarding the Bid are to be directed, must be shown.

4.2 BID SECURITY

- 4.2.1 Bid security in an amount equal to at least 5% of the amount of the Bid shall be a bond provided by a Surety company authorized to do business in this State, or the equivalent in the form of a certified check, or otherwise supplied in a form satisfactory to the Owner. All Bonds shall be executed by such sureties as are named in the current list of Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies.
- 4.2.2 The Bid security shall be in the amount of five percent (5%) of the highest Bid amount submitted, unless otherwise stipulated, pledging that the Bidder will enter into a Contract with the Owner in the terms stated herein and will furnish bonds covering the faithful performance of the Contract and payment of all obligations arising there under. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds, the amount of the Bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.
- 4.2.3 The Owner will have the right to retain the Bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn, or (c) all Bids have been rejected.
- 4.2.4 When the Bidding Documents require Bid security, noncompliance by the Bidder requires that the Bid be rejected.

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4.2.5 If a Bidder is permitted to withdraw his Bid before award, no action shall take place against the Bidder or the Bid security.

4.3 PRE-BID CONFERENCE

4.3.1 The Owner of Record shall conduct a Pre-Bid Conference approximately twelve (15) calendar days prior to the Bid opening date stated in the Invitation for Bid.

4.3.2 The Owner of Record and his consultants, as applicable, shall be represented. Prospective Bidders and Prospective Subcontractors should ask questions regarding substitutions and/or request clarification of the Bidding Documents. The failure of a Bidder, Subcontractor, or Vendor to attend shall preclude them from bidding on the project.

4.3.3 Questions and requests for clarification are to be presented in written form. Responses will be written and issued as Addenda. No verbal response shall be binding.

4.4 RESIDENT PREFERENCE & LOCAL PREFERENCE & RESIDENT VETERANS PREFERENCE

INTENT AND POLICY

The City of Santa Fe recognizes that the intent of the state resident preference statute is to give New Mexico businesses and contractors an advantage over those businesses, manufacturers and contractors from outside the State of New Mexico. The underlying policy is to give a preference to those persons and companies who contribute to the economy of the State of New Mexico by maintaining businesses and other facilities within the state and giving employment to residents of the state (1969 OP. Att'y Gen. No. 69-42). The City also has adopted a policy to include a local preference to those persons and companies who contribute to the economy of the County of Santa Fe by maintaining businesses and other facilities within the county and giving employment to residents of the county.

APPLICATION-IN-STATE AND OUT OF STATE BIDDERS

With acknowledgment of this intent and policy, the preference will only be applied when bids are received from in-state and county businesses, manufacturers and contractors that are within 5% of low bids received from out-of-state businesses, manufacturers and contractors (13-1-21 (A) -1-21 (F) and 13-4-2 (C) NMSA 1978).

To be considered a resident for application of the preference, the in-state bidder must have included a valid state purchasing certification number with the submitted bid.

Thus it is recommended that in-state bidders obtain a state purchasing certification number and use it on all bids, in order to have the preference applied to their advantage, in the event an out-of-state bid is submitted. In submitting a bid, it should never be assumed that an out-of-state bid will not be submitted.

For information on obtaining a state purchasing certification number, the potential bidder should contact the State of New Mexico General Services Department-Purchasing Office. The process involves a short application and certification by the applicant of the information requested by the state resident preference statute. The certificate is generally issued immediately.

All resident preferences shall be verified through the State Purchasing Office. Applications for resident preference not confirmed by the state Purchasing Office will be rejected. The certification must be under the bidder's business name submitting the bid.

NON-APPLICATION-COMPETING IN-STATE BIDDERS

If the lowest responsive bid and the next responsive bids within 5% of the lowest bid, are all from the state of New Mexico, then the resident preference will not be applied and the state purchasing certification number will not be considered. To be considered an in-state bidder in this situation, the bidders must meet the definition criteria of Chapter 13-1-21 (A)(1) and Chapter 13-4-2 (A) NMSA 1978. After examining the information included in the bid submitted, the city Purchasing Director may seek additional information of proof to verify that the business is a valid

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New Mexico business. If it is determined by the city Purchasing Director that the information is not factual and the low responsive bid is actually an out-of-state bidder and not a New Mexico business, then the procedures in the previous section may be applied.

If the bidder has met the above criteria, the low responsive "resident" bid shall be multiplied by .95. If that amount is then lower than the low responsive bid of a "non-resident" bidder, the award will be based taking into consideration the resident preference of 5%.

APPLICATION FOR LOCAL PREFERENCE

For the purposes of this section, the terms resident business and resident manufacturer shall be defined as set out in Section 13-1-21 NMSA 1978; the term local as applied to a business or manufacturer shall mean:

Principal Office and location must be stated: To qualify for the local preference, the principal place of business of the enterprise must be physically located within the Santa Fe County Geographic Boundaries. The business location inserted on the Form must be a physical location, street address or such. DO NOT use a post office box or other postal address. Principal place of business must have been established no less than six months preceding application for certification.

The PREFERENCE FACTOR for resident and local preferences applied to bids shall be .95 for resident and .90 for local. The local preference for proposals shall be 1.10.

New Mexico Resident Veteran Business Preference. New Mexico law, Section 13-1-22 NMSA 1978, provides a preference in the award of a public works contract for a "resident veteran business". Certification by the NM Department of Taxation and Revenue for the resident veteran business requires the Offeror to provide evidence of annual revenue and other evidence of veteran status.

An Offeror who wants the veteran business preference to be applied to its proposal is required to submit with its proposal the certification from the NM Department of Taxation and Revenue and the sworn affidavit.

If an Offeror submits with its proposal a copy of a valid and current veteran resident business certificate, 7%, 8%, or 10% of the total weight of all the evaluation factors used in the evaluation of proposal may be awarded.

The local preference or resident business preference is not cumulative with the resident veteran business preference.

Bids for Goods and Services. When bids for the purchase of goods or services pursuant to Section 22 are received, the lowest responsive bid received from those bidders in the first category listed below shall be multiplied by the Preference Factor. If the resulting price of that bid receiving the preference is lower than or equal to the lowest bid of all bids received, the contract shall be awarded to that bidder receiving the preference. If no bids are received from bidders in the first category, or if the bid receiving the preference does not qualify for an award after multiplication by the Preference Factor, the same procedure shall be followed with respect to the next category of bidders listed to determine if the bid qualifies for award. The priority of categories of bidders is:

- (1) Local business.
- (2) Resident business.

Proposals for Goods and Services. When proposals for the purchase of goods or services pursuant to Section 23 are received, the evaluation score of the proposal receiving the highest score of all proposals from those proponents in the first category listed above shall be multiplied by the Preference Factor. If the resulting score of that proposal receiving the preference is higher than or equal to the highest score of all proposals received, the contract shall be recommended to that proponent receiving the preference. If no proposals are received from proponents in the first category, or if the proposal receiving the preference does not qualify for an award after multiplication by the Preference Factor, the same procedure shall be followed with respect to the next category of proposals listed to determine if a proponent qualifies for award.

Qualifications for Resident Preference. No resident business or manufacturer, as defined, shall be given any preference in the awarding of contracts for furnishing goods or services to the city, unless it shall have qualified with the State

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Purchasing Agent as a resident business or manufacturer and obtained a certification number as provided in Section 13-1-22 NMSA 1978. The certification number must be submitted with its bid for an offeror to qualify for this preference. The Central Purchasing Office shall determine if a resident preference is applicable to a particular offer on a case by case basis.

Qualifications for Local Preference. The Central Purchasing Office shall have available a form to be completed by all bidders/proponents who desire to apply for the local preference as a local business. The completed form with the information certified by the offeror must be submitted by the bidders/proponents with their bid or proposal to qualify for this preference.

Limitation. No offeror shall receive more than a 5% for resident and 10% for local preference pursuant to this section on any one offer submitted. A bidder may not claim cumulative preferences.

Application. This section shall not apply to any purchase of goods or services when the expenditure of federal and/or state funds designated for a specific purchase is involved and the award requirements of the funding prohibit resident and/or local preference(s). This shall be determined in writing by the department with the grant requirements attached to the Purchasing Office before the bid or request for proposals is issued.

Exception. The City Council at their discretion can approve waiving the Local Preference requirements for specific projects or on a case by case basis if it is the City's best interest to do so.

New Mexico Resident Preference Number (if applicable) _____

4.5 SUBCONTRACTORS

4.5.1 The threshold amount for this project is \$5,000.00. The General Contractor must list all Subcontractors who will perform work in excess of this threshold. Only one Subcontractor may be listed for each category as defined by the Contractor. The Subcontractor Fair Practice Act (13-4-31 through 13-4-43 NMSA 1978) shall apply.

The Bidder shall list the Subcontractors or material suppliers he proposes to use for all trades or items on the Subcontractor Listing Form attached to the Bidding Document. If awarded the contract, the Bidder shall use the firm listed, or himself if "General Contractor" has been listed, unless a request for a change or substitution is approved by the Owner for any reason as outlined herein.

4.5.2 The Owner shall consider any request for a change in the listed forms if the Bidder can furnish evidence of being able to perform the work in a manner more satisfactory and beneficial to both the Owner and the Bidder by not using the listed subcontractor. Satisfactory reasons for a substitution may include the inability to bond or lack of evidence of being able to furnish acceptable materials on schedule. Also, if the Bidder has made a legitimate error in listing a low Subcontractor, a request for substitution, made after the Bid Opening with the Owner's approval, will be considered. The proof of error must be conclusive, based upon the approval of said evidence by the listed Subcontractor or material supplier and/or any other confirmation satisfactory to the Owner.

4.5.3 The Bidder shall not list himself as the supplier or as the Subcontractor for any trade unless he has previously performed work of this type or can prove to the Owner's satisfaction that he actually has or will obtain, fully adequate facilities and plans to perform the work with his own forces.

4.5.4 Omission or non-compliance with the intent of the Subcontractor Listing will be grounds for considering a Bid as non-responsive.

4.5.5 Prior to the award of the Contract, the Owner will notify the Bidder in writing if, after due investigation and written findings of fact, the Owner has reasonable and substantial objection to any person or organization on such list and refuses in writing to accept such person or organization, the Bidder may, at his option, (1) withdraw his Bid, or (2) submit an acceptable substitute Subcontractor with no increase in his Bid Price. In the event of withdrawal under this paragraph, Bid security will not be forfeited.

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- 4.5.6 The successful Bidder shall, within seven (7) calendar days of notification of selection for the award of Contract for the work, submit the following information to the Owner:
- (A) A signed list of the proprietary names and the suppliers of principal items or systems of materials and equipment proposed for the work; and
 - (B) A list signed by all Subcontractors proposed for the principal portions of the work in accordance with the Subcontractors Listing Form submitted with the Bid.
- 4.5.7 The successful Bidder will be required to establish to the satisfaction of the Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the work described in the Bidding Documents.
- 4.5.8 Persons and organizations proposed by the Bidder and to whom the Owner has made no reasonable objection under the provisions of Paragraph 4.5.5 must be used on the work for which they were proposed and shall not be changed except with the written consent of the Owner.
- 4.5.9 No successful Bidder shall be required to employ any Subcontractor, other person, or organization against whom he has reasonable objection.

4.6 SUBMISSION OF BIDS

- 4.6.1 Bids shall be submitted at the time and place indicated in the Invitation for Bid and shall be submitted in a sealed envelope marked with the Project title and name and address of the Bidder, New Mexico License # _____, and accompanied by the Bid Security, Subcontractors Listing, and other required documents listed in the Bid Documents.
- 4.6.2 The envelope shall be addressed to:

Purchasing Officer
City of Santa Fe
2651 Siringo Road, Building H
Santa Fe, NM 87505

The following information shall be provided on the front of the Bid envelope: Invitation for Bid number, date of opening, time of opening, and New Mexico License Number. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BIDS ENCLOSED" on the face thereof.

- 4.6.3 Bids received after the date and time for receipt of Bids will be returned unopened.
- 4.6.4 The Bidder shall assume full responsibility for timely delivery of Bids at the office of the City's Purchasing Division, including those Bids submitted by mail. Hand-delivered Bids shall be submitted at the front desk of the City Purchasing Division and will be clocked in at the time received, which must be prior to the time specified. Bids will then be held for public opening.
- 4.6.5 Oral, telephonic, or telegraphic Bids are invalid and will not receive consideration.

4.7 CORRECTION OR WITHDRAWAL OF BIDS

- 4.7.1 A Bid containing a mistake discovered before Bid Opening may be modified or withdrawn by a Bidder prior to the time set for Bid Opening by delivering written or telegraphic notice to the location designated in the Invitation for Bid as the place where Bids are to be received.
- 4.7.2 Bid security, if required, shall be in an amount sufficient for the Bid as modified or resubmitted in conformance with Section 4.2.

*CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B*

4.7.3 Withdrawn Bids may be resubmitted up to the time and date designated for the receipt of Bids, provided they are then fully in conformance with the Bid Documents.

4.7.4 After Bid Opening, no modifications in Bid prices or other provisions of Bids shall be permitted. A low Bidder alleging a material mistake of fact which makes his Bid non-responsive may be permitted to withdraw his Bid if:

(A) The mistake is clearly evident on the face of the Bid document; or

(B) The Bidder submits evidence which clearly and convincingly demonstrates that a mistake was made.

Any decision by the Owner to permit or deny the withdrawal of a Bid on the basis of a mistake contained therein shall be supported by a determination setting forth the grounds for the decision. If withdrawal is permitted, Bid security will not be forfeited.

4.8 NOTICE OF CONTRACT REQUIREMENTS BINDING ON BIDDER

4.8.1 In submitting this Bid, the Bidder represents that he has familiarized himself with the nature and extent of the following requirements of the Conditions of the Construction Contract (General, Supplementary, and Other Conditions).

(A) Definitions – General Conditions, Sections 1.1 to 16.1;

(B) Supplementary Conditions, Sections 1.0 to 1.17;

(C) Bribes, Gratuities, and Kickbacks – Supplementary Conditions, Section 4.0;

(D) Contract Bond Requirements – Supplementary Conditions, Section 6.0

(E) Equal Employment Opportunity – Labor Standards Provisions and other listed within the Contract Documents.

4.9 REJECTION OR CANCELLATION OF BIDS

4.9.1 An Invitation for Bid may be canceled, or any or all Bids may be rejected in whole or in part, when it is in the best interest of the Owner. A determination containing the reasons shall be made part of the Project file. Bid security for rejected Bids shall be returned to the Bidder.

4.10 PROTESTS

4.10.1 Any Bidder, Offeror, or Contractor who is aggrieved in connection with this procurement (Bid) may protest to the City Purchasing Agent and the Owner in accordance with the requirements. The protest should be made in writing within twenty-four (24) hours after the facts or occurrences giving rise thereto, but in no case more than within fifteen (15) calendar days after the facts or occurrences giving rise thereto.

4.10.2 The complete procedures and requirements regarding protest are available from the Purchasing Office upon request.

4.11 COMPETITIVE SEALED BIDS

4.11.1 Contracts solicited by competitive sealed Bids shall require that the base Bid amount exclude the applicable state gross receipts taxes or applicable local option taxes, but that the contracting agency shall be required to pay the applicable taxes including any increase in the applicable tax which becomes effective after the date the Contract is entered into. The applicable gross receipts taxes or local option taxes shall be shown as a separate amount on each billing or request for payment made under the contract.

5.0 CONSIDERATION OF BIDS

5.1 RECEIPT, OPENING, AND RECORDING

- 5.1.1 Bids received on time will be opened publicly and will be read aloud, and an abstract of the amounts of the Base Bids and Alternates or Bid items, if any, will be made available to the Bidders. Each Bid shall be open to public inspection. The Owner shall have the right to waive any informalities or irregularities in any Bid or Bids received and to accept the Bid or Bids which are in the Owner's best interest.

5.2 BID EVALUATION AND AWARD

- 5.2.1 It is the intent of the Owner to award a Contract to the responsible Bidder submitting the lowest base bid provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The unreasonable failure of a Bidder to promptly supply information in connection with an inquiry with respect to responsibility is grounds for a determination that the Bidder is not a responsible Bidder.
- 5.2.2 Discrepancies in the Bid Form between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

5.3 NOTICE OF AWARD

A written Notice of Award shall be issued by the Owner after review and approval of the Bid and related documents by the Governing Authority, "as defined in the Supplementary Conditions", with reasonable promptness.

5.4 IDENTICAL BIDS

- 5.4.1 When two or more of the Bids submitted are identical in price and are the low Bid, the City Purchasing Agent or the Owner may:
- (A) Award pursuant to the identical low bid provisions of the City Purchasing Manual;
 - (B) Award to a resident local business if the identical low Bids are submitted by a resident or local business and a non-resident business;
 - (C) Award to resident or local manufacturer if the identical low Bids are submitted by a resident or local manufacturer and a resident business;
 - (D) Award by lottery to one of the identical low Bidders; or
 - (E) Reject all Bids and re-solicit Bids or proposals for the required services, construction, or items of tangible personal property.

5.5 CANCELLATION OF AWARD

- 5.5.1 When in the best interest of the public, the Owner may cancel the award of any Contract at any time before the execution of said Contract by all parties without any liability against the Owner.

6.0 POST-BID INFORMATION

6.1 RETURN OF BID SECURITY

All Bid security in the form of checks, except those of the two lowest Bidders, will be returned immediately following the opening and checking of the Bids. The retained Bid security of the unsuccessful of the two lowest Bidders, if in the form of a check, will be returned within fifteen (15) days following the award of contract. The retained Bid security of the successful Bidder, if in the form of a check, will be returned after a satisfactory Contract bond has been furnished and the Contract has

been executed. Bid securities in the form of Bid bonds will be returned only upon the request of the unsuccessful Bidder, but will be released by the City Purchasing Agent after the Notice of Award is sent by the Owner.

6.2 NOTICE TO PROCEED

The Owner will issue a written Notice to Proceed to the Contractor stipulating the date from which Contract Time will be charged and the date Contract Time is to expire, subject to valid modifications of the Contract authorized by Change Order.

6.3 FAILURE TO EXECUTE CONTRACT

Failure to return the signed Contract with acceptable Contract Bonds and Certificate of Insurance within fifteen (15) calendar days after the date of the Notice of Award shall be just cause for the cancellation of the award and the forfeiture of the Bid security, which shall become damages sustained. Award may then be made to the next lowest responsible Bidder, or the work may be re-advertised and constructed under Contract or otherwise, as the Owner may decide.

6.4 CONTRACTOR'S QUALIFICATION STATEMENT

Bidders to whom award of a Contract is under consideration shall submit information and data to prove that their financial resources, production or service facilities, personnel and service reputation and experience are adequate to make satisfactory delivery of the services, construction, or items of personal property described in the Bid Documents and form of Statement of Bidder's Qualifications.

6.5 CONTRACT BONDS REQUIREMENTS

6.5.1 The successful Bidder, where the Contract price exceeds twenty five thousand dollars (\$25,000.00), shall post a one hundred percent (100%) Performance Bond and one hundred percent (100%) Labor and Material Payment Bond. Bonds shall be executed on Performance Bond and Labor and Material Payment Bond forms attached hereto, with amount payable conforming to the terms of the Contract. Surety shall be a company licensed to do business in the State of New Mexico and acceptable to the Owner.

6.6 INSURANCE REQUIREMENTS

6.6.1 The selected Bidder shall purchase and maintain, in a company or companies licensed to do business in the State of New Mexico, Liability and Property Insurance as required by law.

6.6.2 The insurance shall be in limits not less than those stated in the General Conditions, enclosed in the Bid package, or greater if required by law.

6.6.3 The insurance coverage shall include worker's compensation, employers liability, comprehensive general liability (Premises Operations, independent contractual liability, explosion and collapse hazard, underground hazard, personal injury), Comprehensive automobile liability (owned and hired), excess liability (umbrella form), and all-risk builder's risk.

6.6.4 All insurance coverage must be maintained for the entire life of the project. Products and completed operations coverage shall be maintained for a minimum period of one (1) year after final payment.

6.6.5 A valid certificate of insurance must be submitted to the Owner prior to issuance of a Notice-to-Proceed.

7.0 MINIMUM WAGE RATES

7.1 Pursuant to the requirements of any Contract entered into in excess of sixty thousand dollars (\$60,000) for construction, alteration, demolition, or repair, or any combination of these, including painting and decorating of public buildings or public works, Contract may be subject to the minimum wage rate determination issued by the New Mexico Department of Workforce Solutions for this project.

7.2 COMPLIANCE WITH CITY'S MINIMUM WAGE RATE ORDINANCE (LIVING WAGE ORDINANCE)

A copy of the City of Santa Fe Ordinance No. 2003-8, passed by the Santa Fe City Council on February 26, 2003 is attached. The proponent or bidder will be required to submit the proposal or bid such that it complies with the ordinance to the extent applicable. The recommended Contractor will be required to comply with the ordinance to the extent applicable, as well as any subsequent changes to the Ordinance throughout the term of this contract. This project is subject to Determination **SF-16-0292-H**.

8.0 OTHER INSTRUCTIONS TO BIDDERS

8.1 The Owner will make copies of available reports available to any Bidder requesting them. These reports are not guaranteed as to accuracy or completeness, nor are they part of the Bidding Documents. Before submitting his Bid, each Bidder shall, at his own expense, make such additional investigations and tests as the Bidder may deem necessary to determine his Bid for performance of the work in accordance with the time, price, and other terms and conditions of the Bidding Documents.

8.2 It shall be the responsibility of the successful Bidder to secure from the New Mexico Regulations & Licensing Department, Construction Industries Division (CID) such permits or licenses required to carry out the construction. The City will also be responsible for the inspection of all work during construction and to issue a Certificate of Occupancy upon completion and acceptance of the construction by the City of Santa Fe.

9.0 STATE OF NEW MEXICO, DEPARTMENT OF WORKFORCE SOLUTIONS, LABOR RELATIONS, PUBLIC WORKS BUREAU CONTRACTOR AND SUBCONTRACTOR REGISTRATION

9.1 A contractor or subcontractor that submits a bid valued at more than fifty thousand dollars (\$50,000) for a city project that is subject to the Public Works Minimum Wage Act (13-4-10 NMSA 1978) shall be registered with the State of New Mexico, Department of Workforce Solutions, Labor Relations, Public Works Bureau. The registration number shall be provided in the bid submitted for the Contractor in the space provided and for subcontractors with work proposed over \$50,000 on the subcontractor form. After the bid opening, the registration number(s) will be verified by the City and the Bid will be determined to be non-responsive and disqualified if the registration number(s) appear to be not valid and the Contractor does not provide proof of the required registration for itself or its subcontractors with work proposed over fifty thousand dollars (\$50,000). It is the responsibility of the Contractor and the Subcontractor to ensure that the registration is completed prior to the Bid Opening.

**INFORMATION AVAILABLE
TO BIDDERS**

(SECTION 00200)

INFORMATION AVAILABLE TO BIDDERS

**Notice-to-Proceed
Initial Construction Time**

**May 25, 2016
240 Calendar Days**

Contracting services are required for the Hospital Tank Replacement Project. The work is designated as City of Santa Fe Project, Hospital Tank Replacement Project. The work consists of, but is not limited to demolition of an existing 4MG water tank and construction of a new dual compartment 4MG pre-stressed, post-tensioned water storage tank and retaining walls, landscaping, storm drainage and tank controls, in accordance with the drawings, specifications, and other contract documents. The Hospital Tank is located near the intersection of St. Michaels Drive and Old Pecos Trail, in Santa Fe, NM. The 4MG tank site is located under the existing tennis courts west of the intersection of Calle Medico and DVR Way.

EXISTING CONDITIONS

The existing partially buried 4MG concrete tank has been leaking for many years with several failed attempts at repairing or stopping leaks. The tank is adjacent to, and temporarily plumbed to, a recently constructed valve vault that is to remain in-place for use with the new replacement tank. Additionally, the north-east wall of the existing tank is to remain in-place and provide necessary retaining during excavation, demolition and construction of the new tank. All the existing plumbing between the existing tank and new valve vault will be removed during the demolition phase. There is an existing parking lot on the south-west side of the tank that was utilized by the public for the three tennis courts on top of the existing tank. In addition to chain link fencing on top of the tank for the tennis courts there is additional fencing surrounding the existing tank and valve vault for security purposes.

OPERATIONAL TIME FRAME

Substantial completion of all construction operations, except landscaping and seeding, shall be achieved no later than (240) two-hundred and forty calendar days after the written Notice to Proceed, except as extended by valid written Change Order by the Owner. Landscape and seeding operations shall be complete no later than March 30, 2017, except as extended by valid written Change Order by the Owner.

(Instructions: Owner of Record to provide a description of existing site, existing buildings, or other existing conditions if information is necessary and not included elsewhere in the Bidding Documents.)

BID FORMS
(SECTION 00300)

CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B

FIXED UNIT PRICE BID SCHEDULE

Note: Gross receipts tax not included.

Item No.	Item Code	Description	Unit	Est. Qty.	Unit Price	Total Price
General						
1	SMA	Mobilization	LS	1		
2	DOT-603	SWPPP	LS	1		
3	SMA	Traffic Control	LS	1		
4	SMA	Geotechnical Under Removed Tank	LS	1		
5	SMA	Testing Allowance	Allow.	1	\$ 20,000.00	\$ 20,000.00
6	SMA	Construction Staking	LS	1		
7	SMA	NMDOT Temporary Driveway Access Permit	LS	1		
8	SMA	Tank Disinfection	LS	1		
Demolition						
9	SMA	Existing Tank Demolition	LS	1		
10	SMA	Tank Excavation	CY	18,500		
11	SMA	Remove / Salvage Chain Link Fence	LF	1,172		
12	SMA	Remove Existing Valve Vault and Manhole	LS	1		
13	SMA	Remove Overflow and Inlet/Outlet Line	LF	115		
14	SMA	Remove / Salvage Riprap	CY	36		
15	SMA	Remove Existing Barbed Wire Fence	LF	537		
16	SMA	Remove Existing Curb & Gutter	LF	1,052		
17	SMA	Remove Existing Pavement	SY	524		
18	SMA	Remove Existing Light Fixtures	EA	1		
19	SMA	Remove Existing Conduit & Electrical Wires	LF	125		
20	SMA	Remove Existing Electrical Metering Pedestal	EA	1		
21	SMA	Remove Existing 2" Waterline	LF	246		
22	SMA	Remove Perforated Tank Foundation Under Drains	LF	800		
23	SMA	Remove / Salvage Existing Tank Level Sensor	EA	1		
Tank Construction						
24	SMA	Construction Shoring (Soil Nailing)	LS	1		
25	SMA	New 4 Million Gallon Concrete Tank	LS	1		
26	SMA	Tank Stairs	LS	2		
27	SMA	Tank Access Hatches (above stairs & inlet/outlet)	LS	2		
28	SMA	Tank Access Hatches (above overflow)	LS	2		
29	SMA	Tank Backfill	CY	18,149		
30	SMA	4" Tank Foundation Drain Pipe	LF	575		

CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B

Item No.	Item Code	Description	Unit	Est. Qty.	Unit Price	Total Price
31	SMA	Retaining Walls	SF	4,669		
32	SMA	3/4" Crushed Rock Type B (Class 1 crushed stone)	CY	451		
33	SMA	Geogrid	SY	836		
34	DOT-570	24" Storm Drain Culvert Pipe	LF	320		
35	DOT-623	5' x 5' Median Drop Inlet & Storm Drain Manhole	LS	1		
36	DOT-570	24" Culvert Pipe End Section	EA	1		
37	DOT-602	Wire Enclosed Riprap (Class A)	SY	110		
38	SMA	Inlet / Outlet Structure	EA	2		
39	SMA	Overflow Structure	EA	2		
40	SMA	20" Welded Steel Pipe	LF	30		
41	SMA	24" Welded Steel Pipe	LF	180		
42	SMA	24" Ductile Iron Pipe (DIP)	LF	250		
43	SMA	20" Ductile Iron Pipe (DIP)	LF	160		
44	SMA	24" DI Restrained Coupling	EA	2		
45	SMA	20" DI Restrained Coupling	EA	1		
46	SMA	24" DI 90° Bend	EA	2		
47	SMA	20" DI 90° Bend	EA	2		
48	SMA	24" DI 45° Bend	EA	4		
49	SMA	24" DI Restrained Mechanical Joint	EA	2		
50	SMA	20" DI Restrained Mechanical Joint	EA	1		
51	SMA	24" to 20" DI Reducer	EA	1		
52	SMA	2" HDPE Still Pipe	LF	30		
53	SMA	Remove / Replace Chain Link Fence Around Vault	LS	1		
54	SMA	Chain Link Fence (around Tank Overflow Outlet)	LF	32		
55	SMA	1" Dia Ultra High Molecular PE Tubing	LF	195		
56	SMA	Water Line Service Tap	LF	1		
57	SMA	Water Meter Assembly CIP	EA	1		
58	DOT-432	4" Hot Mix Asphalt SP-111 (trench patch)	SY	77		
59	SMA	Frost Free Yard Hydrant Assembly CIP	EA	1		
Valve Vault Plumbing						
60	SMA	Remove / Salvage Existing 8" Butterfly Valve	EA	1		
61	SMA	Remove / Salvage Existing 24" Butterfly Valve	EA	1		
62	SMA	Remove Existing 24" FCA w/ Restraining Rods	EA	1		

CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B

Item No.	Item Code	Description	Unit	Est. Qty.	Unit Price	Total Price
63	SMA	Remove / Salvage Existing Pipe Support	EA	1		
64	SMA	Remove Existing 24" Plumbing Stub-out through Wall	EA	1		
65	SMA	Patch Concrete Wall & Cover with 60 mil Waterproofing	LS	1		
66	SMA	8" DI Pipe	LF	28		
67	SMA	24" DI Pipe	LF	12		
68	SMA	24"x24"x8" DI MJ Tee	EA	1		
69	SMA	24"x24"x6" DI MJ Tee	EA	1		
70	SMA	24"x24"x24" DI MJ Tee	EA	1		
71	SMA	24" DIP Blind Flange	EA	1		
72	SMA	8" DI 90° MJ Bend	EA	3		
73	SMA	8" DI Butterfly Valve w/ Electronic Actuator	EA	2		
74	SMA	24" DI Butterfly Valve w/ Electronic Actuator	EA	2		
75	SMA	Pipe Supports	EA	4		
76	SMA	Pipe Nipple for Pressure Transmitter	EA	2		
Site Grading & Landscaping						
77	SMA	Final Site Grading	LS	1		
78	SMA	Juniperus Monosperma / One-seed Juniper	EA	57		
79	SMA	Artemisia Tridentata / Tall Western Sage	EA	28		
80	SMA	Atriplex Canescens / Four Wing Saltbrush	EA	12		
81	SMA	Cercocarpus Ledifolius / Curlleaf Mountain Mahogany	EA	14		
82	SMA	Chamaebatiaria Millefolium / Fembush	EA	24		
83	SMA	Ericameria Nauseosa spp. / Chamisa	EA	21		
84	SMA	Fallugia Paradoxa / Apache Plume	EA	16		
85	SMA	Holodiscus Dumosus / Rock Spirea	EA	15		
86	SMA	Krasheninikovia Lanata / Winterfat	EA	6		
87	SMA	Rhus Trilobata / Three-Leaf Sumac	EA	20		
88	SMA	Ribes Aureum / Yellow Flowering Currant	EA	11		
89	SMA	Shepherdia Argentea / Silver Buffaloberry	EA	6		
90	SMA	Yucca Baccata / Datil Yucca	EA	7		
91	SMA	2' x 3' x 2.5' Boulders	EA	20		
92	SMA	Irrigation Shut-off and Drain Valve	EA	2		
93	SMA	FEBCO 860U 3/4" reduced pressure/ backflow asmbly	EA	1		
94	SMA	Controller, Rainbird ESP-4M and RSD Rain Sensor	EA	1		

*CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B*

Item No.	Item Code	Description	Unit	Est. Qty.	Unit Price	Total Price
95	SMA	Control Valve, Rainbird LFV-100 & RBY100MPTX Filter	EA	3		
96	SMA	3/4" PE Irrigation Tubing	LF	3,000		
97	SMA	3" Sch. 40 PVC Sleeve (under parking area)	LF	30		
98	SMA	Rainbird XB-10C 1 GPH Emitter w/ stake and bug cap	EA	252		
99	SMA	Rainbird PC-05 5 GPH Emitter w/ stake and bug cap	EA	99		
Access Road & Parking lot						
100	DOT-609	Remove C&G, Replace with Type E Laydown Curb	LF	287		
101	DOT-609	Type B Barrier Curb	LF	125		
102	DOT-608	5' Concrete Side Walk	SY	287		
103	DOT-608	ADA Ramp	EA	2		
104	DOT-203	Excavation	CY	2,148		
105	DOT-203	Fill (Embankment)	CY	2,138		
106	DOT-207	6" Compacted Subgrade	SY	1,660		
107	DOT-303	4" Base Course	CY	172		
108	DOT-423	4" Hot Mix Asphalt SP-111	SY	432		
109	DOT-570	36" CMP	LF	130		
110	DOT-570	36" End Section	EA	2		
111	DOT-603	1"-3" Coarse Aggregate for Off Site Tracking Prevention	LS	1		
112	DOT-607	14'-0" Tubular Ranch Gate	EA	2		
113	SMA	14'-0" Road Closure Gate	EA	2		
114	SMA	Relocation of Electrical Box	EA	1		
115	DOT-607	Barbed Wire Fence	LF	50		
116	SMA	DOT Access Permit	LS	1		
117	DOT-608	W-Beam Guardrail	LF	255		
Access Road Intersection Removal						
118	DOT-618	Traffic Control	LS	1		
119	DOT-601	Remove Existing Curb & Gutter	LF	287		
120	DOT-601	Removal Existing Pavement	SY	260		
121	DOT-601	Remove Existing 5' Concrete Sidewalk	SY	287		
122	DOT-609	Type B Barrier Curb	LF	287		
123	DOT-608	5' Concrete Sidewalk	SY	287		
124	DOT-303	4" Base Course	CY	29		
125	DOT-208	Re-grade Site	LS	1		

CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B

Item No.	Item Code	Description	Unit	Est. Qty.	Unit Price	Total Price
126	DOT-832	Re-seeding	LS	1		
Tank Controls						
127	SMA	Design / Build VCP & RTU	Allow.	1	\$ 65,000.00	\$ 65,000.00
128	SMA	SCADA, PLC Programming	Allow.	1	\$ 15,000.00	\$ 15,000.00
129	SMA	3/4" PVC Coated RGC	LF	1,315		
130	SMA	1" PVC Coated RGC	LF	817		
131	SMA	2" PVC Coated RGC	LF	31		
132	SMA	#12 XHHW-2	LF	756		
133	SMA	#14 XHHW-2	LF	7,108		
134	SMA	6 Fiber Cable	LF	1,360		
135	SMA	Belden 9342	LF	1,800		
136	SMA	Pull Box, SS NEMA-4	LF	4		
137	SMA	Junction Box, FS PVC coated	EA	33		
138	SMA	Connect Irrigation Control Panel	EA	1		
139	SMA	20A 1p CB in Existing Panel	EA	4		
140	SMA	Connect Instrument	EA	16		
141	SMA	Connect Motorized Valve	EA	4		
142	SMA	Terminate at VCP	EA	89		
143	SMA	Trench and Backfill	LF	700		
144	SMA	Coredrill Valve Vault	EA	3		
145	SMA	Patch	EA	3		
146	SMA	Removals	LS	1		
Tools and Spare Parts (as defined in Exhibit VI of the RFB)						
147	N/A	Tools	LS	1		
148	N/A	Spare Parts	LS	1		

Sub-Total: _____

10% Contingency: _____

Total Base Bid (excluding tax): _____

CITY OF SANTA FE, NEW MEXICO
BID FORM (SECTION 00310)

**LUMP SUM PRICE OR
UNIT PRICE BID**

Section 00310

Invitation No: '16/31/B

Project: City of Santa Fe Water Division
Hospital Tank Replacement Project

Project No: CIP 3039C

Date:

This Bid is submitted to:

CITY OF SANTA FE
PURCHASING DIRECTOR
2651 SIRINGO ROAD, BUILDING H
SANTA FE, NEW MEXICO 87505

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with the Owner in the form included in the Bidding Documents to perform and furnish all work as specified or indicated in the Bidding Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
2. The Bidder accepts all of the terms and conditions of the Invitation for Bid and Instructions to Bidders, including, without limitation, those dealing with the disposition of Bid security and other Bidding Documents. This Bid will remain subject to acceptance for sixty (60) days after the day of Bid opening. The Bidder shall sign and submit the Agreement between Owner and Contractor (hereinafter called Agreement) with the bonds and other documents required by the Bidding Requirements within fifteen (15) calendar days after the date of the Owner's Notice to Award.
3. In submitting this Bid, the Bidder represents, as more fully set forth in the Agreement, that:
 - A. The Bidder has examined copies of all the Bidding Documents and of the following Addenda (receipt of all of which is hereby acknowledged):

No. _____	Date _____	No. _____	Date _____
No. _____	Date _____	No. _____	Date _____
No. _____	Date _____	No. _____	Date _____
 - B. The Bidder has familiarized himself with the nature and extent of the Bidding Documents, work, site, locality, and all local conditions, laws, and regulations that in any manner may affect cost, progress, performance, or furnishing of the work.
 - C. The Bidder has carefully studied all reports and drawings of subsurface conditions which are identified in the Information Available to Bidders and accepts the determination set forth in the Information Available to Bidders of the extent of the technical data contained in such reports and drawings upon which the Bidder is entitled to rely.
 - D. The Bidder has correlated the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Bidding Documents.
 - E. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is submitted in conformity with any agreement or rules of any group, association, organization, or corporations. The Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; the Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and the Bidder has not sought by collusion to obtain for himself any advantage over any other Bidder or over the Owner. It is understood that the Owner reserves the right to reject any or all Bids and to waive any technical irregularities in the bidding.

*CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B*

F. It is the intent of the City to award a Contract to the responsible Bidder submitting the lowest total base bid, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents.

4. Contracting services are required for the Hospital Tank Replacement Project. The work is designated as City of Santa Fe Project, Hospital Tank Replacement Project. The work consists of, but is not limited to demolition of an existing 4MG water tank and construction of a new dual compartment 4MG pre-stressed, post-tensioned water storage tank and retaining walls, landscaping, storm drainage and tank controls, in accordance with the drawings, specifications, and other contract documents. The Hospital Tank is located near the intersection of St. Michaels Drive and Old Pecos Trail, in Santa Fe, NM. The 4MG tank site is located under the existing tennis courts west of the intersection of Calle Medico and DVR Way.

Contractor shall be responsible for verifications of all items, measurements and dimensions for bidding.

Contractor shall be responsible for all permits, fees, and State and City inspections associated with the construction.

(All prices listed below are for a complete installed product and include all labor, materials, equipment, bonding, insurance, etc.)

The Bidder shall complete the work for the following prices:

Base Bid:	_____	(\$ _____)
	use words	use numbers
Gross Receipts Tax: (8.3125%)	_____	(\$ _____)
	use words	use numbers
Total Base Bid, Plus Tax:	_____	(\$ _____)
	use words	use numbers

TWO COMPLETE COPIES OF THE BID SUBMITTAL ARE REQUIRED

5. The Bidder agrees that:
- A. The work to be performed under the Contract shall be commenced not later than ten (10) consecutive calendar days after the date of written Notice to Proceed, and that completion shall be achieved not later than thirty (30) calendar days after the date of written "Notice to Proceed", except as hereafter extended by valid written Change Order by the Owner.
 - B. Should the Contractor neglect, refuse, or otherwise fail to complete the work within the time specified, the Contractor agrees, in partial consideration for the award of this Contract, to pay the Owner the amount of One-Thousand Dollars (\$1,000.00) per consecutive calendar day that passes until the work is complete, not as a penalty, but as liquidated damages for such breach of the Contract.
 - C. The above process shall include all labor, profit, insurance, taxes, etc., to cover the finished work of the several kinds called for. Changes shall be processed in accordance with the Contract Documents.
 - D. It is understood that the Owner reserves the right to reject any or all Bids and to waive any technical irregularities in the bidding.

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6. The following documents are attached to and made a condition of this Bid:

- A. Bid Bond
- B. Non-Collusion Affidavit of Prime Bidder
- C. Submittal, acknowledgement of Addenda, if any
- D. Properly executed Bid Form
- E. Certification of Equal Employment Opportunity
- F. Certification of Non-segregated Facilities
- G. Subcontractor's Listing (as applicable)
- H. Bidder's Qualifications Form

If any of the above requirements have not been met, the bid will be considered to be non-responsive.

7. The terms used in this Bid and the Bidding and Contract Documents are defined in the Conditions of the Construction Contract (General, Supplementary, and Other Conditions)

8. If the Bidder is:

A. AN INDIVIDUAL:

By: _____
(Individual's Name)

doing business as: _____

Business address: _____

Telephone: _____

(SEAL)

B. A PARTNERSHIP:

By: _____
(Firm Name)

_____ (General Partner)

Business address: _____

Telephone: _____

(SEAL)

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C. A CORPORATION

By: _____
(Corporation Name)

(State of Incorporation)

By: _____
(Name of person authorized to sign)

(Title)

If a New Mexico Corporation: _____
Certificate of Incorporation No.

If a Foreign Corporation: _____
Certificate of Authority No.

Attest: _____
(Secretary)

Business address: _____

Telephone: _____

D. A JOINT VENTURE

By: _____
(Name)

Address: _____

By: _____
(Name)

Address: _____

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

Bidder must fill in the following: (If none, write none)

NM License No.: _____ Classification: _____

NM Taxation and Revenue CRS No.: _____

City of Santa Fe Business Registration No.: _____

NM Resident Preference Number (if applicable): _____

TWO COMPLETE COPIES OF THE BID SUBMITTAL ARE REQUIRED

SUPPLEMENT TO
BID FORMS

(SECTION 00400)

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PENAL SUM FORM

BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

BID

Bid Due Date:

Description (*Project Name— Include Location*):

BOND

Bond Number:

Date:

Penal sum _____ \$ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER _____ (Seal) SURETY _____ (Seal)
Bidder's Name and Corporate Seal Surety's Name and Corporate Seal

By: _____ By: _____
Signature Signature (Attach Power of Attorney)

Print Name Print Name

Title Title

Attest: _____ Attest: _____
Signature Signature

Title Title

*Note: Addresses are to be used for giving any required notice.
Provide execution by any additional parties, such as joint venturers, if necessary.*

**INSTRUCTIONS RELATING TO
LOCAL PREFERENCE CERTIFICATION FORM**

1. **All information must be provided.** A 10% local preference may be available for this procurement. To qualify for this preference, an offeror **must** complete and submit **the local preference certification form with its offer**. If an offer is received without the form attached, completed, notarized, and signed or if the form is received without the required information, the preference will not be applied. **The local preference form or a corrected form will not be accepted after the deadline for receipt of bids or proposals.**
2. **Local Preference precedence over State Preference:** The Local Preference takes precedence over the State Resident Preference and only one such preference will be applied to any one bid or proposal. If it is determined that the local preference applies to one or more offerors in any solicitation, the State Resident Preference will not be applied to any offers.
3. **Principal Office and location must be stated:** To qualify for the local preference, the principal place of business of the enterprise must be physically located within the Santa Fe County Geographic Boundaries. The business location inserted on the Form must be a physical location, street address or such. **DO NOT** use a post office box or other postal address. Principal place of business must have been established no less than six months preceding application for certification.
4. **Subcontractors do not qualify:** Only the business, or if joint venture, one of the parties of the joint venture, which will actually be performing the services or providing the goods solicited by this request and will be responsible under any resulting contract will qualify for this preference. A subcontractor may not qualify on behalf of a prime contractor.
5. **Definition:** The following definition applies to this preference.

A local business is an entity with its Principal office and place of business located in Santa Fe County. A Principal office is defined as: The main or home office of the business as identified in tax returns, business licenses and other official business documents. A Principal office is the primary location where the business conducts its daily operations, for the general public, if applicable. A temporary location or movable property, or one that is established to oversee a City of Santa Fe project does not qualify as a Principal office.

Additional Documentation: If requested a business will be required to provide, within 3 working days of the request, documentation to substantiate the information provided on the form. Any business which must be registered under state law must be able to show that it is a business entity in good standing if so requested.

LOCAL PREFERENCE CERTIFICATION FORM

RFP/RFB NO: _____

Business Name: _____

Principal Office: _____
Street Address City State Zip Code

City of Santa Fe Business License # _____ (Attach Copy to this Form)

Date Principal Office was established: _____ (Established date must be six months before date of Publication of this RFP or RFB).

CERTIFICATION

I hereby certify that the business set out above is the principal Offeror submitting this offer or is one of the principal Offerors jointly submitting this offer (e.g., as a partnership, joint venture). I hereby certify that the information which I have provided on this Form is true and correct, that I am authorized to sign on behalf of the business set out above and, if requested by the City of Santa Fe, will provide within 3 working days of receipt of notice, the necessary documents to substantiate the information provided on this Form.

Signature of Authorized Individual: _____

Printed Name: _____

Title: _____ Date: _____

Subscribed and sworn before me by _____ this _____, day of _____

My commission expires _____

Notary Public

SEAL

YOU MUST RETURN THIS FORM WITH YOUR OFFER

*CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
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THIS FORM MUST BE
ATTACHED TO BOND

BID SECURITY FORM

Section 00420

Review and Approval: This Bond has been executed by a Surety named in the current list of “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies,” as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, United States Treasury Department.

Approved:

DATE:

Owner’s Representative or Governing Authority

STATEMENT OF BIDDER'S QUALIFICATIONS

SUPPLEMENTS TO BID FORMS
Section 00440

Instructions: All questions must be answered, and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information desired.

1. Name of Bidder: _____
2. Permanent main office address: _____

3. When organized: _____
4. If a corporation, where incorporated: _____
5. How many years have you been engaged in the contracting business under your present firm or trade name? _____
6. Contracts on hand (schedule these, showing amount of each Contract and the appropriate anticipated dates of completion): _____

7. General character of work performed by your company: _____

8. Have you ever failed to complete any work awarded to you? _____
If so, where and why? _____

9. Have you ever defaulted on a contract? _____
If so, where and why? _____
10. List the more important projects recently completed by your company, stating the approximate cost for each, and the month and year completed:

11. List your major equipment available for this contract:

12. Describe your organization's experience in construction work similar in importance to this project: _____

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13. Background and experience of the principal members of your organization, including the officers: _____

14. Credit Available: _____

15. Give bank reference: _____

16. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the Owner? ___

17. The undersigned authorizes and requests any person, firm, or corporation to furnish any information requested by the Owner in verification of the recitals comprising this Statement of Bidder Qualifications

Dated at _____

this _____ day of _____, 20____.

Bidder

By: _____

Title: _____

STATE OF NEW MEXICO)
)ss
COUNTY OF)

_____, being duly sworn, deposes and says that he is _____ of

(Name of Organization)

and that the answers to the foregoing questions and all statements therein contained are true and correct.

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

Notary Public

My Commission expires: _____

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

Section 00450

STATE OF _____)
)ss.
COUNTY OF _____)

_____, being first duly sworn, deposes and says that:

- 1) He is the _____ of _____, the Bidder that has submitted and attached Bid;
- 2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;
- 3) Such Bid is genuine and is not a collusive or sham Bid;
- 4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees, or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with the Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract or has in any manner directly or indirectly, sought by agreement or collusion or communications or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the City of Santa Fe, or any person interested in the proposed Contract; and
- 5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

By: _____

Title: _____

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

Notary Public

My Commission expires: _____

CERTIFICATION OF NONSEGREGATED FACILITIES

Section 00460

(Applicable to construction contracts and related subcontracts exceeding \$10,000 which are not exempt from the Equal Opportunity Clause.)

The construction contractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The construction contractor certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract. As used in this certification, the term "segregated facilities" means: any waiting room, work areas, rest rooms and wash rooms, restaurants and other eating areas; time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin because of habit, local custom, or otherwise. The construction contractor agrees that (except where he has obtained identical certifications from proposed Subcontractors for specific time periods) he will obtain identical certifications from proposed SUBCONTRACTORS prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provision of the Equal Opportunity Clause and that he will retain such certifications in his files.

By: _____

Title: _____

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

Notary Public

My Commission expires: _____

**CERTIFICATION OF BIDDER REGARDING
EQUAL EMPLOYMENT OPPORTUNITY**

Section 00470

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246 (30 F.R. 12319-25). The implementing rules and regulations provide that any Bidder or perspective contractor, or any of their proposed Subcontractors, shall state as an initial part of the Bid or negotiations of the Contract whether he has participated in any previous Contract or subcontract subject to the equal opportunity clause; and, if so, whether he has filed all compliance reports due under applicable instructions.

Where the certification indicates that the Bidder has not filed a compliance report due under applicable instructions, such Bidder shall be required to submit a compliance report within seven calendar days after Bid opening. No Contract shall be awarded unless such report is submitted.

CERTIFICATION BY BIDDER

Bidder's Name: _____

Address: _____

1. Bidder has participated in a previous Contract or subcontract subject to the Equal Opportunity Clause.
_____ Yes _____ No

2. Compliance reports were required to be filed in connection with such Contract or subcontract.
_____ Yes _____ No

Certification - The information above is true and complete to the best of my knowledge and belief.

Name and Title of Signer (please type)

Signature

Date

AGREEMENT FORMS

(SECTION 00500)

REQUEST FOR BIDS ONLY

CITY OF SANTA FE
CAPITAL IMPROVEMENTS PROGRAM

AGREEMENT BETWEEN OWNER
AND CONTRACTOR

This Agreement is entered into this ____ day of _____, 2016, by and between the CITY OF SANTA FE, herein known as the Owner, and _____, herein known as the Contractor.

For the following:

PROJECT: Hospital Tank Replacement Project
PROJECT NO.:

RECITALS

WHEREAS, the Owner, through its Governing Body, is authorized to enter into a Construction Contract for the project; and

WHEREAS, the Owner has let this Contract according to the established State and Local Purchasing procedures for contracts of the type and amount let; and

WHEREAS, construction of this Project was approved by the Governing Body of the City of Santa Fe at its meeting of _____.

The OWNER and the CONTRACTOR agree:

ARTICLE 1
THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, the Conditions of the Contract (General, Supplementary, and other Conditions), the Specifications, all Addenda issued prior to and all Modifications issued after execution of this Agreement. These documents form the Contract, and all are as fully a part of the Contract as if attached to this Agreement or repeated herein.

ARTICLE 2
THE WORK

The Contractor shall perform the work designated as City of Santa Fe – Hospital Tank Replacement Project. The work consist of, but is not limited to demolition of an existing 4 million gallon water tank and construction of a new dual compartment 4MG pre-stressed, post-tensioned water storage tank and retaining walls, landscaping, storm drainage and tank controls, in accordance with the drawings, specifications and other

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contract documents. The Hospital Tank is located near the intersection of St. Michaels Drive and Old Pecos Trail in Santa Fe, NM. The 4MG tank site is located under the existing tennis courts west of the intersection of Call Medico and DVR Way.

The work also consists of but not limited to furnishing all equipment, labor and materials as required by the City of Santa Fe, New Mexico.

Contractor shall be responsible for verifications of all measurements and dimensions for bidding on each subsequent Work Order.

Contractor shall provide and keep at the work site, a complete "as-built" record set of drawings that shall be corrected daily and shall show every change from the original approved drawings and specifications. These changes shall be forwarded to City periodically. The drawings shall reflect exact and actual "as-built" conditions of construction, installation, and erection as it progresses. Where drawings are not adequate to show "as-built" conditions, Contractor shall prepare sketches which delineate the necessary "as-built" information. City shall furnish two (2) sets of all paper "blue-line" print "approved" drawings for use in accomplishing specified mark-up. Final "as-built" drawings shall be delivered to City by Contractor upon completion of the work.

The Contractor shall be responsible for maintaining traffic control at the site in conformance with the Manual on Uniform Traffic Control Devices.

Contractor shall be responsible for all permits, fees, and State and City inspections associated with the construction.

ARTICLE 3
TIME OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

The work to be performed under this Contract may commence no later than ten (10) consecutive calendar days after the date of written Notice to Proceed. Substantial completion of all construction operations except landscaping and seeding shall be achieved no later than (240) two-hundred and forty calendar days after the written Notice to Proceed, except as hereafter extended by valid written Change Order by the Owner. Landscape and Seeding operations shall be complete no later than March 2017 except as hereafter extended by valid written Change Order by Owner. This Agreement may be terminated by the City upon ten (10) days written notice to the Contractor.

ARTICLE 4
CONTRACT SUM

The Owner shall pay the Contractor in current funds for the performance of the work, subject to additions and deductions by Change Order as provided in the Contract Documents, the Contract Sum of _____ (\$_____) inclusive of NMGR. The Contractor agrees that if it ever receives a partial or total refund of Gross Receipts Taxes (GRT) it will transmit the refund to the City immediately. The GRT amount of _____ (\$_____) is [\$8.3125]% of Base Bid and is being paid by the Owner to the Contractor so that the Contractor can pay the GRT to the New Mexico Taxation and Revenue

Department (NMTRD). It is not compensation for services rendered. The Contractor agrees to timely remit this GRT to NMTRD.

The Contract Sum is determined as follows:

Base Bid	\$
Gross Receipts Tax	\$
TOTAL	\$

ARTICLE 5
PROGRESS PAYMENTS

Based upon Application for Payment submitted to the Owner by the Contractor and Certificates for Payment issued by the Owner, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided in the Contract documents for the period ending the last day of the month as follows:

Not later than twenty-one (21) days following the end of the period covered by the Application for Payment, ninety five percent (95%) of the portion of the Contract Sum properly allocable to labor, materials, and equipment incorporated in the work and ninety five percent (95%) of the portion of the Contract Sum properly allocable to materials and equipment suitably stored at the site or some other location agreed upon in writing for the period covered by the Application for Payment, less the aggregate of previous payments made by the Owner; and upon substantial completion of the entire work, a sum sufficient to increase the total payments to ninety eight percent (98%) of the Contract Sum, less such amounts as the Owner shall determine for all incomplete work and unsettled claims as provided in the Contract documents.

ARTICLE 6
LIQUIDATED DAMAGES

Should the Contractor neglect, refuse, or otherwise fail to complete the work within the Contract Time or any extension in the Contract thereof, the Contractor agrees to pay to the Owner the amount of One Thousand dollars (\$1,000) per consecutive calendar days of delay until the work is completed and accepted or until voided pursuant to the provisions of the General Conditions of the Contract, not as a penalty, but as liquidated damages for such breach of the Contract.

ARTICLE 7
FINAL PAYMENT

Final payment, constituting the entire unpaid balance of the Contract Sum, shall be paid by the Owner to the Contractor within twenty-one (21) calendar days after all deficiencies to the Contract document that were noted during the Substantial Completion Inspection and listed on the attachment to the Certificate of Substantial Completion have been corrected, and provided the Contract has been fully performed and a final Certificate for Payment has been issued by the Owner. In addition, the Contractor shall provide to the Owner a certified statement of Release of Lien (AIA Document G706A or approved form), Consent of Surety, Warranty from

Prime Contractor, Warranties from Suppliers and Manufacturers, training sessions, equipment/operating manuals, and as-built drawings.

ARTICLE 8
SCHEDULE

The Contractor shall, within five (5) days after the effective date of Notice to Proceed, prepare and submit five (5) copies of a progress schedule covering project operations for the (240) two hundred and forty calendar day contract period including landscape and seeding operations. This progress schedule shall be of the type generally referred to as a Critical Path Method (CPM), Critical Path Schedule (CPS), and Critical Path Analysis (CPA), and other similar designations. The CPM shall be used to control the timing and sequences of the project. All work shall be done in accordance with the CPM Planning and Scheduling. A written statement of explanation shall be submitted with the progress schedule. All costs incurred by the contractor to implement the CPM shall be borne by the Contractor, and are part of their Contract (See Article 4.10, Progress Schedules of Section 00700, General Conditions of the Contract).

ARTICLE 9
GENERAL AND SPECIAL PROVISIONS

- 9.1 This Agreement shall be governed exclusively by the provisions hereof and by the laws of the State of New Mexico as the same from time to time exist.
- 9.2 Terms used in this Agreement which are defined in the Conditions of the Contract shall have the meanings designated in those Conditions.
- 9.3 The Contractor shall defend, indemnify, and hold harmless the Owner against any and all injury, loss, or damage, including, without limitation, costs of defense, court costs and attorney's fees, arising out of the acts, errors, or omissions of the Contractor.
- 9.4 An enumeration of the Contractor's Liability Insurance requirements appears in the General Conditions of the Contract for construction. Insurance requirements are also described in the Instructions to the Bidder section of the Project Manual. Contractor shall maintain adequate insurance in at least the aggregate maximum amounts which the Owner could be liable under the New Mexico Tort Claims Act and shall provide proof of such insurance coverage to the City. It is the sole responsibility of the Contractor to be in compliance with the law.
- 9.5 This Agreement shall not become effective until: (1) approved by the Governing Body; and (2) signed by all parties required to sign this Agreement.
- 9.6 The Contractor and the Contractor's agents and employees are independent contractors performing professional and technical services for the Owner and are not employees of the Owner. The Contractor and the Contractor's agents and employees shall not accrue leave, retirement, insurance, bonding, use of Owner's vehicles, or any other benefits afforded to employees of the Owner as a result of this Agreement.

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- 9.7 The Contractor shall not subcontract any portion of the services to be performed under this Agreement without prior written approval of the Owner.
- 9.8 The Contractor shall maintain detailed time records which indicate the date, time and nature of services rendered. These records shall be subject to inspection by the Owner, the Department of Finance and Administration and the State Auditor. The Owner shall have the right to audit billings both before and after payment; payment under this Agreement shall not foreclose the right of the Owner to recover excessive illegal payments.
- 9.9 The terms of this Agreement are contingent upon sufficient appropriations and authorization being made by the Owner for the performance of this Agreement. If sufficient appropriations and authorization are not made by the Owner, this Agreement shall terminate upon written notice being given by the Owner to the Contractor. The Owner's decision as to whether sufficient appropriations are available shall be accepted by the Contractor and shall be final.
- 9.10 The Contractor warrants that the Contractor presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance or services required under this Agreement.
- 9.11 The Contractor hereby warrants that the Contractor is in compliance with the Americans with Disabilities Act, 29 CFR 1630.
- 9.12 The Contractor, upon final payment of the amounts due under this Agreement, releases the Owner, the Owner's officers and employees, and the City of Santa Fe from all liabilities and obligations arising from or under this Agreement, including, without limitation, all damages, losses, costs, liability, and expenses, including, without limitation, attorney's fees and costs of litigation that the Contractor may have.
- 9.13 The Contractor agrees not to purport to bind the Owner to any obligation not assumed herein by the Owner, unless the Contractor has express written authority to do so, and then only within the strict limits of that authority.
- 9.14 Notices. Any and all notices provided for hereunder shall be in writing and shall be deemed delivered, given and received when (i) personally delivered, or (ii) 5 days after the same are deposited in the United States mail, postage prepaid, registered or certified mail, return receipt requested, addressed to the applicable party at the address indicated below for such party or at such other address as may be designated by either party in a written note to the other party.

OWNER

City of Santa Fe
Sangre De Cristo Water Division
P.O. Box 909
Santa Fe, New Mexico 87504-0909

CONTRACTOR

- 9.15 **Gender, Singular/Plural.** Words of any gender used in this Agreement shall be held and construed to include any other gender, and words in the singular number shall be held to include the plural, unless the context otherwise requires.
- 9.16 **Captions and Section Headings.** The captions and section headings contained in this Agreement are for convenience of reference only, and in no way limit, define, or enlarge the terms, scope and conditions of this Agreement.
- 9.17 This document shall be executed in no less than five (5) counterparts, each of which shall be deemed an original.
- 9.18 **Certificates and Documents Incorporated.** All certificates and documentation required by the provisions of the Agreement shall be attached to this Agreement at the time of execution, and are hereby incorporated by reference as though set forth in full in this Agreement to the extent they are consistent with its conditions and terms.
- 9.19 **Separability.** If any clause or provision of this Agreement is illegal, invalid or unenforceable under present or future laws effective during the term of this Agreement, then and in that event, it is the intention of the parties hereto that the remainder of this Agreement shall not be affected thereby.
- 9.20 **Waiver.** No provision of this Agreement shall be deemed to have been waived by either party unless such waiver be in writing signed by the party making the waiver and addressed to the other party; nor shall any custom or practice which may evolve between the parties in the administration of the terms hereof be construed to waive or lessen the right of either party to insist upon the performance by the other party in strict accordance with the terms hereof. Further, the waiver by any party of breach by the other party of any term, covenant, or condition hereof shall not operate as a waiver of any subsequent breach of the same or any other term, covenant, or condition thereof.
- 9.21 **Entire Agreement.** This Agreement represents the entire Contract between the parties and except as otherwise provided herein, may not be amended, changed, modified, or altered without the written consent of the parties hereto. This Agreement incorporates all of the conditions, agreements, and understandings between the parties concerning the subject matter of this Contract, and all such conditions, understandings, and agreements have been merged into this written Agreement. No prior conditions, agreement, or understanding, verbal or otherwise, of the parties or their agents shall be valid or enforceable unless embodied in this written Agreement.
- 9.22 **Interchangeable Terms.** For purposes of all provisions within this Agreement and all attachments hereto, the terms "Agreement" and "Contract" shall have the same meaning and shall be interchangeable.
- 9.23 **Words and Phrases.** Words, phrases, and abbreviations which have well-known technical or trade meanings used in the Contract documents shall be used according to such recognized meaning. In the event of a conflict, the more stringent meaning shall govern.

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- 9.24 Relationship of Contract Documents. The Contract Documents are complementary, and any requirement of one Contract Document shall be as binding as if required by all.
- 9.25 Pursuant to Section 13-1-191, NMSA 1978, reference is hereby made to the Criminal Laws of New Mexico (including Sections 30-14-1, 30-24-2, and 30-41-1 through 30-41-3, NMSA 1978) which prohibit bribes, kickbacks, and gratuities, violation of which constitutes a felony. Further, the Procurement Code (Sections 13-1-28 through 13-1-199, NMSA 1978) imposes civil and criminal penalties for its violation.
- 9.26 By entering into this Agreement, the parties do not intend to create any right, title or interest in or for the benefit of any person other than the Owner and the Contractor. No person shall claim any right, title or interest under this Agreement or seek to enforce this Agreement as a third party beneficiary of this Agreement.

ARTICLE 10
NEW MEXICO TORT CLAIMS ACT

Any liability incurred by the City of Santa Fe in connection with this Agreement is subject to the immunities and limitations of the New Mexico Tort Claims Act, Section 41-4-1, et. seq. NMSA 1978, as amended. The City and its "public employees" as defined in the New Mexico Tort Claims Act, do not waive sovereign immunity, do not waive any defense and do not waive any limitation of liability pursuant to law. No provision in this Agreement modifies or waives any provision of the New Mexico Tort Claims Act.

This Agreement is entered into as of the day and year first written above.

ATTEST:

YOLANDA Y. VIGIL, CITY CLERK

APPROVED AS TO FORM:

 12/22/15

KELLEY A. BRENNAN, CITY ATTORNEY

APPROVED:

OSCAR RODRIGUEZ, DIRECTOR
FINANCE DEPARTMENT

OWNER:

JAVIER M. GONZALES, MAYOR

DATE

CONTRACTOR:

BY: _____

TITLE: _____

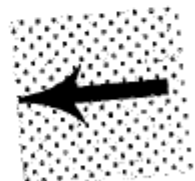
DATE: _____

NM Taxation and Revenue CRS

No

City of Santa Fe Business Registration

No.



**SIGN
HERE**

52355.572970

**BONDS, CERTIFICATES, AND
NOTICES (Sample Forms)**

(SECTION 00600)

*CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B*



PERFORMANCE BOND

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER *(name and address):*

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):*

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form: None See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal *(seal)*

Surety's Name and Corporate Seal *(seal)*

By: _____
Signature

By: _____
Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

*CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B*



PAYMENT BOND

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER *(name and address):*

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):*

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form: None See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

_____ *(seal)*

_____ *(seal)*

Contractor's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____

By: _____

Signature

Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____

Attest: _____

Signature

Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

EJCDC® C-615, Payment Bond

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and American Society of Civil Engineers. All rights reserved. 1 of 3

CERTIFICATE OF INSURANCE

AIA DOCUMENT G705

This certificate is issued as a matter of information only and confers no rights upon the addressee. It does not amend, extend or alter the coverage afforded by the policies listed below.

Name and Address of Insured Covering (Project Name and Location) Addressee: <input type="checkbox"/> (Owner) ┌ └	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">COMPANIES AFFORDING COVERAGE</th> </tr> <tr><td style="width: 20px; text-align: center;">A</td><td style="border: none;"></td></tr> <tr><td style="text-align: center;">B</td><td style="border: none;"></td></tr> <tr><td style="text-align: center;">C</td><td style="border: none;"></td></tr> <tr><td style="text-align: center;">D</td><td style="border: none;"></td></tr> <tr><td style="text-align: center;">E</td><td style="border: none;"></td></tr> <tr><td style="text-align: center;">F</td><td style="border: none;"></td></tr> </table>	COMPANIES AFFORDING COVERAGE		A		B		C		D		E		F	
COMPANIES AFFORDING COVERAGE															
A															
B															
C															
D															
E															
F															

This is to certify that the following described policies, subject to their terms, conditions and exclusions, have been issued to the above named insured and are in force at this time.

TYPE OF INSURANCE	CO. CODE	POLICY NUMBER	EXPIRATION DATE	LIMITS OF LIABILITY IN THOUSANDS		
					EACH OCCURRENCE	AGGREGATE
1. (a) Workers' Compensation (b) Employer's Liability				Statutory		Each Accident
2. Comprehensive General Liability including: <input type="checkbox"/> Premises - Operations <input type="checkbox"/> Independent Contractors <input type="checkbox"/> Products and Completed Operations <input type="checkbox"/> Broad Form Property Damage <input type="checkbox"/> Contractual Liability <input type="checkbox"/> Explosion and Collapse Hazard <input type="checkbox"/> Underground Hazard <input type="checkbox"/> Personal Injury with Employment Exclusion Deleted				Bodily Injury	\$	\$
				Property Damage	\$	\$
				Bodily Injury and Property Damage Combined	\$	\$
				*Applies to Products and Completed Operations Hazard		\$
3. Comprehensive Automobile Liability <input type="checkbox"/> Owned <input type="checkbox"/> Hired <input type="checkbox"/> Non-Owned				Bodily Injury (Each Person)	\$	
				Bodily Injury (Each Accident)	\$	
				Property Damage	\$	
				Bodily Injury and Property Damage Combined	\$	
4. Excess Liability <input type="checkbox"/> Umbrella Form <input type="checkbox"/> Other than Umbrella				Bodily Injury and Property Damage Combined	\$	\$
5. Other (Specify)						

1. Products and Completed Operations coverage will be maintained for a minimum period of 1 2 year(s) after final payment.
2. Has each of the above listed policies been endorsed to reflect the company's obligation to notify the addressee in the event of cancellation or non-renewal? Yes No

CERTIFICATION

I hereby certify that I am an authorized representative of each of the insurance companies listed above, and that the coverages afforded under the policies listed above will not be cancelled or allowed to expire unless thirty (30) days written notice has been given to the addressee of this certificate.

Name of Issuing Agency	Signature of Authorized Representative
Address	Date of Issue

*CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B*

DATE

NAME
ADDRESS
CITY/STATE/ZIP

RE:

Dear:

“OFFICIAL NOTICE-TO-PROCEED”

On _____, the City Manager awarded a Construction Contract to your firm for Capital Improvements Program Project No. 3039C, CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT – Bid Number ‘16/31/B.

This letter shall serve as official Notice-to-Proceed with the work described for this project in the Contract Documents and Request for Bids_____.

The award of the Contract is based on your Bid proposal dated _____, in the amount of \$_____.

Based on the date of issuance of this notice, as starting date, _____, and the _____ () contract work time limit, the entire work under this Contract shall be substantially completed by _____.

Attached are two (2) signed copies of the Agreement between Owner and Contractor. These are for your files and Surety Company.

Please comply with the requirements for filing payroll statements with the State Labor Commission and the City Contract Compliance Officer.

Please acknowledge receipt of this notice and return signed copies to the Owner (City of Santa Fe, Capital Improvements Program) and Engineer (Eric Ulibarri; ELUlibarri@santafenm.gov).

Sincerely,

RECEIPT ACKNOWLEDGED:

By

Nick Schiavo, P.E.
Acting Public Utilities and Water Division Director
Sangre De Cristo Water Division

Date

xc: Project/Book File

GENERAL CONDITIONS OF THE CONTRACT

(SECTION 00700)

CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B

NOTICE

This document has been prepared by the Capital Improvements Program (CIP) and Contract Compliance staff of the City of Santa Fe for use in construction projects.

DOCUMENT - SECTION 00710

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

(THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES;
CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH
RESPECT TO ITS COMPLETION OR MODIFICATION.)

TABLE OF ARTICLES

1. CONTRACT DOCUMENTS	9. PAYMENTS AND COMPLETION
2. ADMINISTRATION – PUBLIC UTILITIES DEPARTMENT WATER DIVISION	10. PROTECTION OF PERSONS AND PROPERTY
3. OWNER	11. INSURANCE
4. CONTRACTOR	12. CHANGES IN THE WORK
5. SUBCONTRACTORS	13. UNCOVERING AND CORRECTION OF WORK
6. WORK BY OWNER OR BY SEPARATE CONTRACTORS	14. TERMINATION OF THE CONTRACT
7. MISCELLANEOUS PROVISIONS	15. EQUAL OPPORTUNITY
8. TIME	16. MINIMUM WAGE RATES

ARTICLE 1

CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Owner-Contractor Agreement, the Conditions of the Contract (General, Supplementary, and Other Conditions), the Drawings, the Specifications, and all Addenda issued prior to and all Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a written interpretation issued by the Owner's Representative, or (4) a written order for a minor change in the work issued by the Owner's Representative. The Contract Documents do not include Bidding Documents such as the Advertisement or Invitation to Bid, the Instructions to Bidders, sample forms, the Contractor's Bid, or portions of Addenda relating to any of these, or any other documents, unless specifically enumerated in the Owner-Contractor Agreement.

1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.1. The Contract Documents shall not be construed to create any contractual relationship of any kind between the Owner's Representative and the Contractor, but the Owner's Representative shall be entitled to performance of obligations intended for his benefit, and to enforcement thereof. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner or the Owner's Representative and any Subcontractor or Sub-subcontractor.

1.1.3 THE WORK

The work comprises the design and completed construction required by the Contract Documents, and includes design specifications, and all labor necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.

1.1.4 THE PROJECT

The Project is the total design and construction of which the work performed under the Contract Documents may be the whole or a part.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 No fewer than five (5) copies of the Contract Documents shall be signed by the Owner and the Contractor. If either the Owner or the Contractor or both do not sign the Conditions of the Contract, Drawings, Specifications, or any of the other Contract Documents, the Owner's Representative shall identify such Documents.

1.2.2 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such

recognized meanings. In the event of a conflict between the Contract Documents, the more stringent requirements shall govern.

- 1.2.4 The organization of the Specifications into divisions, sections and articles, and the arrangement of Drawings shall not control the Contractor in dividing the work among Subcontractors or in establishing the extent of work to be performed by any trade.

ARTICLE 2

ENGINEER

2.1 DEFINITION

- 2.1.1 The Engineer is the person lawfully license to practice engineering, or an entity lawfully practicing engineering identified as such in the Owner-Contractor Agreement, and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term "Engineer" means the Engineer or his authorized representative.

2.2 ADMINISTRATION OF CONTRACT – SANGRE DE CRISTO WATER DIVISION

- 2.2.1 The Engineer will provide administration of the Contract as hereinafter described.
- 2.2.2 The Engineer will be the Owner's representative during construction and until final payment is due. The Engineer will advise and consult with the Owner. The Owner's instructions to the Contractor shall be forwarded through the Engineer. The Engineer shall have the authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with Subparagraph 2.2.17.
- 2.2.3 The Engineer shall submit to the Owner, for approval, a list of critical inspection points based upon the construction schedule furnished by the Contract (Paragraph 4.10.1). The Engineer and his staff (including the on-site representative, if agreed upon) shall make at least three (3) weekly visits to the site at those critical points and at other times as the Engineer deems appropriate during the progress of the work. Additionally, the Engineer shall familiarize himself with the progress and quality of the work and determine if the work is proceeding in accordance with the Contract Documents. On the basis of on-site observations, as an Engineer, he shall guard the Owner against defects and deficiencies in the construction. Should the Engineer determine that any portion of the work varies from the intent of the Contract Documents he shall immediately notify the Contractor and the Owner of the non-compliance and the nature of the work required to correct such non-compliance. The Engineer shall recommend to the Owner, in writing, to issue a "stop work order" for any portion of the work that does not substantially comply with the intent of the Contract Documents, except as follows.
- 2.2.4 The Engineer shall not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the work. Additionally, the Engineer shall not be responsible for the Contractor's failure to carry out the work in accordance with the Contract Documents. The Engineer shall reject work which does not meet or exceed the standards established by the Contract Documents. Whenever, in his reasonable opinion, he considers it necessary or advisable to ensure the proper implementation of the intent of the Contract Documents, he will have authority to require special inspection or testing of any work in accordance with the provisions of the Contract Documents whether or not such work be then fabricated, installed or completed.
- 2.2.5 The Engineer shall at all times have access to the work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the Engineer may perform his functions under the Contract Documents.
- 2.2.6 Based on the Engineer's observations and an evaluation of the Contractor's Application for Payment, the Engineer will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in Paragraph 9.4.
- 2.2.7 The Engineer will be the interpreter of the requirements of the Contract Documents and the judge of the performance thereunder by both the Owner and the Contractor.

*CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B*

- 2.2.8 The Engineer will render interpretations necessary for the proper execution or progress of the work, with reasonable promptness and in accordance with any time limit agreed upon. Either party to the Contract may make written request to the Engineer for such interpretations.
- 2.2.9 Claims, disputes, and other matters in question between the Contractor and the Owner relating to the execution or progress of the work or the interpretation of the Contract Documents shall be referred to the Engineer for decision which he will render in writing within a reasonable time.
- 2.2.10 All interpretations and decisions of the Engineer shall be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. In his capacity as interpreter and judge, he will endeavor to secure faithful performance by both the Owner and the Contractor, will not show partiality to either, and will not be liable for the result of any interpretation or decision rendered in good faith in such capacity.
- 2.2.11 The Engineer's decisions in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.
- 2.2.12 The Engineer will have authority to reject work which does not conform to the Contract Documents. Whenever, in his opinion, he considers it necessary or advisable for the implementation of the intent of the Contract Documents, he will have authority to require special inspection or testing of the work in accordance with Subparagraph 7.6.2 whether or not such work be then fabricated, installed or completed. However, neither the Engineer's authority to act under this Subparagraph 2.2.12, nor any decision made by him in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Engineer to the Contractor, any Subcontractor, any of their agents or employees, or any other person performing any of the work.
- 2.2.13 The Engineer will review and approve or take other appropriate action upon Contractor's submittals such as Shop Drawings, Product Data and samples, but only for conformance with the design concept of the work and with the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Engineer's approval of a specific item shall not indicate approval of an assembly of which the time is a component.
- 2.2.14 The Engineer will prepare Change Orders in accordance will Article 12 and will have authority to order minor changes in the work as provided in Subparagraph 12.3.1.
- 2.2.15 The Engineer will conduct inspections to determine the dates of Substantial Completion and Final Completion will receive and forward to the Owner for the Owner's review of written warranties and related documents required by the Contract and assembled by the Contractor and will issue a final Certificate of payment upon compliance with the requirements of Paragraph 9.9
- 2.2.16 If the Owner and Engineer agree, the Engineer will provide one or more Project Representatives to assist the Engineer in carrying out his responsibilities at the site. The duties, responsibilities and limitations of authority of any such Project Representative shall be as set forth in an exhibit to be incorporated in the Contract Documents.
- 2.2.17 The duties, responsibilities and limitations of authority of the Engineer as the Owner's representative during construction as set for in the Contract Documents will not be modified or extended without written consent of the Owner, the Contractor and the Engineer.
- 2.2.18 In case of the termination of the employment of the Engineer, the Owner shall appoint an Engineer whose status under the Contract Documents shall be that of the former Engineer.

ARTICLE 3

OWNER

3.1 DEFINITION

3.1.1 The Owner is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term "Owner" means the Owner or his authorized representative.

3.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

3.2.1 The Owner shall, at the request of the Contractor, at the time of execution of the Owner-Contractor Agreement, furnish to the Contractor reasonable evidence that he has made financial arrangements to fulfill his obligations under the Contract. Unless such reasonable evidence is furnished, the Contractor is not required to execute the Owner-Contractor Agreement or to commence the work.

3.2.2 The Owner shall furnish all surveys describing the physical characteristics for the site for the Project.

3.2.3 Except as provided in Subparagraph 4.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments, and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

3.2.4 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the work.

3.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, all copies of Drawings and Specifications reasonably necessary for the execution of the work.

3.2.6 The Owner shall forward all instructions to the Contractor through the Owner's Representative.

3.2.7 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to work by Owner or by Separate Contractors, Payments and Completion, and Insurance in Articles 6, 9 and 11 respectively.

3.3 OWNER'S RIGHT TO STOP THE WORK

3.3.1 If the Contractor fails to correct defective work as required by Paragraph 13.2 or persistently fails to carry out the work in accordance with the Contract Documents, the Owner, by a written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the work, or any portion thereof, until the cause of such order has been eliminated; however, this right of the Owner to stop the work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Subparagraph 6.1.3.

3.4 OWNER'S RIGHT TO CARRY OUT THE WORK

3.4.1 If the Contractor defaults or neglects to carry out the work in accordance with the Contract Documents and fails within seven days after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, after seven days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy he may have, make good such deficiencies. In such case, an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Owner's Representative's additional services made necessary by such default, neglect or failure. Such action by the Owner and the amount charged to the Contractor are both subject to the prior approval of the Owner's Representative. If the payments then or thereafter due to the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

ARTICLE 4

CONTRACTOR

4.1 DEFINITION

4.1.1 The Contractor is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term "Contractor" means the Contractor or his authorized representative.

4.2 REVIEW OF CONTRACT DOCUMENTS

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Owner's Representative any error, inconsistency or omission he may discover. The Contractor shall be liable to the Owner or the Owner's Representative for any damage resulting from any such errors, inconsistencies or omissions in the Contract Documents. The Contractor shall perform no portion of the work at any time without Contract Documents or, where required, approved Shop Drawings, Product Data or Samples for such portion of the work.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The Contractor shall supervise and direct the work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the contract.

4.3.2 The Contractor shall be responsible to the Owner for the acts and omissions of his employees, Subcontractors and their agents and employees, and other persons performing any of the work under a contract with the Contractor.

4.3.3 The Contractor shall not be relieved from his obligations to perform the work in accordance with the Contract Documents either by the activities or duties of the Owner's Representative in his administration of the Contract, or by inspections, tests or approvals required or performed by persons other than the Contractor.

4.4 LABOR AND MATERIALS

4.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the work, whether or not incorporated or to be incorporated in the work.

4.4.2 The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the work any unfit person or anyone not skilled in the task assigned to him.

4.5 WARRANTY

4.5.1 The Contractor warrants to the Owner and Owner's Representative that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all work will be of good quality, free from faults and conforming to these requirements. Substitutions not properly approved and authorized, may be considered defective. If required by the Owner's Representative, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty is not limited by the provisions in Paragraph 13.2.

4.5.2 The Contractor shall and hereby does warrant and guarantee all workmanship, labor, and materials performed and supplied by him or his Subcontractors for a period of one (1) year from the date of completion as evidenced by the date of the Owner's Representative's Final Certificate of Payment of this Contract. This also includes all labor required for replacing materials or equipment found to be defective within the one (1) year period. All guarantees for a longer period of time required by the work sections of these Specifications shall be secured by the Contractor

*CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B*

from Subcontractors and delivered to the Owner's Representative and are hereby warranted by the Contractor as much as if countersigned by him.

- 4.5.3 The Contractor shall and hereby does warrant and guarantee all asphalt and concrete installed for roadway and trail paving, curb and gutter, including all workmanship, labor, and materials performed and supplied by him or his Subcontractors for a period of two (2) years from the date of completion as evidenced by the date of the Owner's Representative's Final Certificate of Payment of this Contract. This also includes all labor required for replacing roadway and trail paving, curb and gutter found to be defective within the two (2) year period. All guarantees for a longer period of time required by the work sections of these Specifications shall be secured by the Contractor from Subcontractors and delivered to the Owner's Representative and are hereby warranted by the Contractor as much as if countersigned by him.

4.6 TAXES

- 4.6.1 The Contractor shall pay all sales, consumer gross receipts tax, use and other similar taxes for the work or portions thereof provided by the Contractor which are legally enacted at the time Bids are received, whether or not yet effective.

4.7 PERMITS, FEES AND NOTICES

- 4.7.1 The Contractor shall secure and pay for the building permit and for all other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the work which are customarily secured after execution of the Contract and which are legally required at the time the Bids are received.
- 4.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the work.
- 4.7.3 It is not the responsibility of the Contractor to make certain that the Contract Documents are in accordance with applicable laws, statutes, building codes and regulations. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, he shall promptly notify the Owner's Representative in writing, and any necessary changes shall be accomplished by appropriate Modification.
- 4.7.4 If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Owner's Representative, he shall assume full responsibility therefore and shall in turn notify the Owner's Representative of such action.

4.8 ALLOWANCES

- 4.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by these allowances shall be supplied for such amounts and by these allowances shall be supplied for such amounts and by such persons as the Owner may direct, but the Contractor will not be required to employ persons against whom he makes a reasonable objection.
- 4.8.2 Unless otherwise provided in the Contract Documents:
- A. These allowances shall cover the cost to the Contractor, less any applicable trade discount of the materials and equipment required by the allowance delivered at the site, and all applicable taxes;
 - B. The Contractor's costs for unloading and handling on the site, labor, installations costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in this allowance;
 - C. Whenever the cost is more than or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order, the amount of which will recognize changes, if any, in handling costs on the site, labor, installation costs, overhead, profit and other expenses.

4.9 SUPERINTENDENT

4.9.1 The Contractor shall employ a competent Superintendent and necessary assistants who shall be in attendance at the project site during the progress of the work. The Superintendent shall represent the Contractor, and all communications given to the Superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be so confirmed on written request in each case.

4.10 PROGRESS SCHEDULES

- 4.10.1 The Contractor shall, within ten (10) days after the effective date of Notice to Proceed, furnish five copies of a preliminary progress schedule describing his operations for the two-hundred and forty (240) day contract period. The preliminary progress schedule shall be a bar graph or an arrow diagram showing the items the Contractor intends to commence and complete the various work stages, operations, and contract means planned to be started during the two-hundred and forty (240) day contract period.
- 4.10.2 Unless otherwise specified in the Special Provisions, the Contractor shall submit for approval by the Owner's Representative, within five (5) days after the effective date of Notice to Proceed, traffic control plans prepared by a qualified individual for this project.
- 4.10.3 Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration. The graphic network diagram shall consist of an arrow diagram or a geometric figure and connector diagram which clearly depicts the major subdivisions of the work, the order and interdependencies of activities planned by the Contractor, as well as, activities by others which affect the Contractor's planning. The intended time for starting and completing each activity shall be shown for each construction operation. For those activities lasting more than 30 days, either the estimated time for 25-50 and 75 percent completion or other significant milestones in the course of the activity, shall be shown. In addition to the actual construction operations, the network diagram shall show such items as submittal of samples and Shop Drawings, delivery of materials and equipment, construction in the area by other forces, traffic detour controls, and other significant items related to the progress of construction. The graphic network diagram shall be printed or neatly and legibly drawn to a linear scale.
- 4.10.4 Activities shown shall be coordinated insofar as possible with the Contract Bid items, types of work and maximum number of activities of each type.
- 4.10.5 The computer printout or list of activities shall show for each activity the estimated duration, the earliest starting and finishing dates, the latest starting and finishing dates, and float or slack time. Activities which constitute the critical sequence shall be identified showing a total job duration equal to the Contract Time.
- 4.10.6 The written explanation shall contain sufficient information to describe the construction methods to be used and to enable the Owner's Representative to evaluate the schedule and supporting analysis for validity and practicability. If the schedule or written explanation is not accepted by the Owner's Representative, the Contractor shall resubmit the rejected items within ten (10) days after rejection.
- 4.10.7 The analysis may employ the use of an electric computer or may consist of a non-computer analysis if the latter is suitable to analyze the number of activities required. The adequacy of the system selected shall be acceptable to the Owner's Representative.
- 4.10.8 The Contractor shall submit to the Owner's Representative monthly progress status reports on dates directed by the Owner's Representative. Such reports shall list those uncompleted activities which have less than 30 days' float and which are either in progress or scheduled to be started within the next reporting period. For each of the listed activities, the following shall be shown:
- A. Starting date scheduled in last critical-path-analysis.
 - B. Actual or intended starting date.
 - C. Revised activity duration, if any.

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If the noted starting dates or duration delay the scheduled project completion date, the delay shall be named. Reasons for the delay shall be given with an explanation of the Contractor's proposed corrective action. The Contractor shall also note each activity completed during the report period.

- 4.10.9 A revised critical-path-type analysis shall be submitted when one or more of the following conditions occur:
- A. When an approved Change Order significantly affects the contract completion date, or the sequence of activities.
 - B. When progress of any critical activity falls significantly behind the scheduled progress.
 - C. When delay on a non-critical activity is of such magnitude as to change the course of the critical path.
 - D. At any time the Contractor elects to change any sequence of activities affecting the critical path.
 - E. When an Application for Payment is submitted.

The revised analysis shall be made in the same form and detail as the original submittal and shall be accompanied by an explanation of the reasons for the revisions. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.

- 4.10.10 The Contractor shall prosecute the work in accordance with the latest critical path type analysis. Deviations therefrom shall be submitted to the Owner's Representative for review. In the event that the progress of items along the critical path is delayed, the Contractor shall revise his planning to include additional forces, equipment, shifts or hours necessary to meet the Contract completion date. All additional cost resulting therefrom will not be borne by the Owner.
- 4.10.11 Indicate within the progress schedule, the delivery dates for Owner furnished products and products identified under Allowances.

4.11 DOCUMENTS AND SAMPLES AT THE SITE

- 4.11.1 The Contractor shall maintain at the site, for the Owner, one record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data and Samples. These shall be available to the Owner's Representative and shall be delivered to him for the Owner upon completion of the work.

4.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- 4.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the work.
- 4.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the work.
- 4.12.3 Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the work will be judged.
- 4.12.4 The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the work or in the work of the Owner or any separate Contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.
- 4.12.5 By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the work and of the Contract Documents.
- 4.12.6 The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Owner's Representative's approval of Shop Drawings, Product Data or Samples unless the

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Contractor has specifically informed the Owner's Representative in writing of such deviation at the time of submission and the Owner's Representative has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Owner's Representative's approval thereof.

- 4.12.7 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Owner's Representative on previous submittals.
- 4.12.8 No portion of the work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been approved by the Owner's Representative as provided in Subparagraph 2.2.13. All such portions of the work shall be in accordance with approved submittals.
- 4.12.9 See additional Shop Drawing and Product Requirements in Basic Requirements Section 01 00 00.

4.13 USE OF SITE

- 4.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not reasonably encumber the site with any materials or equipment.
- 4.13.2 The Contractor shall hold and save the Owner free and harmless from liability of any nature or kind arising from use, trespass or damage occasioned by third persons.

4.14 CUTTING AND PATCHING OF WORK

- 4.14.1 The Contractor shall be responsible for all cutting, fitting, patching or grading that may be required to complete the work or to make its several parts fit together properly.
- 4.14.2 The Contractor shall not damage or endanger any portion of the work or the work of the Owner or any separate contracts by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate Contractor except with the written consent of the Owner and of such separate Contractor. The Contractor shall not unreasonably withhold from the Owner or any separate Contractor his consent to cutting or otherwise altering the work.

4.15 CLEANING UP

- 4.15.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the work, he shall remove all his waste materials and rubbish from and about the Project as well as all his tools, construction equipment, machinery and surplus materials.
- 4.15.2 If the Contractor fails to clean up at the completion of the work, the Owner may do so as provided in Paragraph 3.4, and the cost thereof shall be charged to the Contractor.
- 4.15.3 The Contractor shall be solely responsible for performance of the following clean up:
 - A. Debris: Regardless of the nature of the debris, it shall be immediately cleared form the work area. Each trade shall cooperate with other trades in the removal of debris and in keeping a clean job throughout.
 - B. Cleaning of All Painted, Decorated, and Stained Work: The Contractor shall remove all marks, stains, finger prints, and other soil or dirt from all painted, decorated, and stained work.
 - C. Removal of all Temporary Protections: The Contractor shall remove all temporary protections and shall clean all floors, furnishings and structures at completion.
 - D. Removal of all Spots, Soils, and Other Contaminants for Paved Surfaces: The Contractor shall remove all spots, soil and debris from all paved surfaces and shall wash the same upon completion.

- E. Cleaning of all Fixtures and Equipment: The Contractor shall clean all fixtures and equipment, removing all stains, paint, dirt, and dust.

4.16 COMMUNICATIONS

- 4.16.1 The Contractor shall forward all communications to the Owner through the Owner's Representative.
- 4.16.2 The Contractor shall designate a contact person to establish and maintain communication with all residents who will be affected by this construction. The Contractor shall contact all affected residents and businesses at least one week prior to commencing work and will provide updates at least weekly to the residents. Residents and businesses whose ingress and egress from their property will be temporarily blocked shall be given notice at least 48 hours prior to the blockage. Those residents and businesses shall be provided with a start and finish time when the blockage will occur. All access to properties will be restored each evening by 5 pm. Work on the project shall not commence before 8 am.

4.17 ROYALTIES AND PATENTS

- 4.17.1 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 the Owner harmless from loss on account thereof, except that the Owner shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified; but if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Owner's Representative.

4.18 INDEMNIFICATION

- 4.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner and the Owner's Representative and their agents and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees arising out of or resulting from the performance of the work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself), including the loss of use resulting therefrom, and (2) is caused in whole or in part by any negligent act or omission by the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder. Such negligence shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Paragraph 4.18.
- 4.18.2 In any and all claims against the Owner or the Owner's Representative or any of their agents or employees by an employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.18 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.
- 4.18.3 The obligation of the Contractor under this Paragraph 4.18 shall not extend to the liability of the Owner's Representative, his agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs, or specifications.

ARTICLE 5

SUBCONTRACTORS

5.1 DEFINITION

- 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and

masculine in gender and means a Subcontractor or his authorized representative. The term "Subcontractor" does not include any separate Contractor or his Subcontractors.

- 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Contractor to perform any of the work at the Site.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

- 5.2.1 Unless otherwise required by the Contract Documents or the Bidding Documents, the Contractor, as soon as practicable after the award of the Contract, shall furnish to the Owner and the Owner's Representative in writing the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the work. The Owner's Representative will promptly reply to the Contractor in writing stating whether or not the Owner or the Owner's Representative, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or the Owner's Representative to reply promptly shall constitute notice of no reasonable objection.
- 5.2.2 The Contractor shall not contract with any such proposed person or entity to whom the Owner or the Owner's Representative has made reasonable objection under the provisions of Subparagraph 5.2.1. The Contractor shall not be required to contract with anyone to whom he has a reasonable objection.

5.3 SUBCONTRACTUAL RELATION

- 5.3.1 By an appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and the Owner's Representative. Said agreement shall preserve and protect the rights of the Owner and the Owner's Representative under the Contract Documents with respect to the work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with his Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph 5.3, and identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Documents available to his Subcontractors.

ARTICLE 6

WORK BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

- 6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, he shall make such claim as provided elsewhere in the Contract Documents.
- 6.1.2 When separate contracts are awarded for different portions of the Project or other work on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.
- 6.1.3 The Owner will provide for the coordination of the work of his own forces and of each separate Contractor with the work of the Contractor, who shall cooperate therewith as provided in paragraph 6.2.

- 6.1.4 The Owner will contract with a design engineer for work during this Project. The Contractor shall plan to work around and with this other firm.

6.2 MUTUAL RESPONSIBILITY

- 6.2.1 The Contractor shall afford the Owner and the separate Contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall connect and coordinate his work with theirs as required by the Contract Documents.
- 6.2.2 If any part of the Contractor's work depends for proper execution or results upon the work of the Owner or any separate Contractor, the Contractor shall, prior to proceeding with the work, promptly report to the Owner's Representative any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acceptance of the Owner's or the separate Contractor's work as fit and proper to receive his work, except as to defects which may subsequently become apparent in such work by others.
- 6.2.3 Any costs caused by defective or ill-timed work shall be borne by the party responsible thereof.
- 6.2.4 Should the Contractor wrongfully cause damage to the work or property of the Owner, or to other work on the site, the Contractor shall promptly remedy such damage as provided in Subparagraph 10.2.5.
- 6.2.5 Should the Contractor wrongfully cause damage to the work or property of any separate Contractor, the Contractor shall upon due notice promptly attempt to settle with such other Contractor by agreement, or otherwise to resolve the dispute. If such separate Contractor sues or initiates an arbitration proceeding against the Owner on account of any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor, who shall defend such proceedings at the Contractor's expense, and if any judgment or award against the Owner arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorneys' fees and court or arbitration costs which the Owner has incurred.

6.3 OWNER'S RIGHT TO CLEAN UP

- 6.3.1 If a dispute arises between the Contractor and separate Contractors as to their responsibility for cleaning up as required by Paragraph 4.15, the Owner may clean up and charge the cost thereof to the Contractors responsible therefore as the Owner's Representative shall determine to be just.

ARTICLE 7

MISCELLANEOUS PROVISIONS

7.1 GOVERNING LAW

- 7.1.1 The Contract shall be governed by the law of the State of New Mexico.
- 7.1.2 The Owner and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due or to become due to him thereunder, without the previous written consent of the Owner.

7.2 WRITTEN NOTICE

- 7.2.1 Written notice shall be deemed to have been dully served if delivered in person to the individual or member of the firm or entity or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known to him who gives the notice.

7.3 CLAIMS FOR DAMAGES

7.3.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or of any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

7.4 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

7.4.1 The Contractor to whom the Contract is awarded shall furnish and pay for reputable and approved Performance and Labor and Material Payment Bonds, each for the full amount of the Contract Sum. Bonds shall be executed on standard AIA forms.

7.5 RIGHTS AND REMEDIES

7.5.1 The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

7.5.2 No action or failure to act by the Owner, the Owner's Representative, or the Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

7.6 TESTS

7.6.1 This work shall consist of compaction testing, material testing, and other testing in accordance with the plans and specifications. If the Contract Document, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the work to be inspected, tested or approved, the Contractor shall give the Owner's Representative timely notice of its readiness so the Owner's Representative may observe such inspection, testing or approval. The Contractor shall bear all costs of such inspections, tests or approvals. Tests specifically called for by specifications shall be made by a professional testing laboratory acceptable to the Owner's Representative, and the Contractor shall employ same and pay all charges in connection therewith. Records of tests shall be delivered to the Engineer, contract administrator for Owner.

7.6.2 If the Owner's Representative determines that any work requires special inspection, testing, or approval which Subparagraph 7.6.1 does not include, he will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in Subparagraph 7.6.1. If such special inspection or testing reveals a failure of the work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Owner's Representative's additional services made necessary by such failure; otherwise the Owner shall bear such costs, and an appropriate Change Order shall be issued.

7.7 INTEREST

7.7.1 The Owner will not pay interest on payments due and unpaid under the Contract Documents.

ARTICLE 8

TIME

8.1 DEFINITIONS

8.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for Substantial Completion of the work as defined in Subparagraph 8.1.3, including authorized adjustments thereto.

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- 8.1.2 The date of commencement of the work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Owner-Contractor Agreement or such other date as may be established therein.
- 8.1.3 The date of Substantial Completion of the work or designated portion thereof is the date certified by the Owner's Representative and approved by the Owner when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner can occupy or utilize the work or designated portion thereof for the use for which it is intended.
- 8.1.4 The term "day" as used in the Contract Document shall mean calendar day unless otherwise specifically designated.

8.2 PROGRESS AND COMPLETION

- 8.2.1 All time limits stated in the Contract Documents are the essence of the Contract.
- 8.2.2 The Contractor shall begin the work on the date of commencement as defined in Subparagraph 8.1.2. He shall carry the work forward expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

8.3 DELAYS AND EXTENSIONS OF TIME

- 8.3.1 If the Contractor is delayed at any time in the progress of the work by any act or neglect of the Owner or the Owner's Representative or by any employees of either, or by any separate Contractor employed by the Owner or by changes ordered in the work, or by labor disputes, fire, unusual delay in unavoidable casualties, or any causes beyond the Contractor's control or by delay authorized by the Owner pending arbitration, or by any other cause which the Owner's Representative determines may justify the delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Owner's Representative may determine.
- 8.3.2 Any claim for extension of time shall be made in writing to the Owner's Representative not more than twenty days after the commencement of the delay; otherwise it shall be waived. In the case of a continuing delay, only one claim is necessary. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the work.
- 8.3.3 If written agreement is made stating the dates upon which interpretations shall be furnished, then no claim for delay shall be allowed on account of failure to furnish such interpretations until fifteen days after written request is made for them, and not then unless such claim is reasonable.
- 8.3.4 This Paragraph 8.3 does not exclude the recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9

PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

- 9.1.1 The Contract Sum is stated in the Owner-Contractor Agreement and including authorized adjustments thereto, is the total amount payable by the Owner to the Contractor for the performance of the work under the Contract Documents.

9.2 SCHEDULE OF VALUES

- 9.2.1 Before the first Application for Payment, the Contractor shall submit to the Owner's Representative a schedule of values allocated to the various portions of the work, prepared in such form and supported by such data to substantiate its accuracy as the Owner's Representative may require. This schedule, unless objected to by the Owner's Representative, shall be used only as a basis for the Contractor's Applications for payment. Submit

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schedule of values on the Construction Progress sheet within the Application for Payment forms provided in the Construction Contract Documents, or on other form acceptable to the Engineer. Contractor's standard form or electronic media printout will be considered.

- 9.2.2 Base structure of Schedule of Values on Bid Schedule with identical item numbering, quantities, and values.
- 9.2.3 Contractor shall prepare a schedule of values breakdown for lump sum bid items on the Bid Form and submit to Owner and Engineer for approval.
- 9.2.4 Submit Schedule of Values in duplicate at least 15 days prior to first Progress Meeting.

9.3 APPLICATIONS FOR PAYMENT

- 9.3.1 At least ten days before the date for each progress payment established in the Owner-Contractor Agreement, the Contractor shall submit to the Owner's Representative an itemized Application for Payment, or Partial Payment Estimate, notarized if required, supported by such data substantiating the Contractor's right to payment as the Owner or the Owner's Representative may require and reflecting retainage, if any, as provided elsewhere in the Contract Documents. On the Owner's Representative's recommendation, and after the Project is 50% or more complete, and if the Project is on schedule, the retainage may be reduced with the approval of the Owner. The full Contract retainage may be reinstated if the manner of completion of the work and its progress do not remain satisfactory to the Owner's Representative and the Owner. Submit one (1) electronic copy of each application on the Partial Payment Estimate form provided in the Contract Documents, together with updated Schedule of Values identifying fully the list of items in the Application for Payment.
- 9.3.2 The Contractor warrants that title to all work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interest or encumbrances hereinafter referred to in this Article 9 as "liens"; and that no work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing work at the site or furnishing materials or equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.
- 9.3.3 The Partial Payment Estimate forms consist of four sections: Cover Sheet, Construction Progress spreadsheet, Materials-On-Hand form, and Monthly Construction Progress Certificate. The purpose of the Monthly Construction Progress Certificate is to provide a complete account of all change orders/claims for the corresponding contract period, and all outstanding change orders/claims from previous contract periods, and waives any rights to further adjustments in contract times or price for any change orders/claims that originated in the current contract period.
- 9.3.4 Engineer will take measurements and compute quantities accordingly. The Contractor will assist in taking of measurements and determination of work completed prior to preparation of corresponding Application for Payment.
- 9.3.5 Submit revised progress schedules with each Application for Payment, identifying changes since previous version. Indicate estimated percentage of completion for each item of Work at each submission.

9.4 CERTIFICATES FOR PAYMENT

- 9.4.1 The Owner's Representative will, within ten (10) days after the receipt of the Contractor's Application for Payment, either issue a Certificate for Payment to the Owner with a copy to the Contractor for such amount as the Owner's Representative determines is properly due, or notify the Contractor in writing of his reasons for withholding a Certificate as provided in Subparagraph 9.6.1.
- 9.4.2 The issuance of Certificate for Payment will constitute a representation by the Owner's Representative to the Owner, based on his observations at the site and the data comprising the Application for Payment, that the work has progressed to the point indicated; that, to the best of his knowledge, information and belief, the quality of the work is in accordance with the Contract Documents (subject to an evaluation of the work for conformance with the Contract Documents upon Substantial Completion, to the results of any subsequent tests required by or performed under the

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Contract Documents correctable prior to completion, and to any specific qualifications stated in his Certificate); and that the Contractor is entitled to payment in the amount certified. However, by issuing a Certificate for Payment, the Owner's Representative shall not thereby be deemed to represent that he has made exhaustive or continuous on-site inspections to check the quality or quantity of the work or that he has reviewed the construction means, methods, techniques, sequences or procedures, or that he has made any examination to ascertain how or for what purpose the Contractor has used the moneys previously paid on account of the Contract Sum.

9.5 PROGRESS PAYMENTS

- 9.5.1 After the Owner's Representative has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents.
- 9.5.2 The Contractor shall promptly pay each Subcontractor upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's work, the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractor's work. The Contractor shall, by an appropriate agreement with each Subcontractor, require each Subcontractor to make payment to his Subcontractors in similar manner.
- 9.5.3 The Owner's Representative may, on request and at his discretion, furnish to any Subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the Owner's Representative on account of work done by such Subcontractor.
- 9.5.4 Neither the Owner nor the Owner's Representative shall have any obligation to pay or to see to the payment of any moneys to any Subcontractor except as may otherwise be required by law.
- 9.5.5 No Certificate for progress payment, no progress payment, nor any partial or entire use of occupancy of the Project by the Owner shall constitute an acceptance of any work not in accordance with the Contract Documents.

9.6 PAYMENT WITHHELD

- 9.6.1 The Owner's Representative may decline to certify payment and may withhold his Certificate in whole or in part, to the extent necessary to reasonably protect the Owner, if in his opinion he is unable to make representations to the Owner as provided in Subparagraph 9.4.2.
- 9.6.2 If the Owner's Representative is unable to make representations to the Owner, as provided in Subparagraph 9.4.2 and to certify payment in the amount of the Application, he will notify the Contractor as provided in Subparagraph 9.4.1. If the Contractor and Owner's Representative cannot agree on a revised amount, the Owner's Representative will promptly issue a Certificate for Payment for the amount for which he is able to make such representations to the Owner. The Owner's Representative may also decline to certify payment, or because of subsequently discovered evidence or subsequent observations, he may nullify the whole or any part of any Certificate for Payment previously issued, to such extent as may be necessary in his opinion to protect the Owner from loss because of:
 - A) Defective work not remedied;
 - B) Third party claims filed or reasonable evidence indicating probable filing of such claims;
 - C) Failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
 - D) Reasonable evidence that the work cannot be completed for the unpaid balance of the Contract Sum;
 - E) Damage to the work of another Contractor;
 - F) Reasonable evidence that the work will not be completed within the Contract Time; or,
 - G) Failure to carry out the work in accordance with the Contract Documents.

- 9.6.2 When the above grounds in Subparagraph 9.6.1 are removed or remedied, payment shall be made for amounts withheld because of them.

9.7 FAILURE OF PAYMENT

- 9.7.1 If the Owner's Representative does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents any amount certified by the Owner's Representative, then the Contractor may, upon seven additional days' written notice to the Owner and the Owner's Representative, stop the work until payment of the amount owing has been received. The Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, which shall be effected by appropriate Change Order in accordance with Paragraph 12.3.

9.8 SUBSTANTIAL COMPLETION

- 9.8.1 When the Contractor considers that the work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Subparagraph 8.1.3, the Contractor shall prepare for submission to the Owner's Representative a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents. When the Owner's Representative, with the Owner, on the basis of an inspection determines that the work or designated portion thereof is substantially complete, he will then prepare a Certificate of Substantial Completion Form, AIA Document G704-1978, which shall establish the Date of Substantial Completion, shall state the responsibilities of the Owner and the Contractor for security and maintenance, and the time within which the Contractor shall complete the items listed therein. Warranties required by the Contract Documents shall commence on the date of Final Completion of the work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Contractor and the Owner for their written acceptance of the responsibilities assigned to them in such Certificate.
- 9.8.2 Upon Substantial Completion of the work or designated portion thereof and upon application by the Contractor and certification by the Owner's Representative, the Owner shall make payment, reflecting adjustment in retainage, if any, for such work or portion thereof, as provided in the Contract Documents.

9.9 FINAL COMPLETION AND FINAL PAYMENT

- 9.9.1 Upon receipt of written notice that the work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Owner's Representative will promptly make such inspection and, if he finds the work acceptable under the Contract Documents and the Contract fully performed, he will promptly issue final Certificate for Payment stating that, to the best of his observations and inspections, the work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in said Final Certificate, is due and payable. The Owner's Representative's Final Certificate of payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Subparagraph 9.9.2 have been fulfilled.
- 9.9.2 Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Owner's Representative (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner or his property might in any way be responsible have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment, and (3) if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designed by the Owner. If any Subcontractor refuses to furnish a release or waiver required by the Owner the Contractor may furnish a bond satisfactory to the Owner to indemnify him against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

- 9.9.3 If, after Substantial Completion of the work, final completion thereof is materially delayed through no fault of the Contractor or by the issuance of Change Orders affecting final completion, and the Owner's Representative so confirms, the Owner shall, upon application by the Contractor and certification by the Owner's Representative and without terminating the Contract, make payment of the balance for that portion of the work fully completed and accepted. If the remaining balance for work not fully completed or corrected is less than the retainage stipulated in the Contract Document, and if bonds have been furnished as provided in Paragraph 7.4, the written consent of the surety to the payment of the balance due for that portion of the work fully completed and accepted shall be submitted by the Contractor to the Owner's Representative prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.
- 9.9.4 The making of final payment shall constitute a waiver of all claims by the Owner except those arising from:
- A) Unsettled liens;
 - B) Faulty or defective work appearing after Substantial Completion;
 - C) Failure of the work to comply with the requirements of the Contract Documents; and
 - D) Terms of any special warranties required by the Contract Documents.
- 9.9.5 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final Application for Payment.

9.10 RETAINAGE

- 9.10.1 Progress Payments will be made to the Contractor in accordance with Article 9 "Payments and Completion". The Owner will pay 100% of the value of Work performed and Materials complete in place, until the sum of the Progress Payments made equals 95% of the Total Original Contract Amount as amended by Change Order. The five percent (5%) retained when the Progress Payments equals 95% of the Total Original Contract Amount as amended by Change Order is the amount considered necessary to protect the interests of the public and the Owner; those interests include ensuring that the Work is Acceptable, on schedule, in compliance with the Contract, and that the Work reaches Substantial Completion and final Acceptance. Subject to other deductions, the amount retained shall be provided to the Contractor in accordance with Section 9.9 "Final Completion and Final Payment".

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

- 10.1.1 The Contractor shall be responsible in initiating, maintaining and supervising all safety precautions and programs in connection with the work.

10.2 SAFETY OF PERSONS AND PROPERTY

- 10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:
- 10.2.1.1 All employees on the work and all other persons who may be affected thereby;
 - 10.2.1.2 All the work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-subcontractors; and
 - 10.2.1.3 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

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- 10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations, and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.
- 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and progress of the work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.
- 10.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.
- 10.2.5 The Contractor shall promptly remedy all damage or loss (other than damage or loss insured under paragraph 11.3) to any property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, any Subcontractor or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Contractor is responsible under clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to the acts or omissions of the Owner or the Owner's Representative or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to his obligations under Paragraph 4.18.
- 10.2.6 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's Superintendent unless otherwise designated by the Contractor in writing to the Owner and the Owner's Representative.
- 10.2.7 The Contractor shall not load or permit any part of the work to be loaded so as to endanger its safety.

10.3 EMERGENCIES

- 10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his reasonable discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 12 for changes in the work.

ARTICLE 11

INSURANCE

11.1 CONTRACTOR'S LIABILITY INSURANCE

- 11.1.1. The Contractor shall carry insurance to protect the City of Santa Fe from and against all claims, demands, actions, judgments, costs, expenses and liabilities which may arise or result directly or indirectly from or by reasons of loss, injury or damage related to the Project. The Contractor shall file with the City of Santa Fe current certificates evidencing public liability insurance with limits as provided in the New Mexico Tort Claims Act, Section 41-4-19 NMSA 1978, and as that section or successors section may be amended from time to time. The contractor shall also carry such insurance as it deems necessary to protect it from all claims under any workmen's compensation law in effect that may be applicable to the Contractor. All insurance required by this Agreement shall be kept and remain in full force and effect for the entire life of this Agreement.
- 11.1.2. The insurance coverage shall include worker's compensation, employer's liability, comprehensive general liability (Premises-Operations, independent contractors, products and completed operations, broad form property damage, contractual liability, explosion and collapse hazard, underground Hazard, personal injury) comprehensive automobile liability (owned and hired), excess liability (umbrella form), and all-risk builder's risk.
- 11.1.3. All insurance coverage must be maintained for the entire life of the Project. Products and completed operations coverage shall be maintained for a minimum period of one (1) year after final payment.

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11.1.4. A valid certificate of insurance must be submitted to the Owner prior to issuance of a Notice-to-Proceed.

Type of Required Coverage	Minimum Limits of Liability
Workman's compensation (including accident and occupational disease coverage)	Statutory
Employer's Liability	\$100,000
Comprehensive General Liability (including endorsements providing broad form property damage coverage, personal injury coverage, and contractual assumption of liability coverage for all liability the Contractor has assumed under his Contract).	Bodily injury liability: \$500,000 each occurrence; \$1,000,000 aggregate. Property damage liability: \$500,000 each occurrence; \$1,000,000 aggregate.
Auto Liability (including non-owned auto coverage)	Bodily injury liability: \$500,000 each person; \$1,000,000 each occurrence. Property damage liability: \$1,000,000 each occurrence

11.1.5 Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the work. These Certificates shall contain a provision that coverage afforded under the policies will not be canceled until at least thirty days' prior written notice has been given to the Owner. The Contractor shall furnish one (1) copy of each of the Certificates of insurance herein required for each copy of the Contract.

11.2 OWNER'S LIABILITY INSURANCE

11.2.1 The Owner shall be responsible for purchasing and maintaining his own liability insurance and, at his option, may purchase and maintain such insurance as will protect him against all claims which may arise from operations under the Contract.

11.3 PROPERTY INSURANCE

11.3.1 The Contractor shall maintain traditional course of construction insurance upon the work at the site for at least the actual cash value thereof. The traditional course of construction insurance shall cover the interests of the Owner, the Contractor, Subcontractors, and Sub-subcontractors in the work. The insurance shall insure against at least the following perils: fire extended coverage, vandalism, malicious mischief, and flood insurance with a deductible of no more than \$25,000. The Contractor shall bear the cost of such insurance and include its cost in the Bid.

11.3.2 Any loss insured under Subparagraph 11.3.1 is to be adjusted with the Owner and made payable to the Owner as trustee for the insured, as their interests may appear subject to the requirements of any applicable mortgage clause. The Owner shall deposit the proceeds in a separate account and shall distribute them in accordance with such agreement as the parties in interest, including the Owner, may reach. The Contractor shall pay each Subcontractor a just share of any insurance proceeds which the Contractor receives and shall require by written agreement signed by the Subcontractor that the Subcontractor will make payments to his Sub-subcontractors in a similar manner. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate order.

11.3.3 To the extent permitted under their respective property insurance policies, the Owner and the Contractor hereby waive all rights, each against the other, for damages caused by fire or other perils to the extent covered by Insurance obtained pursuant to this Article 11 or any other property insurance applicable to the work, except such rights as they may have to the proceeds of such Insurance held by the Owner as trustee. The Owner or the Contractor, as appropriate, shall require the Owner's Representative, other Contractors, Subcontractors, and Sub-subcontractors to similarly waive rights of subrogation or property insurers.

11.3.4 If the Owner finds it necessary to occupy use of any portion of the work prior to Substantial Completion, such occupancy or use shall not commence prior to the time mutually agreed to by the Owner and the Contractor and, if

required by the applicable insurance or self-insurance coverage not prior to the time the builder's risk property insurer has consented to such occupancy or use. The Contractor's consent to such occupancy or use shall not be unreasonably withheld.

11.4 LOSS OF USE INSURANCE

11.4.1 The Owner, at his option, may purchase and maintain such insurance as will insure him against loss of use of his property due to fire or other hazards, however caused.

ARTICLE 12

CHANGES IN THE WORK

12.1 CHANGE ORDERS

12.1.1 A Change Order is a written order to the Contractor signed by the Owner's Representative and the Contractor and approved in writing by the Owner. A Change Order may be issued only after the execution of the Contract and shall be the only means used to order changes in the work for which the Contractor requires additional compensation, changes to the Contract Time, or changes to the Contract Sum. Minor changes in the work for which the Contractor requires no additional compensation or time shall be executed in accordance with the provision of Subparagraph 12.3.1. All Change Orders shall be prepared on the form provided in these Contract Documents.

12.1.2 The Owner, without invalidating the Contract, may order changes in the work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the work shall be authorized by Change Order and shall be performed under the applicable conditions of the Contract Documents.

12.1.3 The cost or credit to the Owner resulting from a change in the work shall be determined in one or more of the following ways:

- A) By mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- B) By unit prices stated in the Contract Documents or subsequently agreed upon;
- C) By cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- D) By the method provided in Subparagraph 12.1.4.

12.1.4 If none of the methods set forth in Clauses 12.1.2 or 12.1.3 is agreed upon, the Contractor, provided he receives a written order signed by the Owner, shall promptly proceed with the work involved. The cost of such work shall be determined by the Owner's Representative on the basis of the reasonable expenditures and savings of those performing the work attributable to the change, including, in the case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, the Contractor shall keep and present, in such form as the Owner's Representative may prescribe, an itemized accounting together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following: cost of materials, including sales tax and cost of delivery; cost of labor, including social security, old age and unemployment insurance, and fringe benefits, required by agreement or custom, workers' or workmen's compensation insurance; bond premiums; rental value of equipment and machinery; and the additional costs of supervision and field office personnel directly attributable to the change. Pending final determination of cost to the Owner payments on account shall be made on the Owner's Representative's Certificate for payment. The amount of credit to be allowed by the Contractor to the Owner for any deletion or change which results in a net decrease in the Contract Sum will be the amount of the actual net cost as confirmed by the Owner's Representative. When both additions and credits covering related work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any, with respect to that change.

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12.1.5 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if the quantities originally contemplated are so changed in a proposed Change Order that application of the agreed unit prices to the quantities of work proposed will cause substantial inequity to the Owner or the Contractor, the applicable unit prices shall be equitably adjusted.

12.1.6 By submission of a Bid, the Contractor agrees and binds himself to the following method of calculating Change Order costs. The Owner also agrees to the following method of calculating the cost of any changes to the Contract. With each proposal for a change in the amount of the Contract, the Contractor shall submit an itemized breakdown of all increases or decreases in the cost of the Contractor's and all Subcontractor's and Sub-subcontractor's work to include at least the following detail in the general order listed:

- A) Material quantities and unit costs;
- B) Labor amounts and hourly rates (identified with specific items of material to be placed or operation to be performed);
- C) Costs inherent in use of Contractor/Sub-subcontractor owned equipment;
- D) Equipment rental, if any;
- E) Workmen's compensation and public liability insurance;
- F) General administration, overhead, supervision, project insurance and profit, based on the following schedule:

<u>Subtotal before Applying the Percentage Shown</u>	<u>\$500 & Less</u>	<u>Over \$500</u>
Contractor for work performed by his own forces	22%	19%
Contractor for work performed by Subcontractor	10%	8%
Subcontractor for work performed by his own forces	18%	15%
Subcontractor for work performed by Sub-subcontractor	10%	8%
Sub-subcontractor for work performed by his own forces	18%	15%

- G) Employment taxes under FICA and FUTA; and
- H) State gross receipts tax (Contractor only).

12.1.7 The quotation for work under a Change Order shall be binding for sixty (60) days from the date submitted by the Contractor.

12.2 CONCEALED CONDITIONS

12.2.1 Should concealed conditions encountered in the performance of the work below the surface of the ground or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown physical conditions below the surface of the ground or should concealed or unknown conditions in an existing structure of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the Character provided for in this Contract, be encountered, the Contract Sum shall be equitably adjusted by Change Order upon verified claim by either party made within twenty days after the first observance of the conditions.

12.2.2 If the Contractor wishes to make a claim for an increase in the Contract Sum, he shall give the Owner's Representative written notice thereof within twenty days after the occurrence of the event giving rise to such claim.

This notice shall be given by the Contractor before proceeding to execute the work, except in an emergency endangering life or property, in which case the Contractor shall proceed in accordance with Paragraph 10.3. No such claim shall be valid unless so made. If such claims are justified and the Owner authorizes an increase in the Contract Sum, the Owner and the Contractor shall proceed to negotiate the amount of the adjustment in the Contract Sum. If the Owner and the Contractor cannot agree on the amount of the adjustment in the Contract Sum, it shall be determined by the Owner's Representative. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order.

- 12.2.3 If the Contractor claims that additional cost is involved because of, but not limited to, (1) any written interpretation, (2) any order by the Owner to stop the work pursuant to Paragraph 3.3 where the Contractor was not at fault, (3) any written order for a minor change in the work issued pursuant to Paragraph 12.3.1 or (4) failure of payment by the Owner pursuant to Paragraph 9.7, the Contractor shall make such claims as provided in Subparagraph 12.2.2.

12.3 MINOR CHANGES IN THE WORK

- 12.3.1 The Owner's Representative will have authority to order minor changes in the work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 13

UNCOVERING AND CORRECTION OF WORK

13.1 UNCOVERING OF WORK

- 13.1.1 If any portion of the work should be covered contrary to the request of the Owner's Representative or to requirements specifically expressed in the Contract Documents, it must, if required by the Owner's Representative, be uncovered for his observation and shall be replaced at the Contractor's expense.

13.2 CORRECTION OF WORK

- 13.2.1 The Contractor shall promptly correct all work rejected by the Owner's Representative as defective or as failing to conform to the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected work, including compensation for the Owner's Representative's additional services made necessary thereby.
- 13.2.2 If, within one year after the Date of Substantial Completion of the work or designated portion thereof or within one year after acceptance by the Owner of designated equipment or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a specific written acceptance of such condition. This obligation shall survive termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.
- 13.2.3 The Contractor shall remove from the site all portions of the work which are defective or non-conforming and which have not been corrected under Subparagraphs 4.5, 13.2.1 and 13.2.2, unless removal is specifically waived in writing by the Owner.
- 13.2.4 If the Contractor fails to correct defective or non-conforming work as provided in Subparagraph 4.5.1, 13.2.1 and 13.2.2, the Owner may correct it in accordance with Paragraph 3.4.
- 13.2.5 If the Contractor does not proceed with the correction of such defective or non-conforming work within a reasonable time fixed by written notice from the Owner's Representative, the Owner may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage

within ten days thereafter, the Owner may upon ten additional days' written notice sell such work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor including compensation for the Owner's Representative's additional services made necessary thereby. If such proceeds of sale do not cover all costs which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

- 13.2.6 The Contractor shall bear the cost of making good all work of the Owner or separate Contractors destroyed or damaged by such correction or removal.
- 13.2.7 Nothing contained in this Paragraph 13.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Paragraph 4.5 hereof. The establishment of the time period of one year after the Date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the Contractor to correct the work and has no relationship to the time within which his obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to his obligations other than specifically to correct the work.

13.3 ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK

- 13.3.1 If the Owner prefers to accept defective or non-conforming work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 14

TERMINATION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

- 14.1.1 If the work is stopped for a period of thirty days under an order of court or other public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of the Contractor or a Sub-contractor or their agents or employees or any other persons performing any of the work under a contract with the Contractor, or because the Owner's Representative has not issued a Certificate for payment as provided in Paragraph 9.7, or because the Owner has not made payment thereon as provided in paragraph 9.7, then the Contractor may, upon seven additional days' written notice to the Owner and the Owner's Representative, terminate the Contract and recover from the Owner payment for all work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit and damages.

14.2 TERMINATION BY THE OWNER

- 14.2.1 If the Contractor is adjudged bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he fails to make prompt payment to Subcontractors for material or labor, or persistently disregards laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, then the Owner, upon certification by the Owner's Representative that sufficient cause exists to justify such action, may without prejudice to any right or remedy and after giving the Contractor and his surety, if any, seven days written notice, terminate the employment of the Contractor and take possession of the site and of all material, tools, construction equipment and machinery thereon owned by the Contractor and may finish the work by whatever method he may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished.

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- 14.2.2 If the unpaid balance of the Contract Sum exceeds the costs of finishing the work, including compensation for the Owner's Representative's additional services made necessary thereby, and any damages sustained by the Owner as a result of the Contractor's breach, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be certified by the Owner's Representative upon application, in the manner provided in paragraph 9.4 and this obligation to the Contractor or to the Owner, as the case may be, shall be certified by the Owner's Representative upon application, in the manner provided in Paragraph 9.4 and this obligation for payment shall survive the termination of the Contract.
- 14.2.3 In the event that the Project is abandoned by the Owner, the Owner may terminate this contract at any time by giving at least seven (7) days' notice to the Contractor. In the event of termination, all work completed shall become the property of the Owner. The Contractor shall be entitled to receive compensation for actual work satisfactorily completed hereunder, including reimbursable expense authorized by the Owner which are then due.
- 14.2.4 In the event the Contractor fails to perform the work in accordance with the Contract Documents, the Owner may terminate the Contract after giving the Contractor five (5) working days' notice.

ARTICLE 15

EQUAL OPPORTUNITY

- 15.1 The Contractor shall maintain policies of employment as follows:
- 15.1.1 The Contractor, all Subcontractors, and all Sub-subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor shall take affirmative action to ensure that applicants are employed and that employees are treated without discrimination during employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous place, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.
- 15.1.2 The Contractor, all Subcontractors, and all Sub-subcontractors shall, in all solicitation or advertisements for employees placed by them or on their behalf, state that all qualified applicant will receive consideration for employment without regard to race, religion, color, sex, or national origin.

ARTICLE 16

MINIMUM WAGE RATES

- 16.1 The project is subject to *New Mexico Wage Decision # SF-16-0292-H* and the City of Santa Fe's Minimum Wage Ordinance both attached.

SUPPLEMENTARY CONDITIONS

(SECTION 00800)

SUPPLEMENTARY CONDITIONS (SECTION 00800)

SUPPLEMENTARY CONDITIONS

This document is intended to be used in conjunction with the General Conditions of the Contract.

ADDITIONAL CONDITIONS

- 1.0 DEFINITIONS - The following definitions shall apply through the Bidding Documents or Contract Documents unless otherwise specified.
- 1.1 ADDENDUM: Written or graphic instrument issued prior to the execution of the Contract which modifies or interprets the Bidding Documents, including Drawings and Specifications, by additions, deletions, clarifications or corrections. Addenda will become part of the Contract Documents when the Construction Contract is executed. Plural: ADDENDA
 - 1.2 ADDITIVE OR DEDUCTIVE ALTERNATE BID: Amount stated in the Bid to be added or deducted from the amount of the Base Bid if the corresponding change in project scope or alternate materials and/or methods of construction is accepted.
 - 1.3 BASE BID: Amount of money stated in the Bid as the sum for which the Bidder offers to perform the work, not including that work for which Alternate Bids are also submitted.
 - 1.4 BID: A complete and properly signed proposal to do the work or designated portion thereof for the sums stipulated therein, supported by data called for by the Bidding Documents.
 - 1.5 BID LOT: A major item of work for which a separate quotation or proposal is requested.
 - 1.6 BIDDER: One who submits a Bid for a prime contract with the Owner, as distinct from a Subcontractor, who submits a Bid to a Bidder. Technically, a Bidder is not a Contractor on a specific project until a contract exists between him and the Owner.
 - 1.7 BIDDING DOCUMENTS: Documents that include the Invitation for Bid, Instructions to Bidders, the Bid Form, other sample bidding and contract forms, and the proposed Contract Documents, including any Addenda issued prior to receipt of Bids. The Contract Documents proposed for the work consist of the Owner-Contractor Agreement, the Conditions of the Construction Contract (General, Supplementary, and Other Conditions), the Drawings, the Specifications, and all Addenda issued prior to and all Modifications issued after execution of the Contract.
 - 1.8 DAY: Calendar day, which is every day shown on the calendar, beginning and ending at midnight.
 - 1.9 CENTRAL PURCHASING OFFICE: The Central Purchasing Office is the City of Santa Fe Purchasing Department.
 - 1.10 GOVERNING AUTHORITY: The Governing Authority of the City of Santa Fe for the execution of construction contracts is the Mayor and City Manager.
 - 1.11 INVITATION FOR BID: The Bidding Documents utilized for soliciting sealed Bids. "Invitation to Bid" shall have the same meaning as "Invitation for Bid".
 - 1.12 OWNER: The City of Santa Fe, New Mexico.
 - 1.13 PROCUREMENT OFFICER: The Director of the Purchasing Division, or a designee authorized to enter into or administer contracts and make written determination with respect thereto.

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- 1.14 **RESPONSIBLE BIDDER:** A Bidder who submits a responsive Bid and who has furnished, when required, information and data to prove that his financial resources, production or service facilities, personnel, service reputation, and experience are adequate to make satisfactory delivery of the services, construction, or items of tangible personal property described in the Bidding Documents (13-1-82, NMSA 1978).
- 1.15 **SUCCESSFUL BIDDER:** The lowest qualified and responsible Bidder to whom the Owner, on the basis of the Owner's evaluation, makes an award.
- 1.16 **UNIT PRICES:** Amounts stated in the Contract as prices per unit of measurement for materials or services as described in the Contract Documents.
- 1.17 **USER:** The City of Santa Fe or agencies or designated entity for whose use the Project is being constructed.

2.0 CONTRACT AUDIT

The Owner shall be entitled to audit the books and records of a Contractor or any Subcontractor under any negotiated contract or subcontract other than a firm fixed-price contract to the extent that such books and records relate to the performance of such contract or subcontract. Such books and records shall be maintained by the Contractor for a period of three years from the date of final payment under the prime contract and by the Subcontractor for a period of three years from the date of final payment under the subcontract unless a shorter period is otherwise authorized in writing (13-1-161, NMSA 1978).

3.0 DEBARRED OR SUSPENDED CONTRACTORS

A business (Contractor, Subcontractor, or Supplier) that has either been debarred or suspended pursuant to the requirements of Sections 13-1-177 through 13-1-180, and 13-4-11 through 13-4-17, NMSA 1978, or City Purchasing provisions shall not be permitted to do business with the City and shall not be considered for award of contract during the period for which it is debarred or suspended.

4.0 BRIBES, GRATUITIES, AND KICK-BACKS

- 4.1 It is illegal in the State of New Mexico for any public employee to solicit or accept anything of value in connection with award of this Bid and for any person to offer or pay anything of value to any such public employee (30-24-1 through 30-24-2, NMSA 1978).
- 4.2 Pursuant to Section 13-1-191, NMSA 1978, reference is hereby made to the Criminal Laws of New Mexico (including 30-24-1, 30-23-2, and 30-41-1 through 3-41-3, NMSA 1978), which prohibit bribes, kick-backs, and gratuities and violation of which constitutes a felon. Further, the Procurement Code (13-1-28 through 13-1-199, NMSA 1978), imposes civil and criminal penalties for its violation

5.0 PROTESTS (CITY PURCHASING MANUAL)

- 5.1 Any Contractor who is aggrieved in connection with a procurement may protest to the City Purchasing Agent and the Owner. The protest should be made in writing within twenty-four (24) hours after the facts or occurrences; giving rise thereto, but in no case, not more than fifteen (15) calendar days after the facts or occurrences giving rise thereto.
- 5.2 In the event of a timely protest under the City Purchasing Manual, the City Purchasing Agent and the Owner shall not proceed further with the procurement unless the City Purchasing Agent or the Owner makes a determination that the award of contract is necessary to protect substantial interests of the Owner.
- 5.3 The City Purchasing Agent or his designee shall have the authority to take any action reasonably necessary to resolve a protest of an aggrieved Contractor concerning a procurement.
- 5.4 This authority shall be exercised in accordance with adopted regulations, but shall not include the authority to award money damages or attorneys' fees.

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CIP 3039C, Bid '16/31/B*

- 5.5 The City Purchasing Agent or his designee shall promptly issue a determination relating to the protest. The determination shall:
- A) State the reasons for the action taken; and,
 - B) Inform the protestant of the right to judicial review of the determination pursuant to the City Purchasing Manual.
- 5.6 A copy of the determination issued under the City Purchasing Manual shall be mailed to the protestant.

6.0 CONTRACT BOND REQUIREMENTS

- 6.1 The Successful Bidder, where the Contract Price exceeds twenty five thousand dollars (\$25,000), shall post a one hundred percent (100%) Performance Bond and a one hundred percent (100%) Labor and Material Payment Bond. Bonds shall be executed on Performance Bond and Labor and Material Payment Bond forms attached hereto, with amount payable conforming to the terms of the Contract. Surety shall be a company licensed to do business in the State of New Mexico and acceptable to the Owner.
- 6.2 Personal sureties may be accepted if the Owner so determines in advance, but in such case the amount of the Bond shall be the full Contract Price, and the sureties shall justify under oath in amounts above liabilities and exemptions aggregating double the amount of the Bond.
- 6.3 Special attention of Bidders is called to the requirements of Section 13-4-18 through 13-4-20, NMSA 1978 regarding a Contractor who does not have his principal place of business in the State of New Mexico for all taxes due arising out of construction services rendered under the Contract.
- 6.3.1 The right to sue on this Bond accrues only to the Owner and the parties to whom Sections 13-4-18 through 13-4-20, NMSA 1978 grant such right; and any such right shall be exercised only in accordance with the provisions and limitations of said statutes.

7.0 NON-RESIDENT CONTRACTOR'S REQUIREMENTS REGARDING GROSS RECEIPTS TAX SURETY BOND

- 7.1 Section 7-1-55A, NMSA 1978 provides that any person (as defined in Section 7-1-3, NMSA 1978) engaged in the construction business who does not have his principal place of business in New Mexico and enters into a prime construction contract to be performed in this State shall, at the time such contract is entered into, furnish the Director of the Revenue Division, Taxation and Revenue Department, or his delegate with a surety bond or other acceptable security in a sum equivalent to the gross receipts to be paid under the contract multiplied by the applicable rate of the gross receipts tax imposed by Section 7-9-4, NMSA 1978 to secure payment of the tax imposed on the gross receipts from the contract, and shall obtain a certificate from the Director of the Revenue Division, Taxation and Revenue Department, or his delegate that the requirements of this paragraph have been met.
- 7.2 If the total sum to be paid under the contract is changed by ten percent or more after the date the surety bond or other acceptable security is furnished, to the Director or his delegate, such person shall increase or decrease, as the case may be, the amount of the bond or security within fourteen days after the change (7-1-55B, NMSA 1978).
- 7.3 In addition to the above requirements, the Contractor will be subject to all the requirements of the City Procurement Code.

8.0 CONTRACTOR'S GROSS RECEIPTS TAX REGISTRATION

- 8.1 Section 7-10-4, NMSA 1978 provides that any person (as defined in Section 7-10-3, NMSA 1978) performing services for the City of Santa Fe, as those terms are used in the Gross Receipts and Compensating Tax Act (Section 7-10-1 to 7-10-5, NMSA 1978), must be registered and be issued an identification number with the Revenue Division of the Taxation and Revenue Department to pay the gross receipts tax.

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CIP 3039C, Bid '16/31/B

- 8.2 The identification number is needed to properly complete the approval process of the contract; therefore, so as to cause no delay in the processing, the Contractor must register with the State of New Mexico, Taxation and Revenue Department. For information contact:

Revenue Division
Taxation and Revenue Department
Manual Lujan Building
1200 St. Francis Drive
Santa Fe, New Mexico 87503
(505) 988-2290

- 8.3 If any person who performs services for the City of Santa Fe is not registered to pay the gross receipts tax, the City shall withhold payment of the amount due until the person has presented evidence of registration with the Taxation and Revenue Department to pay the gross receipts tax.

9.0 CONTRACT WITH NONRESIDENT PERSON OR PARTNERSHIPS OR UNADMITTED FOREIGN CORPORATIONS; AGENT FOR SERVICE OF PROCESS

- 9.1 Special attention of Bidders is called to requirements of Sections 13-4-21 through 13-4-24, NMSA 1978, whereby a public works contract with a nonresident person or partnership or foreign corporation not authorized to do business in the State shall contain a specific provision designating an agent resident within the State, and his address, upon whom process and writs in any action or proceeding against such business may be served in any action arising out of such contract.

10.0 STATE ALLOWANCES

- 10.1 The Contractor shall purchase the "Allowed Materials" as directed by the Owner through the Owner's Representative/Engineer on the basis of the lowest and the best Bid of at least three competitive Bids. If the actual price for purchasing the "Allowed Materials" is more or less than the "Cash Allowance", the Contract Price shall be adjusted accordingly. The adjustment in Contract Price made on the basis of the purchase price without additional charges for overhead, profit, insurance, or any other incidental expenses. The cost of installation of the "Allowed Materials" shall be included in the applicable section of the Specifications covering the work.

11.0 MINIMUM WAGE RATES

- 11.1 This project is subject to New Mexico State Wage Rate *Wage Decision # SF-16-0292-H* and the City of Santa Fe's Minimum Wage Ordinance both of which are attached.

12.0 FORM OF CHANGE ORDER AND CHANGE ORDER NOTICE TO PROCEED

- 12.1 The provided forms issued by the Owner are to be utilized by the Contractor, Owner's Representative/Engineer, and the Owner pursuant to the requirements of the General Conditions.

13.0 STATE OF NEW MEXICO, CONSTRUCTION INDUSTRIES DIVISION (CID)

- 13.1 The Contractor, at his own expense, shall secure the required building permits from the State CID as required for this Project. Contractor shall adhere to the requirements established for inspections.

14.0 CITY OF SANTA FE REQUIREMENTS

- 14.1 The General Contractor shall include in the Bid the cost of all landfill dumping fees; additionally, the Contractor shall be responsible that all rubble, excess materials, etc., are disposed of at an approved, legal dumping site.
- 14.2 Construction debris and human debris must be cleaned from the site before contractor leaves site daily.

*CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B*

- 14.3 The Contractor shall adhere to any applicable City of Santa Fe ordinances, resolutions, guidelines, and other requirements to complete the work.

CONTRACT EXHIBITS

Exhibit I – Wage Rates and Labor Enforcement Fund Registration

Exhibit II – City of Santa Fe Minimum Wage Ordinance Information

Exhibit III – Construction Administration Forms

Exhibit IV – Technical Specifications

Exhibit V – Geotechnical Report

Exhibit VI – Specifications for Materials and Equipment

Exhibit VII – Construction Drawings

EXHIBIT I – WAGE RATES AND LABOR ENFORCEMENT FUND REGISTRATION

1.0 WAGE RATES

This project is subject to the Minimum Wage Rates as determined by the New Mexico State Labor & Industrial Commission pursuant to Chapter 13, Section 13-14-11, NMSA 1978. The Minimum Wage Rates to be paid by the Contractor and any Subcontractors to their employees on this project are as listed in the New Mexico State Labor and Industrial Commission Minimum Wage Rate Decision Number ***SF-16-0292-H***.

A copy of this decision is bound in these documents immediately following this page. The Contractor shall submit within three days of the notice of award, a complete sub-contractor list and Statements of Intent (SOI) to pay Prevailing Wages for each contractor and subcontractor. In addition, all Contractors and sub-contractors shall submit one (1) certified copy of the project bi-weekly payroll, as required, to the City of Santa Fe Water Division, 801 W. San Mateo Road, Santa Fe, NM 87505, C/O Project Engineer, not later than five (5) working days after the close of each payroll period. The prime contractor shall be responsible for the submission of copies of payrolls of all sub-contractors. In addition, the contractor must ensure that when the project has been completed, the Affidavits of Wages Paid (AWP) is sent to the City of Santa Fe, Water Division at the same address as provided above.

This project is subject to the City of Santa Fe Minimum Wage Rate Ordinance Compliance: under Ordinance No. 2003-8, passed by the Santa Fe City Council on February 26, 2003 as well as any subsequent changes to the ordinance throughout the term of this contract.

(New Mexico State Labor & Industrial Commission Wage Rate Decision **WGD** & City of Santa Fe Minimum Wage Ordinance 2003-8 Following This Sheet)

Effective immediately, The Contracting Agency is accountable for ensuring compliance with 11.1.2 NMAC of its agents, contractors and sub-contractors.

Per 11.1.2.9 B(3) NMAC, the Contracting Agency or its agent shall provide the Notice of Award and Sub-Contractor lists to the New Mexico Department of Workforce Solutions (NMDWS), Labor and Industrial Bureau promptly after award of the project.

Per 11.1.2.9 C(1) NMAC, the Contracting Agency is required to obtain the Statement of Intent to Pay Prevailing Wages and the Affidavit of Wages Paid from the general contractor and all sub-contractors. Payments are not to be made until the intent form is filed.

Per 11.1.2.9 B(6) the Contracting Agency is required to obtain certified payroll records from the general contractor for all sub-contractors on a bi-weekly basis. The Contracting Agency must present the documents to the NMDWS, Labor and Industrial Bureau upon request by the Director or designee.



STATE OF NEW MEXICO
NEW MEXICO DEPARTMENT OF
WORKFORCE SOLUTIONS
Labor Relations Division
121 Tijeras Ave NE, Suite 3000
Albuquerque, NM 87102
www.dws.state.nm.us

PUBLIC WORKS PROJECT REQUIREMENTS

As a participant in a Public Works project valued at more than \$60,000 in the State of New Mexico, the following list addresses many of the responsibilities that are defined by statute or regulation to each project stakeholder.

Contracting Agency

- Ensure that all Contractors wishing to bid on a Public Works project when the project is \$60,000 or more are actively registered with the Public Works and Apprenticeship Application (PWAA) website: <http://www.dws.state.nm.us/pwaa> (Contractor Registration) prior to bidding.
- Please submit Notice of Award (NOA) and Subcontractor List(s) to the PWAA website promptly after the project is awarded.
- Please update the Subcontractor List(s) on the PWAA website whenever changes occur.

General Contractor

- Provide a complete Subcontractor List and Statements of Intent (SOI) to pay Prevailing Wages for each Contractor to the Contracting Agency within 3 (three) days of award.
- Ensure that all Subcontractors wishing to bid on a Public Works project have an active Contractor Registration with the Public Works and Apprenticeship Application (PWAA) website: <http://www.dws.state.nm.us/pwaa> prior to bidding when their bid will exceed \$60,000.
- Submit bi-weekly certified payrolls to the Contracting Agency.
- Make certain the Public Works Apprentice and Training Act contributions are paid either to an approved Apprenticeship Program or to the Public Works Apprentice and Training Fund.
- Confirm the Wage Rate poster, provided in PWAA, is displayed at the job site in an easily accessible place.
- Make sure, when a project has been completed, the Affidavits of Wages Paid (AWP) is sent to the Contracting Agency.

Subcontractor

- Ensure that all Subcontractors wishing to bid on a Public Works project have an active Contractor Registration with the Public Works and Apprenticeship Application (PWAA) website: <http://www.dws.state.nm.us/pwaa> prior to bidding when their bid will exceed \$60,000.
- Submit bi-weekly certified payrolls to the General Contractor(s).



STATE OF NEW MEXICO
NEW MEXICO DEPARTMENT OF
WORKFORCE SOLUTIONS
Labor Relations Division,
121 Tijeras Ave NE, Suite 3000
Albuquerque, NM 87102
www.dws.state.nm.us

Wage Decision Approval Summary

1) Project Title: City of Santa Fe Hospital Tank Replacement Engineering
Requested Date: 02/11/2016
Approved Date: 02/11/2016
Approved Wage Decision Number: SF-16-0292-H

Wage Decision Expiration Date for Bids: 06/10/2016

2) Physical Location of Jobsite for Project:
Job Site Address: St. Michael's Drive
Job Site City: Santa Fe
Job Site County: Santa Fe

3) Contracting Agency Name (Department or Bureau): City of Santa Fe Public Works Dept.
Contracting Agency Contact's Name: Leroy Pacheco
Contracting Agency Contact's Phone: (505) 955-6853 Ext.

4) Estimated Bid Opening Date: 03/30/2016

5) Estimated total project cost: \$6,800,000.00
a. Are any federal funds involved?: No
b. Does this project involve a building?: No
c. Is this part of a larger plan for construction on or appurtenant to the property that is subject to this project?: No
d. Are there any other Public Works Wage Decisions related to this project?: No
e. What is the ultimate purpose or functional use of the construction once it is completed?: Four million gallon concrete water storage tank demolition and reconstruction.

6) Classifications of Construction:

Classification Type and Cost Total	Description
Highway Engineering (H) Cost: \$6,800,000.00	Four million gallon concrete water storage tank demolition and reconstruction.

TYPE "H" - HEAVY ENGINEERING
Effective January 1, 2016

Trade Classification	Base Rate	Fringe Rate	Apprenticeship
Asbestos Worker - Heat & Frost Insulator	31.26	11.11	0.50
Boilermaker	18.50	3.31	0.50
Bricklayer/Blocklayer/StoneMason	23.32	7.30	0.50
Carpenter/Lather	23.40	8.62	0.50
Millwright/Piledriver	31.00	14.56	0.50
Cement Mason	20.50	9.24	0.50
Electricians			
Outside Classifications			
Groundman	21.28	10.57	0.50
Equipment Operator	30.54	12.98	0.50
Lineman/Tech	35.93	14.23	0.50
Cable Splicer	39.52	15.13	0.50
Inside Classifications			
Wireman/Tech	29.70	9.94	0.50
Cable Splicer	32.67	10.03	0.50
Glazier	20.15	3.65	0.50
Ironworker	26.50	13.68	0.50
Painter (Brush/Roller/Spray)	21.17	6.53	0.50
Plumber/Pipefitter	31.14	11.55	0.50
Roofer	19.56	11.34	0.50
SheetmetalWorker	28.28	15.37	0.50
Operators			
Group I	17.67	5.83	0.50
Group II	18.76	5.83	0.50
Group III	19.41	5.83	0.50
Group IV	19.62	5.83	0.50
Group V	19.68	5.83	0.50
Group VI	19.82	5.83	0.50
Group VII	19.94	5.83	0.50
Group VIII	21.38	5.83	0.50
Group IX	26.45	5.83	0.50
Group X	29.35	5.83	0.50
Laborers			
Group I	18.00	5.05	0.50
Group II	19.18	5.05	0.50
Group III	19.53	5.05	0.50
Group IV	19.94	5.05	0.50
Group V	20.30	5.05	0.50
Group VI	19.03	5.05	0.50
Group VII	19.18	5.05	0.50
Group VIII	19.43	5.05	0.50
Group IX	19.63	5.05	0.50
Group X	20.30	5.05	0.50
Truck Drivers			
Group I	15.05	4.94	0.50
Group II	15.25	4.94	0.50
Group III	15.45	4.94	0.50
Group IV	15.65	4.94	0.50

NOTE: SUBSISTENCE, ZONE AND INCENTIVE PAY APPLY ACCORDING TO THE PARTICULAR TRADES COLLECTIVE BARGAINING AGREEMENT. DETAILS ARE LOCATED AT WWW.DWS.STATE.NM.US.

EXHIBIT II – CITY OF SANTA FE MINIMUM WAGE ORDINANCE INFORMATION



PURSUANT TO THE CITY OF SANTA FE
LIVING WAGE ORDINANCE, SECTION 28-1 SFCC 1987
EFFECTIVE MARCH 1, 2015 ALL WORKERS WITHIN THE
CITY OF SANTA FE
SHALL BE PAID A LIVING WAGE OF

\$10.84
PER HOUR

Santa Fe's Living Wage

- The Santa Fe Living Wage Ordinance establishes minimum hourly wages.
- The March 1, 2015 Living Wage increase corresponds to the increase in the Consumer Price Index (CPI).
- All employers required to have a business license or registration from the City of Santa Fe ("City") must pay at least the adjusted 2015 Living Wage to employees for all hours worked within the Santa Fe city limits.

Who is Required to Pay the Living Wage?

- The City to all full-time permanent workers employed by the City;
- Contractors for the City, that have a contract requiring the performance of a service but excluding purchases of goods;
- Businesses receiving assistance relating to economic development in the form of grants, subsidies, loan guarantees or industrial revenue bonds in excess of twenty-five thousand dollars (\$25,000) for the duration of the City grant or subsidy;
- Businesses required to have a business license or registration from the City; and
- Nonprofit organizations, except for those whose primary source of funds is from Medicaid waivers.
- For workers who customarily receive more than one hundred dollars (\$100) per month in tips or commissions, any tips or commissions received and retained by a worker shall be counted as wages and credited towards satisfaction of the Living Wage provided that, for tipped workers, all tips received by such workers are retained by the workers, except that the pooling of tips among workers shall be permitted.

More Information, including the Living Wage Ordinance, is available at
<http://www.santafenm.gov>
(Click on Hot Topics/Living Wage)

City of Santa Fe Minimum Wage Ordinance 2003-8

CITY OF SANTA FE, NEW MEXICO



LIVING WAGE ORDINANCE

AMENDED*: 11/28/07 (Ord. 2007-43)

EFFECTIVE DATE OF AMENDMENT: 1/1/08

* Ord. No. 2007-43 amended Section 28-1.2 and Section 28-1.5 of the Santa Fe City Code, the remainder of Article 28-1 remained the same

28-1 LIVING WAGE.

28-1.1 Short Title.

This section may be cited as the "Living Wage Ordinance". (Ord. #2002-13, §1)

28-1.2 Legislative Findings.

The governing body of the city has determined that:

A. The public welfare, health, safety and prosperity of Santa Fe require wages and benefits sufficient to ensure a decent and healthy life for workers and their families;

B. Many Santa Fe workers earn wages insufficient to support themselves and their families;

C. Many Santa Fe workers cannot participate in civic life or pursue educational, cultural, and recreational opportunities because they must work such long hours to meet their households' most basic needs;

D. Minimum wage laws promote the general welfare, health, safety and prosperity of Santa Fe by ensuring that workers can better support and care for their families through their own efforts and without financial governmental assistance;

E. The average earnings per job in Santa Fe County is twenty-three percent (23%) below the national average and the cost of living is eighteen percent (18%) higher than the national average;

F. Housing costs in Santa Fe are much higher than in most other parts of New Mexico, and low income workers must therefore spend a disproportionate percentage of their income sheltering themselves and their families;

G. Livable wages also benefit employers and the economy as a whole by improving employee performance, reducing employee turnover, lowering absenteeism, and thereby improving productivity and the quality of the services provided by employees;

H. When businesses do not pay a livable wage, the community bears the cost in the form of increased demand for taxpayer-funded social services including homeless shelters, soup kitchens and healthcare for the uninsured. Coupled with high real estate values, low wages reduce the ability of low- and moderate-income residents to access affordable housing. As a result, the city has had to invest significant tax dollars to support affordable housing including funding to nonprofit organizations, purchasing land, building infrastructure and waiving fees. In addition, the city has allocated significant tax dollars to operate after school and summer recreation programs and to support nonprofit organizations offering an array of human services and children and youth services, all of which are needed by very low-income residents and their families;

I. It is in the public interest to require certain employers benefiting from city actions and funding, and from the opportunity to do business in the city, to pay employees a minimum wage, a "living wage", adequate to meet the basic needs of living in Santa Fe;

J. According to the 2000 Census, approximately twelve and three-tenths percent (12.3%) of the Santa Fe community lives below the poverty level; and

K. According to the New Mexico department of labor, twenty-three and one-half percent (23.5%) of Santa Feans who are employed in the nongovernmental sector earn hourly wages of ten dollars and fifty cents (\$10.50) per hour or less.

L. The governing body has reviewed the impact of previous minimum wage increases, relevant studies and other appropriate data, and finds that the city's minimum wage should be upwardly adjusted each year to keep pace with increases in the cost of living.

M. The governing body has found that limiting coverage of the minimum wage just to businesses with twenty-five (25) or more employees has hindered compliance and has created an uneven playing field among local businesses.
(Ord. #2002-13, §2; Ord. #2003-8, §1; Ord. #2007-43, §1)

28-1.3 Authority of the City of Santa Fe.

This Living Wage Ordinance is adopted pursuant to the general welfare and police powers conferred upon the city of Santa Fe by §3-17-1 et seq. and §3-18-1 et seq. NMSA 1978, pursuant to the powers conferred upon the city of Santa Fe by New Mexico Constitution, Article X §§6(D) and 6 (E) and the Municipal Charter Act §3-15-1 et seq. NMSA 1978, which have been exercised by the city's adoption of its "Santa Fe Municipal Charter". (Ord. #2002-13, §3; Ord. #2003-8, §2)

28-1.4 Purpose.

The purposes of this section are:

A. To have the city of Santa Fe set an example for the public and private sectors by paying its employees a minimum wage adequate to meet the basic needs of living in Santa Fe.

B. To raise the income of low-income employees of employers who contract with the city, receive grants, subsidies or other benefits from the city or benefit from the opportunity to do business in Santa Fe.
(Ord. #2002-13, §4; Ord. #2003-8, §3)

28-1.5 Minimum Wage Payment Requirements.

A. The following shall pay the minimum wage:

(1) The city of Santa Fe to all full-time permanent workers employed by the city. However, the provisions of this section are expressly limited by and subject to future union negotiations in compliance with the Fair Labor Standards Act and subsequent appropriations by the governing body in compliance with the Bateman Act;

(2) Contractors for the city, that have a contract requiring the performance of a service including construction services but excluding purchases of goods, shall pay the

minimum wage to their workers and subcontractors performing work under the contract if the total contract amount with the city is, or by way of amendment becomes, equal to or greater than thirty thousand dollars (\$30,000.); and

(3) Businesses receiving assistance relating to economic development in the form of grants, subsidies, loan guarantees or industrial revenue bonds in excess of twenty-five thousand dollars (\$25,000.) to those employed by such entity for the duration of the city grant or subsidy; and

(4) Businesses required to have a business license or business registration from the city of Santa Fe and nonprofit organizations shall pay the minimum wage to their workers for all hours worked within the city of Santa Fe that month. For purposes of this paragraph, worker shall not include any person who is related by blood or by marriage to any person who may have or possess any ownership interest in the business that employs them. For purposes of identifying persons entitled to be paid the minimum wage, all individuals employed by or providing work to the business for compensation, whether on a part-time, full-time or temporary basis, during a given month shall be counted as a worker. This definition shall include contingent or contracted workers, and persons made available to work through the services of a temporary service, staffing or employment agency or similar entity. However, interns working for a business for academic credit in connection with a course of study at an accredited school, college or university or persons working for an accredited school, college or university while also attending that school, college or university, or persons working for a business in connection with a court-ordered community service program such as teen court or workers who are in an apprenticeship program in a 501C(3) organization (such as the Santa Fe Opera) shall not be counted as a worker for such purposes.

B. Beginning January 1, 2004, the minimum wage shall be an hourly rate of eight dollars and fifty cents (\$8.50). In computing the wage paid for purposes of determining compliance with the minimum wage, the value of health benefits and childcare shall be considered as an element of wages. On January 1, 2006, the minimum wage shall be increased to an hourly rate of nine dollars and fifty cents (\$9.50). Beginning January 1, 2009, and each year thereafter, the minimum wage shall be adjusted upward by an amount corresponding to the previous year's increase, if any, in the consumer price index for the western region for urban wage earners and clerical workers.

C. For workers who customarily receive more than one hundred dollars (\$100.) per month in tips or commissions, any tips or commissions received and retained by a worker shall be counted as wages and credited towards satisfaction of the minimum wage provided that, for tipped workers, all tips received by such workers are retained by the workers, except that the pooling of tips among workers shall be permitted.

D. Nonprofit organizations whose primary source of funds is from Medicaid waivers are exempt.

E. Staff shall contract for a study or studies to review the impact of changes made to the Living Wage Ordinance approved as Ordinance No. 2007-43 on businesses of less than ten employees and on the student drop-out rate. The study shall be presented to the governing body no later than July 1, 2009.
(Ord. No. 2002-13, §5; Ord. #2003-8, §4; Ord. #2005-40; Ord. #2007-43, §2)

28-1.6 Prohibitions Against Retaliation and Circumvention.

A. It shall be unlawful for any employer or employer's agent or representative to take any action against an individual in retaliation for the exercise of or communication of information regarding rights under this section. This section shall also apply to any individual that mistakenly, but in good faith, alleges noncompliance with this section.

B. Taking adverse action against an individual within sixty (60) days of the individual's assertion of or communication of information regarding rights shall raise a rebuttable presumption of having done so in retaliation for the assertion of rights.

C. It shall be unlawful for any business or employer to intentionally circumvent the requirements of this section by contracting portions of its operation or leasing portions of its property. (Ord. #2002-13, §6; Ord. #2003-8, §5)

28-1.7 Reserved.

Editors Note: Former subsection 28-1.7, Compliance Through Collective Bargaining Process, previously codified herein and containing portions of Ordinance No. 2002-13, was repealed in its entirety by Ordinance No. 2004-38.

28-1.8 Enforcement; Remedies.

A. *Administrative Enforcement.* The city manager, or his/her designee, is authorized, as appropriate and as resources permit, to enforce this section. The city manager is authorized to investigate possible violations of this section. Where the city manager, after a proceeding that affords a suspected violator due process, concludes that a violation has occurred, the city manager may issue orders to the employer appropriate to effectuate the complaining person's rights, including but not limited to back pay and reinstatement. The city manager also has the power to order termination of any and all economic benefit derived by any offending party from the city and has the power to revoke the employer's business license or registration.

B. *Criminal Penalty.* A person violating this section shall be guilty of a misdemeanor and, upon conviction, for each offense may be subject to fines and imprisonment as set forth in Section 1-3 SFCC 1987. A person violating any of the requirements of this section shall be guilty of a separate offense for each day or portion thereof and for each worker or person as to which any such violation has occurred.

C. *Other Remedies.* The city, any individual aggrieved by a violation of this section, or any entity the members of which have been aggrieved by a violation of this section, may bring a civil action in a court of competent jurisdiction to restrain, correct, abate or remedy any violation of this section and, upon prevailing, shall be entitled to such legal or equitable relief as may be appropriate to remedy the violation including, without limitation, reinstatement, the payment of any wages due and an additional amount as liquidated damages equal to twice the amount of any wages due, injunctive relief, and reasonable attorney's fees and costs.

D. *Nonexclusive Remedies and Penalties.* The remedies provided in this section are not exclusive, and nothing in this section shall preclude any person from seeking any other remedies, penalties, or relief provided by law.

(Ord. #2002-13, §8; Ord. #2003-8, §6)

28-1.9 Effect.

Nothing in this Living Wage Ordinance shall be deemed to nor shall be applied in such a manner so as to have a constitutionally prohibited effect as an ex post facto law or impairment of an existing contract within the meaning of New Mexico Constitution, Article II, §19. (Ord. #2002-13, §9)

28-1.10 Severability.

The requirements and provisions of this section and their parts, subparts and clauses are severable. In the event that any requirement, provision, part, subpart or clause of this section, or the application thereof to any person or circumstance, is held by a court of competent jurisdiction to be invalid or unenforceable, it is the intent of the governing body that the remainder of the section be enforced to the maximum extent possible consistent with the governing body's purpose of ensuring a living wage for persons covered by the section. (Ord. #2002-13, §10; Ord. #2003-8, §7)

28-1.11 Notice; Posting; and Publication.

Any business subject to the provisions of this section shall as a condition to obtaining and holding a city of Santa Fe business license or registration, post and display in a prominent location next to its business license or registration on the business premises a notice, in English and Spanish, that the business is in compliance with the provisions of this section and in particular post the text of subsections 28-1.5, 28-1.6 and 28-1.8 SFCC 1987. Failure to comply with this subsection shall be construed a violation of this section and, in addition, shall be considered grounds for suspension, revocation, or termination of the business license or registration. (Ord. #2003-8, §8)

28-1.12 Living Wage Review.

The city shall conduct a review of this section on or before July 1, 2005. In conducting said review the governing body may, at its discretion and pursuant to a duly-adopted resolution, appoint an ad hoc committee to advise and assist in making recommendations regarding this section and to investigate the economic and social effects of this section on Santa Fe. The city will contract with an independent third party to develop an evaluation that will generate objective measures on the effect of the Living Wage Ordinance on the health, security, and livelihood of Santa Feans by March 31, 2003. Data necessary for such an evaluation on Santa Fe city businesses will be compiled and presented to the governing body for their review on or before July 1, 2003. In compiling the data, consideration should be given to potential impacts on youth employment and possible recommendations that might prevent unforeseen consequences hurting children in the community. (Ord. #2003-8, §9)

EXHIBIT III – CONSTRUCTION ADMINISTRATION FORMS

The following forms included within the present Exhibit III shall be used during the construction process, as needed/applicable:

- Partial Payment Estimate Forms – 4 pages
[An MS Excel version of which will be made available to the selected Contractor at the Pre-Construction Conference]
- Work Change Directive Form (EJCDC C-940)
- Change Order Form (EJCDC C-941)
- Field Order Form (EJCDC C-942)

CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B

INFRASTRUCTURE IMPROVEMENTS PROJECT CITY OF SANTA FE WATER DIVISION Hospital Tank Replacement Project PARTIAL PAYMENT ESTIMATE				CONTRACT NO. _____ PARTIAL PAYMENT ESTIMATE NO. _____ PAGE 1 OF 4	
OWNER: City of Santa Fe Water Division		CONTRACTOR: _____		PERIOD OF ESTIMATE FROM: _____ TO: _____	
CONTRACT CHANGE ORDER SUMMARY				ESTIMATE	
No.	Agency Approval Date	Amount			
		Additions	Deductions		
					1. Original Contract \$ -
					2. Change Orders \$ -
					3. Revised Contract (1 + 2) \$ -
					4. Work Completed \$ -
					5. Stored Materials \$ -
					6. Subtotal (4 + 5) \$ -
					7. Retainage \$ -
					8. Previous Payments \$ -
					9. Subtotal (6-7-8) \$ -
					10. Tax @ 8.3125% \$ -
					11. Current Payment Due \$ -
TOTALS		\$ -	\$ -		
NET CHANGE		\$ -			
CONTRACT TIME					
Original (days)		On Schedule <input type="checkbox"/> Yes <input type="checkbox"/> No		Starting Date _____	
Revised				Projected Completion _____	
Remaining					
CONTRACTOR'S CERTIFICATION The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.			ENGINEER'S CERTIFICATION The undersigned certifies that, to the best of their knowledge and belief, the quantities shown in this estimate are correct and the work has been performed in general conformance with the Contract Documents.		
Contractor: _____ By _____ Date _____			Engineer: <u>Souder, Miller & Associates</u> By _____ Date _____		
APPROVED BY OWNER: Owner: <u>City of Santa Fe Water Division</u> By _____ Date _____			ACCEPTED BY AGENCY: The review and acceptance of this estimate does not attest to the correctness of the quantities shown or that the work has been performed in accordance with the Contract Documents. By _____ Title _____ Date _____		

CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B

CONSTRUCTION PROGRESS
CITY OF SANTA FE WATER DIVISION
Hospital Tank Replacement Project

Partial Payment Estimate No. _____
(construction period)

Contractor: _____

Item Description	Unit Price	Original Amount	Original Value	Revised Amount	Revised Value	Work Completed			Total Completed	Percent Complete	Balance To Finish
						Qty	Previous	This Period			
1		\$	-	\$	-	0	\$	-	\$	0.0%	\$
2		\$	-	\$	-	0	\$	-	\$	0.0%	\$
3		\$	-	\$	-	0	\$	-	\$	0.0%	\$
4		\$	-	\$	-	0	\$	-	\$	0.0%	\$
5		\$	-	\$	-	0	\$	-	\$	0.0%	\$
6		\$	-	\$	-	0	\$	-	\$	0.0%	\$
7		\$	-	\$	-	0	\$	-	\$	0.0%	\$
8		\$	-	\$	-	0	\$	-	\$	0.0%	\$
9		\$	-	\$	-	0	\$	-	\$	0.0%	\$
10		\$	-	\$	-	0	\$	-	\$	0.0%	\$
11		\$	-	\$	-	0	\$	-	\$	0.0%	\$
12		\$	-	\$	-	0	\$	-	\$	0.0%	\$
13		\$	-	\$	-	0	\$	-	\$	0.0%	\$
14		\$	-	\$	-	0	\$	-	\$	0.0%	\$
15		\$	-	\$	-	0	\$	-	\$	0.0%	\$
16		\$	-	\$	-	0	\$	-	\$	0.0%	\$
17		\$	-	\$	-	0	\$	-	\$	0.0%	\$
18		\$	-	\$	-	0	\$	-	\$	0.0%	\$
19		\$	-	\$	-	0	\$	-	\$	0.0%	\$
20		\$	-	\$	-	0	\$	-	\$	0.0%	\$
TOTALS (TAX NOT INCLUDED)											

CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B

MONTHLY CONSTRUCTION PROGRESS CERTIFICATE		CONTRACT NO.	
Hospital Tank Replacement Project		PARTIAL PAYMENT ESTIMATE NO.	
OWNER: City of Santa Fe Water Division	CONTRACTOR:	CONTRACT PERIOD FROM: TO:	
Field Orders Issued This Period:			
1		Issued <input type="checkbox"/>	Under Review <input type="checkbox"/>
2		Issued <input type="checkbox"/>	Under Review <input type="checkbox"/>
3		Issued <input type="checkbox"/>	Under Review <input type="checkbox"/>
Change Orders/Contractor Claims This Period:		Changes in Contract	
		Days	Price
			\$ -
Under Review (Outstanding) <input type="checkbox"/> New <input type="checkbox"/> Settled <input type="checkbox"/>			
			\$ -
Under Review (Outstanding) <input type="checkbox"/> New <input type="checkbox"/> Settled <input type="checkbox"/>			
			\$ -
Under Review (Outstanding) <input type="checkbox"/> New <input type="checkbox"/> Settled <input type="checkbox"/>			
			\$ -
Under Review (Outstanding) <input type="checkbox"/> New <input type="checkbox"/> Settled <input type="checkbox"/>			
			\$ -
On Schedule? Yes <input type="checkbox"/> No <input type="checkbox"/>		Comments:	
Days Left for Completion			
Briefly Describe Project Progress During This Period:			
Issues Addressed During This Period (Indicate Any Issues That Remain Unresolved):			
Engineer's Attestation:	Owner Concurrence:	*Contractor Concurrence:	
X	X	X	
Signature	Signature	Signature	
Print Name	Print Name	Print Name	
Title	Title	Title	
* Contractor agrees this certificate is a complete account of all change orders/claims for this contract period, and all outstanding change orders/claims from previous contract periods and waives any rights to further adjustments in contract times or price for any change orders/claims that originated in this contract period.			



WORK CHANGE DIRECTIVE NO. _____

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

Contractor is directed to proceed promptly with the following change(s):
Description:

Attachments: *[List documents supporting change]*

Purpose for Work Change Directive:

Directive to proceed promptly with the Work described herein, prior to agreeing to changes on Contract Price and Contract Time, is issued due to: *[check one or both of the following]*

- Non-agreement on pricing of proposed change.
 Necessity to proceed for schedule or other Project reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price \$ _____ [increase] [decrease].
Contract Time _____ days [increase] [decrease].

Basis of estimated change in Contract Price:

- Lump Sum Unit Price
 Cost of the Work Other

RECOMMENDED:	AUTHORIZED BY:	RECEIVED:
By: _____ Engineer (Authorized Signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable)

By: _____ Date: _____
Title: _____

CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B



FIELD ORDER NO. _____

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

Contractor is hereby directed to promptly execute this Field Order, issued in accordance with General Conditions Paragraph 11.01, for minor changes in the Work without changes in Contract Price or Contract Times. If Contractor considers that a change in Contract Price or Contract Times is required, submit a Change Proposal before proceeding with this Work.

Reference: _____
Specification(s) Drawing(s) / Detail(s)

Description:

Attachments:

ISSUED:	RECEIVED:
By: _____ Engineer (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____
Date: _____	Date: _____

Copy to: Owner

EXHIBIT IV – TECHNICAL SPECIFICATIONS

**CITY OF SANTA FE WATER DIVISION
HOSPITAL TANK REPLACEMENT PROJECT**

Table of Contents

GENERAL REQUIREMENTS

- 01 00 00 Basic Requirements
- 01 22 00 Measurement and Payment

EXISTING CONDITIONS

- 02 41 16 Structure Demolition

CONCRETE

- 03 10 00 Formwork
- 03 20 00 Reinforcement
- 03 23 00 Post-Tensioning Tendons
- 03 25 30 Waterstops
- 03 30 00 Cast-in-place Concrete
- 03 35 00 Procedure
- 03 90 00 Watertightness Testing

PLUMBING

- 22 05 29 Hangers and Supports

INTEGRATED AUTOMATION

- 25 01 00 Process Transmitters and Switches
- 25 02 00 Telemetry System

ELECTRICAL

- 26 05 00 General Provisions
- 26 05 10 Utility Work
- 26 06 10 Grounding Systems
- 26 12 10 Instrumentation Cable
- 26 12 20 600 Volt Cable
- 26 13 10 Rigid Conduit
- 26 13 20 Flexible Conduits
- 26 13 50 Pull Boxes
- 26 13 60 Outlet Boxes
- 26 13 70 Underground Duct Banks
- 26 13 80 Manholes and Handholes
- 26 14 10 Receptacles
- 26 28 50 Surge Protection Devices
- 26 40 00 Service Entrance
- 26 44 20 Lighting, Instrumentation and Distribution Panelboards
- 26 98 00 Start-Up, Commissioning and Field Testing

*CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
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EARTHWORK

- 31 05 19.13 Geotextile Fabric
- 31 10 00 Site Clearing
- 31 22 13 Rough Grading
- 31 23 23 Backfill

UTILITIES

- 33 11 00 Water Utility Distribution Piping
- 33 13 00 Disinfection of Water Utility Distribution
- 33 13 13 Water Storage Tank Disinfection

EXHIBIT V – GEOTECHNICAL REPORT

Geotechnical Engineering Services, Job No. 1-15411
Hospital Tank Replacement
Santa Fe, New Mexico

Prepared by Geo-Test, Inc.
Dated: September 18, 2015
34 pages

CITY OF SANTA FE WATER DIVISION - HOSPITAL TANK REPLACEMENT PROJECT
CIP 3039C, Bid '16/31/B

EXHIBIT VI – SPECIFICATIONS FOR MATERIALS AND EQUIPMENT

The following specifications detail the Materials and Equipment lump sum bid items on the Bid Form (refer to Bid Items 147 and 148).

TOOLS			
QTY	MANUFACTURER	CAT#	DESCRIPTION
2	Westward	IKEH5	Standard and Metric Socket set
1	Dewalt	DW292K	Electric Impact Wrench
2	Proto	J724S	Large Adjustable Wrench
1	Dewalt	DCGG57OK	Cordless Grease Gun 18V
2	Westward	35MT15	10 ton Hydraulic Bottle jack
1	Rigid	97075	Universal NPT Threading Machine Die Head 1/8 to 2"
1	Rigid	50960	High Speed Steel Replacement Pipe Die 1 to 2"
1	Trumbull	364-9986	3-Double Socket Ratchet Wrenches
1	Fluke	375FC	AC/DC Clamp Meter
1	Fluke	789	Process Meter loop calibration multimeter
1	Fluke	C125	Meter Case
1	Fluke	AC220	Alligator Clips
1	Fluke	TL220	Industrial Test Lead Set
1	Vivax/Metrotech	VM-810	Single Frequency Line Locator

SPARE PARTS			
QTY	MANUFACTURER	CAT#	DESCRIPTION
1	Allen Bradley	1769-16ER-BB1B	PLC Processor
2	Allen Bradley	1734-IE8C	Analog Input Point I/O Card
2	Allen Bradley	1734-TB	Analog Input Terminal Block
2	Xetawave	XETA9X-E Emancipator+	Ethernet Radio (NOTE: Radio must include mounting hardware)
1	IFM	PI2793	Pressure Sensor
1	IFM	TN2531	Temperature Sensor
1	Cla-Val	TBD	12" Complete Rebuild Kit (Diaphragm, Stem and Seat, etc.)
1	Cla-Val	TBD	3/8" Pilot Regulator and Solenoid Assembly
2	Rotork	Based on MOV provided	Power Supply

**All tools and spare parts shall be tagged with label and reflected on itemized list (Schedule of Values)

EXHIBIT VII – CONSTRUCTION DRAWINGS

**CITY OF SANTA FE WATER DIVISION
HOSPITAL TANK REPLACEMENT PROJECT**

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GENERAL

G-1	COVER
G-2	INDEX OF SHEETS
G-3	GENERAL NOTES & ABBREVIATIONS
G-4	SUMMARY OF QUANTITIES
G-5	MISCELLANEOUS QUANTITIES
G-6	EXISTING SITE PLAN & SURVEY CONTROL
G-7	EXISTING TANK PLAN
	<i>SUBTOTAL = 7 SHEETS</i>

CIVIL DEMOLITION

CD-1	DEMOLITION SITE PLAN
CD-2	TANK EXCAVATION PLAN
CD-3	DEMOLITION SEQUENCE PLAN VIEW
CD-4	DEMOLITION SEQUENCE SECTIONS & DETAILS
CD-5	DEMOLITION EXCAVATION SEQUENCE
CD-6	EXTENT OF SOIL NAILING
	<i>SUBTOTAL = 6 SHEETS</i>

CIVIL SITE

C-1	TANK REPLACEMENT PLAN
C-2	TANK GRADING PLAN
C-3	PARKING LOT GEOMETRY PLAN
C-4	TANK SECTIONS
C-5	RETAINING WALL PLAN
C-6	RETAINING WALL PROFILES
C-7	RETAINING WALL SECTIONS
C-8	STORM DRAIN PLAN & PROFILE
C-9	TANK FOOTING DRAIN
	<i>SUBTOTAL = 9 SHEETS</i>

CIVIL ROADWAY

CR-1	TEMPORARY CONSTRUCTION ACCESS ROAD PLAN
CR-2	TEMPORARY CONSTRUCTION ACCESS ROAD PLAN & PROFILE
CR-3	TEMPORARY CONSTRUCTION ACCESS ROAD INTERSECTION GEOMETRY
CR-4	TEMPORARY CONSTRUCTION ACCESS ROAD STRUCTURE SECTION
CR-5	TEMPORARY CONSTRUCTION ACCESS ROAD SECTIONS
CR-6	TEMPORARY CONSTRUCTION ACCESS ROAD INTERSECTION REMOVAL & RESTORATION
	<i>SUBTOTAL = 6 SHEETS</i>

STRUCTURAL

S-1	GENERAL NOTES AND TYPICAL TANK DETAILS
S-2	FLOOR PLAN AND SECTIONS
S-3	FOUNDATION SECTIONS & DETAILS
S-4	TYPICAL WALL SECTIONS & DETAILS

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S-5	WALL PILASTER SECTIONS & DETAILS
S-6	ROOF PLAN
S-7	ROOF SECTIONS & DETAILS
S-8	STAIR PROFILE 2ND AND 3RD LEVEL
S-9	STAIR PROFILE 1ST LEVEL
S-10	STAIR LAYOUT & DETAILS
S-11	TANK ACCESS ROOF HATCH FOR STAIRS
	<i>SUBTOTAL = 11 SHEETS</i>

MECHANICAL

M-1	TANK CONTROL SITE PLAN
M-2	TANK PLUMBING PLAN
M-3	TANK INLET/OUTLET PLAN & PROFILE
M-4	EXISTING VALVE VAULT
M-5	VALVE VAULT PLUMBING
M-6	VALVE VAULT SECTIONS
M-7	WATER SUPPLY LINE FOR IRRIGATION
	<i>SUBTOTAL = 7 SHEETS</i>

DETAILS

D-1	CHAIN LINK FENCE
D-2	KEYSTONE RETAINING WALL SYSTEMS (TYPICAL WALL DETAILS)
D-3	KEYSTONE RETAINING WALL SYSTEMS (TYPICAL WALL DETAILS)
D-4	TYPICAL WALL TREE PLANTING DETAILS
D-5	RETAINING WALLS
D-6	RETAINING WALLS (2)
D-7	WATERLINE DETAILS
D-8	ROAD CLOSURE GATE DETAILS
	<i>SUBTOTAL = 8 SHEETS</i>

LANDSCAPE ARCHITECTURE

L-1	LANDSCAPE PLAN
L-2	LANDSCAPE IRRIGATION PLAN
L-3	LANDSCAPE DETAILS
	<i>SUBTOTAL = 3 SHEETS</i>

**SUPERVISORY CONTROL & ACQUISITION (SCADA) AND
PIPING & INSTRUMENTATION DIAGRAM (P&ID)**

SCADA-1	ALTITUDE VALVE VAULT & SCADA BUILDING SCHEMATIC
SCADA-2	TANK PLAN P&ID
SCADA-3	ALTITUDE VALVE P&ID
	<i>SUBTOTAL = 3 SHEETS</i>

ELECTRICAL

E-1	VALVE VAULT PLAN
E-2	ALTITUDE VALVE VAULT PLAN
E-3	CONDUIT SCHEDULE & LEGEND
	<i>SUBTOTAL = 3 SHEETS</i>

NEW MEXICO DEPARTMENT OF TRANSPORTATION STANDARD DRAWINGS

570-02-1/2	CULVERT PIPE END SECTION (METAL)
602-01-1/1	WIRE ENCLOSED RIPRAP CLASS "A"
602-02-1/1	EROSION CONTROL AT CULVERT OUTLETS
603-01-7/7	T.E.S.C.M. OFFSITE TRACKING PREVENTION & DIVERSION DIKE
606-GR31-1/20	W-BEAM GUARDRAIL

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607-01-1/4 BARBED WIRE AND WOVEN WIRE FENCE PLACEMENT
607-01-2/4 BARBED WIRE AND WOVEN WIRE FENCE PLACEMENT
608-001-1 PEDESTRIAN ACCESS ROUTE - GENERAL NOTES
608-001-2 PERPENDICULAR CURB RAMPS
608-001-3 PARALLEL CURB RAMPS
608-001-4 DIAGONAL CURB RAMPS
608-001-5 COMBINATION CURB RAMPS
608-001-6 PEDESTRIAN REFUGE ISLAND
608-001-7 CURB RAMP AND SIDEWALK TRANSITION DETAILS
608-001-8 DETECTABLE WARNING SURFACE
608-001-9 DRIVEWAY APRONS
608-001-10 DRIVEWAY APRONS
608-001-11 PEDESTRIAN ACCESS DETAILS STAIRWAYS AND HANDRAILS
608-001-12 PEDESTRIAN ACCESS DETAILS PARKING AND PASSENGER LOADING ZONES
609-01-1/1 SIDEWALK CURB AND GUTTER
623-01-1/1 MEDIAN DROP INLET JUNCTION BOX, GRATES, NOTES AND QUANTITIES
623-02-1/1 MEDIAN DROP INLET DETAIL AND QUANTITIES - TYPE I AND II
623-03-1/1 MEDIAN DROP INLET DETAIL AND QUANTITIES - TYPE III
623-06-1/1 MEDIAN DROP INLET 5'-0" x 5'-0" - DETAILS AND QUANTITIES
662-01-1/3 PRECAST CONCRETE MANHOLE TYPE "C" FOR STORM DRAIN
662-01-2/3 PRECAST CONCRETE MANHOLE TYPE "E" FOR STORM DRAIN
662-01-3/3 PRECAST CONCRETE MANHOLE FRAME LID DETAILS AND STEP DETAILS
SUBTOTAL = 27 SHEETS

TOTAL NUMBER OF SHEETS = 90 SHEETS

SECTION 01 00 00
BASIC REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Summary:
 - 1.2: Contract description.
 - 1.3: Special considerations.
 - 1.4: Work by Owner.
 - 1.5: Contractor's use of premises.
 - 1.6: Specification conventions.

- B. Price and Payment Procedures:
 - 1.7: Testing and inspection allowances.

- C. Administrative Requirements:
 - 1.8: Coordination.
 - 1.9: Suspension of Work.
 - 1.10: Field engineering.
 - 1.11: Pre-Construction Conference.
 - 1.12: Progress meetings.
 - 1.13: Cutting and patching.

- D. Submittals:
 - 1.14: Submittal procedures.
 - 1.15: Proposed products list.
 - 1.16: Product data.
 - 1.17: Shop drawings.
 - 1.18: Manufacturer's instructions and certificates.

- E. Quality Requirements:
 - 1.19: Quality control.
 - 1.20: Tolerances.
 - 1.21: References.
 - 1.22: Manufacturer's field services and reports.
 - 1.23: Examination.

- F. Temporary Facilities and Controls:
 - 1.24: Temporary services.
 - 1.25: Access roads.
 - 1.26: Progress cleaning and waste removal.
 - 1.27: Project identification.
 - 1.28: Barriers and fencing.
 - 1.29: Protection of installed work.
 - 1.30: Security.

- 1.31: Water control.
- 1.32: Pollution and environmental control.
- 1.33: Removal of utilities, facilities, and controls.

G. Product Requirements:

- 1.34: Products.
- 1.35: Delivery, handling, storage, and protection.
- 1.36: Substitutions.

H. Execution Requirements:

- 1.37: Closeout procedures.
- 1.38: Final cleaning.
- 1.39: Starting of systems.
- 1.40: Demonstration and instructions.
- 1.41: Testing, adjusting and balancing.
- 1.42: Protecting installed construction.
- 1.43: Project record documents.
- 1.44: Operation and maintenance data.
- 1.45: Spare parts and maintenance materials.
- 1.46: Warranties.

1.2 CONTRACT DESCRIPTION

- A. Work of the Project includes demolition of an existing 4 million gallon water tank and construction of a new dual compartment 4 million gallon pre-stressed, post-tensioned water storage tank and retaining walls, landscaping, storm drainage and tank controls.
- B. Perform Work of Contract under a stipulated price basis with Owner in accordance with Conditions of Contract.

1.3 SPECIAL CONSIDERATIONS

- A. Ground surfaces will be restored to their original condition by grading, and seeding with native plant species.
- B. Contractor will be required to construct a temporary construction access road off of St. Michaels drive with limited right turn in and right turn out only. All trucks (delivery or removal of waste) will be required to approach the site off of I-25 to St. Michaels drive and leave the site heading south on St. Michaels drive to St. Francis drive. U-turns of any kind should be avoided.
- C. Working hours will be restricted from no earlier than 7am to no later than 6pm.
- D. No concrete crushing activities will be allowed on site.
- E. The construction staging area will be shared with McCarthy Building Companies who will be constructing a new wing on the Christus St. Vincent hospital. Contractor to coordinate construction staging with McCarthy Building Companies to ensure there are no conflicts.

- F. Contractor must provide water for construction at the Contractor's expense. The Owner has indicated that water can be made available for purchase.
- G. Contractor shall submit a Testing and Disinfection schedule to the Engineer for approval prior to performing the respective activities. Hydrostatic testing of the waterline, disinfection and bacteriological testing shall follow specifications outlined in Section 33 11 00 Water Utility Distribution Piping, 33 13 00 Disinfection of Water Distribution, AWWA C600, AWWA C605, AWWA C651 and New Mexico Standard Specifications for Public Works Construction.
- H. Prior to beginning construction activities, the Contractor must furnish full-coverage video documentation of the entire construction site. The video must include coverage of all areas and adjacent features that may potentially be impacted by the impending construction work. Contractor must submit two (2) copies of the video documentation on DVD format as part of the submittal process.
- I. Contractor shall prepare record drawing information under the direction of a Licensed Professional Surveyor. Refer to Article 1.43 Project Record Documents below and General Notes on the Drawings for specific requirements related to As-Built Drawings.
- J. Contractor shall coordinate with Owner for tie-in to existing water system. Contractor shall notify Engineer prior to performing the respective activities.
- K. Contractor must maintain a full set of Drawings and Technical Specifications at the construction site at all times throughout the construction process. All subcontractors must possess at least all Drawings and Technical Specifications pertaining to their portion of the work while on the construction site at all times.

1.4 WORK BY OWNER

Not applicable.

1.5 CONTRACTOR'S USE OF PREMISES

- A. No work shall be done before 7:00 A.M. or after 6:00 P.M., local time on a working day, on Sundays, or on legal holidays, except as necessary for the proper care and protection of work already performed, or during emergencies.
- B. The Contractor shall make every effort to minimize noise caused by his operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise.
- C. The Contractor shall restrict his operations as nearly as possible to the immediate site. Unnecessary cutting of vegetation adjacent to the site is prohibited. Every effort shall be made to minimize erosion during and after construction and the site shall be returned to its original condition, except where improvements are indicated or required.
- D. The Contractor shall take affirmative action to prevent the misuse of the natural environment, wasting of natural resources, or destruction of natural values.

- E. The Contractor shall conform to all requirements set forth in the latest edition of the New Mexico Standard Specifications for Public Works Construction with latest revision, and Occupational Safety and Health Administration Regulations for trenching, shoring and excavation, and all other activities where such regulations apply. The Contractor and all subcontractors shall conduct all activities in conformance with federal and state laws and regulations relating to occupational health and safety. Authorized inspectors from NMED's Occupational Health and Safety Bureau shall have unobstructed access to project sites and shall not be impeded in any way from performance of their duties.

1.6 SPECIFICATION CONVENTIONS

- A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.
- B. The Contractor shall furnish all materials, labor, plant and equipment necessary to complete the contract work as called for by the Technical Specifications and as indicated on the Drawings. Material and work, either expressed or implied, necessary for the satisfactory completion of the contract work shall be considered an integral part thereof.

- C. All standards incorporated herein by reference shall be the latest edition, unless otherwise specified. The abbreviations and applicable standards are described below:

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AIA	American Institute of Architects
ANSI	American National Standards Institute, Inc.
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
CID	Construction Industries Division of the NM Regulation and Licensing Department
EJCDC	Engineers Joint Contract Documents Committee
EPA	Environmental Protection Agency
IBC	International Building Code
ISO	International Organization for Standardization
MSJC	Masonry Standards Joint Committee
NACE	National Association of Corrosion Engineers
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Department of Environment
NMSSPWC	New Mexico Standard Specifications for Public Works Construction
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Administration
SAE	Society of Automotive Engineers
SSPC	Steel Structure Painting Council
UL	Underwriters Laboratories, Inc.

1.7 TESTING AND INSPECTION ALLOWANCES

- A. Testing Allowance: The bid schedule includes a predetermined sum to cover the cost of testing and inspection services as required in the Contract Documents.
- B. Contractor shall submit details regarding the proposed testing laboratory or inspection firm, including a statement of qualifications and a proposed schedule of unit price costs for testing and inspection to be completed under the allowance. Any additional costs, such as

travel time, shall also be detailed. Engineer may require the Contractor to solicit additional quotes if the proposed costs are not competitive.

- C. Costs Included in Allowance: Cost of engaging testing or inspection firm, execution of tests or inspection, and reporting of results.
- D. Costs Not Included in Allowance:
 - 1. Incidental labor and facilities required to assist testing or inspection firm.
 - 2. Cost of disinfection of waterlines, if applicable.
 - 3. Costs of hydrostatic pressure testing or testing of material welds as called for in the Contract Documents.
 - 4. Costs of failed tests.
- E. Costs will be drawn from testing allowance and paid based on invoice(s) submitted to Contractor by testing or inspection firm(s), and reimbursed at cost, with no markup by Contractor. Contractor shall submit appropriate NTTC form to testing firm to assure tax is not included on invoices.
- F. Refer to Section 7.6 - TESTS of the General Conditions of the Contract for Construction.

1.8 COORDINATION

- A. Contractor to coordinate construction staging with other contractor onsite, per Article 1.3 Special Considerations above.
- B. Coordinate scheduling, submittals, and Work of various sections of specifications to ensure efficient and orderly sequence of installation of interdependent construction elements.
- C. Verify utility requirement characteristics of operating equipment are compatible with building utilities.
- D. Submit a Traffic Control Plan which shall be approved by the Engineer before continuing with the project.
 - 1. All existing signs, markers, delineators, etc. within the construction limits shall be removed, stored, and reset.
 - 2. Subject to the approved Traffic Control Plan, at least one lane shall be open to traffic at all times. Provide proper signage to maintain the traffic lane in such a manner as to assure proper safety to the traveling public on all affected roads. Provide access to all private and public property at all times except when grading, excavation and backfill operations are being conducted immediately in front of the property, in which case access will not be denied for more than 4 hours without approval from the Engineer.
 - 3. Traffic lanes provided during construction shall be maintained in such a condition under all weather conditions, so as to permit the reasonable passage of passenger vehicles, and shall be kept graded and smooth and watered several times daily, as needed, to control dust.
- E. Obtain all applicable permits from the NMDOT before boring under any roadways or working along or across NMDOT rights-of-way, unless the permits have already been

obtained by the Engineer. The Contractor is also responsible for obtaining all applicable local, county and state building and development permits not previously obtained by Engineer or Owner. This includes permits from the Construction Industries Division of the Regulation and Licensing Department of the State of New Mexico, and any other regulatory agency having jurisdiction.

- F. Contractor is responsible for timely scheduling of any pertinent inspections with local, county and state agencies with jurisdiction, and as required by the permits.
- G. Coordinate space requirements and installation of mechanical and electrical work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable.
- H. All notices, demands, requests, instructions, approvals, proposals and claims must be in writing.
 - 1. Any notice to or demand upon the Contractor shall be sufficiently given if delivered at the office of the Contractor stated on the signature page of the Agreement.
 - 2. All papers required to be delivered to the Owner shall, unless otherwise specified in writing to the Contractor, be delivered to the Owner at the address stated on the signature page of the Agreement.
 - 3. Any such notice shall be deemed to have been given as of the time of actual delivery, in the case of mailing, when the same should have been received in due course of post, or in the case of telegrams, certified mail, or telephone facsimiles, at the time of actual receipt as the case may be.
- I. Contractor to coordinate with Geotechnical Engineer for additional borings to be drilled directly under the existing tank footprint once it's been demolished/removed. This is necessary to verify the soil bearing pressure as recommended in the geotechnical report.

1.9 SUSPENSION OF WORK

- A. The Owner may order suspension of work due to seasonal or other conditions unsuitable for construction work.
- B. Maintenance during suspension: Prior to suspension for any cause, the Contractor shall take necessary precautions to protect the work during the period of suspension from any factors which would contribute to its deterioration.
- C. Time elapsed during suspension of the work shall not count as contract time. The Contractor shall make no claim for damages due to delay, additional mobilization charges, nor any additional costs that may be incurred solely due to suspension of work.
- D. Upon approval, additional contract time granted by the Owner shall be in full force and effect, the same as though it were the original date for completion, and will be shown as the completion date plus an amount of additional working days. Any time required to complete the work beyond the contract time or additional contract time will result in the assessment of liquidated damages, as specified in the Contract Documents. Failure to make timely requests in writing as stipulated in Section 8.3 DELAYS AND EXTENSIONS OF

TIME of the General Conditions of the Contract for Construction will be considered as a waiver on the part of the Contractor as to the need for additional contract time.

1.10 FIELD ENGINEERING

- A. Establish elevations, lines, and levels and certify and confirm elevations and locations of the Work, conforming with the Contract Documents, with the Engineer prior to performing any excavation.
- B. Verify field measurements are as indicated on shop drawings or as instructed by manufacturer.
- C. From the information provided by the Owner, the Contractor shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, easement alignments, stakes for pipe locations and other working points, lines, elevations and cut sheets.

1.11 PRE-CONSTRUCTION CONFERENCE

- A. Engineer will schedule Pre-Construction Conference after Notice of Award for affected parties.
- B. The Contractor, or his duly authorized representative, and subcontractor representatives will attend the meeting.

1.12 PROGRESS MEETINGS

- A. Schedule in coordination with the Engineer at maximum monthly intervals, and attend all Progress Meetings throughout progress of the Work.
- B. The purpose of the meetings will be to review the following:
 - 1. Work progress since previous meetings.
 - 2. Field observations, problems, conflicts.
 - 3. Problems which impede construction schedule.
 - 4. Corrective measures and procedures to regain projected schedule.
 - 5. Revisions to construction schedule.
 - 6. Plan progress and schedule during succeeding work period.
 - 7. Coordination of schedules.
 - 8. Off-site fabrication and delivery schedules.
 - 9. Maintenance of quality standards.
 - 10. Proposed changes, construction schedule and completion date.
 - 11. Coordination of separate contracts.
 - 12. Record or "as-built" drawings of completed work.
 - 13. Other business as required.
 - 14. Regulatory requirements including OSHA, New Mexico Board of Labor, and others as applicable.
 - 15. Funding requirements including RUS, NMED, NMFA, DFA, USEPA and others as applicable.

- C. During each meeting, the Contractor is required to present any issues which may impact his Work, with a plan to resolve these issues expeditiously.
- D. Together with each payment application, Contractor must present the current as-built drawings reflecting all work performed to date.

1.13 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching new Work; restore Work with new Products.
- B. Execute cutting, fitting, and patching, including excavation and fill, to complete Work, and to:
 - 1. Uncover Work to install or correct ill-timed Work.
 - 2. Remove and replace defective and non-conforming Work.
 - 3. Remove samples of installed Work for testing.
 - 4. Provide openings in elements of Work for penetration of mechanical and electrical Work.
- C. Cut masonry and concrete materials using masonry saw or core drill. Restore Work with new Products in accordance with requirements of Contract Documents.
- D. Fit Work tight to adjacent elements. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- E. Refinish surfaces to match adjacent finishes.
- F. Refer to Section 4.14 CUTTING AND PATCHING of the General Conditions of the Contract for Construction.

1.14 SUBMITTAL PROCEDURES

- A. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.
- B. Apply Contractor's stamp, signed or initialed, certifying that review, verification of Products required, field dimensions and elevations, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.
- C. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of completed Work.
- D. Revise and resubmit submittals as required by the Engineer; identify changes made since previous submittal.
- E. Submit number of copies Contractor requires, plus two copies Engineer will retain, at a minimum, unless otherwise indicated at the Pre-Construction Conference.

- F. Transmit each submittal with Engineer accepted form.
- G. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- H. Prior to commencing construction activities, Contractor shall provide two (2) copies of the corresponding Project safety plan to the Engineer.
- I. Refer to Section 4.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES of the General Conditions of the Contract for Construction.

1.15 PROPOSED PRODUCTS LIST

- A. Unless required as an attachment to Bid, within 15 days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.16 PRODUCT DATA

- A. Product Data: Submit to Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Submit copies and distribute in accordance with Submittal Procedures article.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

1.17 SHOP DRAWINGS

- A. Shop Drawings:
 - 1. Submitted to Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
 - 2. Include detail design calculations, shop drawings, fabrication, and installation drawings, erection drawings, list, graphs, catalog sheets, data sheets, and similar items.
 - 3. Design calculations shall bear the signature and seal of an engineer registered in the appropriate branch and in the state wherein the project is to be built, unless otherwise directed.
 - 4. After review, provide copies and distribute in accordance with Submittal Procedures article and for record documents purposes as specified.
 - 5. Except as may otherwise be indicated herein, the Engineer will return copies of each submittal to the Contractor with comments noted thereon, within 30 calendar days following their receipt by the Engineer.

- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Submit number of opaque reproductions Contractor requires, plus two copies Engineer will retain.
- D. Refer to Section 4.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES of the General Conditions of the Contract for Construction.

1.18 MANUFACTURER'S INSTRUCTIONS AND CERTIFICATES

- A. When specified in individual specification sections, submit manufacturer printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- C. When specified in individual specifications sections, submit certifications by manufacturer to Engineer, in quantities specified for Product Data.
- D. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- E. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.
- F. Refer to Section 4.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES of the General Conditions of the Contract for Construction.

1.19 QUALITY CONTROL

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturer's instructions.
- C. Comply with specified standards as minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.20 TOLERANCES

- A. Monitor fabrication and installation tolerance control of installed products over suppliers, manufacturers, products, site conditions, and workmanship, to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply fully with manufacturer's tolerances.

1.21 REFERENCES

- A. Conform to reference standards by date of issue current as of date of Contract Documents.
- B. When specified reference standard conflict with Contract Documents, request clarification from Engineer before proceeding.

1.22 MANUFACTURER'S FIELD SERVICES AND REPORTS

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to furnish qualified staff personnel to observe site conditions and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions that are supplemental or contrary to manufacturer's written instructions.

1.23 EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify utility services are available, of correct characteristics, and in correct location.
- C. Contractor is solely responsible for utility location, protection and verification. Contractor must notify New Mexico One Call System Inc., at 811, and all local utility providers, three (3) days before starting utility line construction.
- D. It shall be the responsibility of the Contractor to become acquainted with the location of all underground structures which may be encountered or which may affect the Work hereunder.

1.24 TEMPORARY SERVICES

- A. Provide, maintain and pay for suitable quality water service as required.
- B. Maintain uninterrupted water and electric service to all properties adjoining the Work, except where specifically approved by the authority having jurisdiction. Services damaged by the Contractor shall be immediately and permanently repaired or replaced at the expense of the Contractor. Give a minimum of 48-hour advance notice to occupants of adjacent properties before interrupting any service. Any interruption of service shall be kept to the minimum length of time possible.
- C. Until final inspection and approval of the Work and issuance of the Certificate of Substantial Completion, the Contractor is responsible for all Work directly or indirectly affected by the Contractor's activities. Such responsibility continues for all Work detailed on the punch list that may accompany the Certificate of Substantial Completion, until satisfactorily completed by the Contractor and approved by the Owner and Engineer.

- D. Furnish, install and maintain any temporary water storage structures, electrical connections, meters, wiring, outlets, switches, lamps, etc., as necessary for the work. The Contractor shall provide such temporary heat as may be necessary for the prevention of injury to the work or material through dampness or cold. All temporary connections, installations, facilities and supplies furnished or installed as specified in this paragraph, shall be removed prior to the completion of the Contract, and the premises left perfectly clean and satisfactory to the Owner.
- E. Maintain ambient temperature above freezing in enclosed/occupied areas where construction is in progress, unless indicated otherwise in specifications.
- F. Provide temporary electricity and power outlets for construction operations, connections, branch wiring, distribution boxes, and flexible power cords as required. Do not disrupt Owner's need for continuous service.
- G. Provide and maintain required sanitary facilities and enclosures in clean and sanitary condition.

1.25 ACCESS ROADS

- A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.
- B. Existing on-site roads, designated by the Owner, may be used for construction traffic.

1.26 PROGRESS CLEANING AND WASTE REMOVAL

- A. Collect and maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
- B. Remove waste and surplus materials, rubbish, and construction facilities from site. Restore all job sites and adjoining areas, including roads and driveways, to a condition equal to or better than the original status. Special attention will be made to not disturb unimproved roads by placing any excavated material to the sides of these roads when water lines are located along the right-of-way.
- C. Brush and trees shall be felled parallel to the right-of-way to minimize damage to trees and structures on adjacent property. All brush, tree tops, stumps and other debris shall be removed from the right-of-way and disposed of by the Contractor, subject to and in conformity with the special provisions applying to the tract of land involved (if any). The Contractor shall not destroy nor remove any trees, shrubbery, nor any other improvements, without permission of the Owner.
- D. The Contractor shall not dispose of debris, refuse or sanitary wastes in an open dump or in a natural watercourse, whether on public or private property, or in such places that undesirable wastes can eventually be exposed or carried to a natural watercourse.

1.27 PROJECT IDENTIFICATION

- A. No project sign is required.
- B. The Contractor shall not erect, or permit the erection of advertising signs. Only minimal identification and direction signs shall be permitted on the site. Unnecessary or obnoxious posters, pictures, signs, symbols, drawings or writing on work, material or equipment, resulting from vandalism or other causes, shall be covered or removed by the Contractor.

1.28 BARRIERS AND FENCING

- A. Provide barriers or fencing to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage.

1.29 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where specified in individual specification sections.

1.30 SECURITY

- A. Provide security and facilities to protect Work and existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.31 WATER CONTROL

- A. Provide erosion control.
- B. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- C. In the event that one acre of earth or more is disturbed, the Contractor shall submit to the Owner's Representative a Storm Water Pollution Prevention Plan (SWPPP) that will address all construction phases and the proposed pollution prevention and sediment control measures. This shall be done in accordance with the National Pollution Discharge Elimination System (NPDES) general permit requirements for all construction activities, and shall include all required reporting. If the Bid Form does not include an item for preparation and implementation of the SWPPP, the cost thereof will be considered incidental to related work.
- D. The Contractor shall conduct his operations to minimize damage to natural watercourses, and shall not permit petroleum products, volatile fluid wastes, or any other wastes which are prohibited by local ordinances, or excessive amounts of silt, clay, or mud to enter any drainage system. The bed of natural watercourses or man-made irrigation ditches shall be restored to normal gradient and cross-section after being disturbed.

1.32 POLLUTION AND ENVIRONMENTAL CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
- B. Provide dust control, erosion and sediment control, noise control, pest control and rodent control to allow for proper execution of the Work. Short term effects of dust produced by equipment will be mitigated by sprinkling traffic areas with water. Motor equipment shall be kept in repair and equipped with anti-pollution devices, if possible, to cut down on exhaust emissions. Burning as a method of cleaning or disposal will not be permitted without approval of the proper authorities.
- C. Comply with all applicable standards, orders, or regulations issued pursuant to the Clean Air Act of 1970 (42 U.S.C. 1251 et seq.) as amended. Violations shall be reported to the New Mexico Environment Department.
- D. The Contractor shall be responsible for the reporting and the cleanup of spills associated with project construction and shall report and respond to spills of hazardous materials such as gasoline, diesel, motor oil, solvents, chemicals, toxic and corrosive substances, and other materials which may be a threat to the public health or the environment. The Contractor shall be responsible for reporting past spills encountered during construction and of current spills not associated with construction. Reports shall be made to the New Mexico Environment Department Emergency Response Team at (505) 476-6025 during business hours. If there is no emergency situation the Contractor can leave a message regarding the nature of the spill, location and contact information. For emergencies that require immediate attention and mitigation, and there is no response at the NMED Emergency Response Team number above, call (505) 827-9329. For emergencies that pose immediate danger to public health or property, call 911. For any and all spills, Contractor shall also immediately contact the Owner's Representative.
- E. The Contractor shall clean up any unreported spills associated with project construction identified after construction.

1.33 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, and materials, prior to Substantial Completion review.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

1.34 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation,

fabrication, conveying and erection of the Work. Products may also include existing materials or components specifically identified for reuse.

- B. Do not use materials and equipment removed from existing premises, except as specifically identified or allowed by the Contract Documents.
- C. Provide interchangeable components of same manufacturer for components being replaced.

1.35 DELIVERY, HANDLING, STORAGE, AND PROTECTION

- A. Deliver, handle, store, and protect Products in accordance with manufacturer's instructions.

1.36 SUBSTITUTIONS

- A. Substitutions will only be considered when Product becomes unavailable through no fault of Contractor, or where an "approved equal" is specifically allowed elsewhere in the Technical Specifications or noted on the Drawings.
- B. Specific manufacturers may be required for certain items in order to maintain consistency with the Owner's existing inventory. In such cases, substitutions will not be allowed as indicated in each specification section where applicable.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. Submit three [3] copies of request for Substitution to the Engineer for consideration. Limit each request to one proposed Substitution.

1.37 CLOSEOUT PROCEDURES

- A. Submit written certification Contract Documents have been reviewed, Work has been inspected, and Work is complete in accordance with Contract Documents and ready for Engineer's inspection.
- B. Submit final Application for Payment identifying total adjusted Contract Price, previous payments, and amount remaining due.
- C. Among required closeout submittals include: Release of Liens, Consent of Surety, and Certification of Labor Standards.

1.38 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Upon completion of the work under this contract, thoroughly clean and make any needed repairs caused by damage during construction to any existing utilities or other structures on the site.

- C. Notify the Engineer in writing once final cleaning is complete. The final estimate will not be prepared until the Contractor has complied with all requirements set forth and the Engineer has made his final inspection of the entire work and is satisfied that it is properly constructed and the site properly cleaned.

1.39 STARTING OF SYSTEMS

- A. Provide seven [7] days notification prior to start-up of each item.
- B. Ensure each piece of equipment or system is ready for operation.
- C. Execute start-up under supervision of responsible persons in accordance with manufacturer's instructions.
- D. Submit written report stating equipment or system has been properly installed and is functioning correctly.

1.40 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six [6] months.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at designated location.

1.41 TESTING, ADJUSTING, AND BALANCING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Owner retains the right to appoint, employ, and pay for services of independent firm to perform testing, adjusting, and balancing. Reports will be submitted by independent firm to Engineer indicating observations and results of tests and indicating compliance or non-compliance with specified requirements and with requirements of Contract Documents.
- C. Contractor will cooperate with independent firm; furnish assistance as requested.
- D. Re-testing required because of non-conformance to specified requirements will be charged to Contractor.

1.42 PROTECTING INSTALLED CONSTRUCTION

- A. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

- B. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- C. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- D. Prohibit traffic from landscaped areas.

1.43 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of Contract Documents to be utilized for record documents.
- B. Record actual revisions to the Work. Record information concurrent with construction progress.
- C. Specifications: Legibly mark and record at each Product section description of actual Products installed.
- D. Record Documents and Shop Drawings (As-Built Drawings): Legibly mark each item to record actual construction. Deliver two (2) sets of As-Built Drawings with redlines to the Owner upon completion of the Project. The As-Built Drawings will be submitted to the Engineer prior to processing of final payment to the Contractor.
- E. The Contractor shall also submit electronic survey information of the actual placement of lines and appurtenances. Submittals to be a combination of electronic survey point files with copies of survey field book information and/or electronic CAD drawing files including relevant survey point file and field book information. All survey information and electronic CAD drawings to be tied to established survey control as provided on plan set survey control sheet.
- F. Submit documents to Engineer together with claim for final Application for Payment.

1.44 OPERATION AND MAINTENANCE DATA

- A. Submit 3 sets prior to final inspection, bound in 8-1/2 x 11 inch text pages, three D side ring binders with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS" and title of project.
- C. Internally subdivide binder contents with permanent page dividers, logically organized.
- D. Contents:
 - 1. Part 1: Directory
 - a. List names, addresses, and telephone numbers of Engineer, Contractor, subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system:

- a. Equipment summary, operational procedures, preventive maintenance procedures and schedules, parts list, shop drawings, safety issues.
3. Part 3: Project documents and certificates.
 - a. All equipment warranties, affidavits, and certifications required by the Technical Specifications shall be placed in this part.

1.45 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.
- B. Provide tools and spare parts specified in Exhibit VI - Specifications for Materials and Equipment, in the quantities specified, and per the manufacturer and model specified.
- C. Deliver to project site and place in location as directed by Engineer; obtain receipt prior to final payment.

1.46 WARRANTIES

- A. Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers for all products with extended warranties beyond one (1) year.
- B. Submit prior to final Application for Payment.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 22 00

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Measurement and payment shall be as specified in this Section.
- B. Work to be performed under this contract will be paid for on a unit price basis under the appropriate Bid Items on the Bid Form. All costs for work shown on Drawings or described in Specifications shall be incidental to the Contract and shall be included in the Contract Price. A claim by the Contractor for extra compensation for an item shown on the Drawings or described in the Specifications will not be considered for any reason, including but not limited to, the claim that it does not fall within the scope of one of the Bid Items.
- C. Contractor shall, within 10 days of receipt of Notice to Proceed, submit a complete breakdown of any lump sum bid items showing value assigned to each part of work including overhead and profit. Payment for materials delivered but not fully incorporated in work will be made only if such materials are listed and assigned a value in Contractor's submittal.
- D. General Scope of Work under each Bid item includes labor and materials required for construction of a completely functional and operational water storage facility as detailed on the Drawings and in these Specifications.
- E. Estimated quantities stipulated on the Bid Form are approximate and are to be used only (a) as a basis for determining the probable cost of the work and (b) for the purpose of comparing the bids submitted for the work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment of work and materials will be the actual amount of work done and materials furnished.

1.2 BID ITEM DESCRIPTIONS

- A. Item numbers listed below correspond directly to Bid Item numbers on the Bid Form. Item Codes identified on the Bid Form correspond to NMDOT specifications.

General

Item No. I - Mobilization

Includes: Work consists of preparatory work, preliminary operations, movement of personnel, equipment, supplies and incidentals to the Project including but not limited to:

- All costs for Contractor's mobilization and demobilization, insurance and bonds, construction permits and fees, water for dust control and miscellaneous construction, job trailers and site administration expenses, and utilities to the job trailers including power, telephone, etc.

Payments:

Submit Mobilization schedule of values as part of the CPM or monthly progress schedule to the project manager. Partial payments will be made in accordance with the approved Mobilization schedule of values.

Item No. 2 - SWPPP

Includes: All cost associated with the preparation, implementation and administration of the Storm Water Pollution Prevention Plan throughout the duration of the project per the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction section 603 (current edition, typ.).

Item No. 3 - Traffic Control

Includes: All cost associated with design, DOT permitting, implementation and administration throughout the duration of the project (See Basic Requirements section 01 00 00).

Payments:

Submit traffic Control schedule of values as part of the CPM or monthly progress schedule to the project manager. Partial payments will be made in accordance with the approved Traffic Control schedule of values.

Item No. 4 - Geotechnical under removed tank

Includes: Additional borings underneath the demolished tank to verify the soil bearing pressure recommended by the geotechnical report (as prepared by Geo-Test on September 18, 2015 with the job No. 1-50411). Number and location of borings as recommended by the Geotechnical engineer. Geotechnical lab tests, reports and recommendations.

Payments:

Submit Geotechnical schedule of values as part of the CPM or monthly progress schedule to the project manager. Partial payments will be made in accordance with the approved Geotechnical schedule of values.

Item No. 5 - Testing Allowance

Includes: All soil compaction testing, concrete testing, Hydrostatic Testing, water tightness testing, bacteriological testing and any other required test per SMA not already covered by New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction (current edition) (see Basic Requirements section 01 00 00).

Item No. 6 – Construction Staking

Includes: This work consists of all construction staking essential for the control and completion of the project and must be performed under the responsibility of a licensed New Mexico Professional Surveyor. Work may include but not be limited to:

- Locating and/or establishing control points with the data given on the plans
- Verifying provided survey data and submitting any changes or adjustments (including record data) to the project manager for review and approval at no cost to the city.
- Maintain field notes and submit copies to the project manager along with pay requests
- Meet accuracy requirements as dictated by the individual elements of work.

Payments:

Submit construction-staking schedule of values as part of the CPM or monthly progress schedule to the project manager. Partial payments will be made in accordance with the approved construction staking schedule of values.

Item No. 7 - NMDOT Temporary Driveway Access Permit

Includes: All cost associated with acquisition of an NMDOT temporary driveway access permit include any permit application requirements, fees and additional drawings if required.

Item No. 8 - Tank Disinfection

Includes: All cost associated with tank disinfection excluding having to repeat disinfection do to failed test.

Demolition

Item No. 9 - Existing Tank Demolition

Includes: Demolition and removal of the existing tank in its entirety excluding the north-east wall which is to remain in-place. This includes but is not limited to: 4" topping demolition, wall demolition, footing demolition, concrete column and beams demolition, concrete slab demolition and all disposal fees.

Payments:

Submit Demolition schedule of values as part of the CPM or monthly progress schedule to the project manager. Partial payments will be made in accordance with the approved demolition schedule of values.

Item No. 10 - Tank Excavation

Includes: All Excavation associated with the removal of the existing tank and as require for construction of the replacement tank. This also includes any additional effort that may be associated with excavating along the north-east wall in lifts as required by the tank demolition plans (see sheets CD-5 & CD-6 and Technical Specifications section 31 22 13).

Item No. 11 - Removal and salvage chain link fence

Includes: all materials and labor for removal, salvage and delivery to city salvage yard as directed by the Owner's Representative.

Item No. 12 - Remove existing valve vault and manhole

Includes: demolition, removal and disposal of existing vault and manhole.

Item No. 13 - Remove overflow and inlet/outlet line

Includes: demolition, removal and disposal of existing waterlines, fittings and valves.

Item No. 14 - Remove/salvage rip-rap

Includes: demolition, removal and salvage (to the extent possible) and store on site for use in new Rip-Rap.

Item No. 15 - Remove existing barbed wire fence

Includes: demolition, removal and disposal of existing barbed wire fence.

Item No. 16 - Remove existing curb & gutter

Includes: demolition, removal and disposal of existing curb and gutter.

Item No. 17 - Removal existing pavement

Includes: demolition, removal and disposal of existing asphalt pavement.

Item No. 18 - Removal existing light fixtures

Includes: demolition, removal and disposal of existing light fixtures.

Item No. 19 - Remove existing conduit & electrical wires

Includes: coordination with utility provider, utility provider fees if applicable, demolition, removal and disposal of existing electrical conduit and wiring.

Item No. 20 - Remove existing electrical metering pedestal

Includes: coordination with utility provider, utility provider fees if applicable, demolition, removal and disposal of existing electrical metering pedestal.

Item No. 21 - Remove existing waterlines

Includes: demolition, removal and disposal

Item No. 22 - Remove perforated tank foundation under drains

Includes: demolition, removal and disposal of pipe and gravel bedding material.

Item No. 23 – Remove and salvage existing tank level sensor.

Includes: removal and delivery to city salvage yard as directed by the Owner's Representative.

Construction

Item No. 24 - Construction Shoring (Soil Nailing)

Includes: all materials and labor associated with soil nailing of existing tank north-east wall, soil nailing in gunite and gunite of exposed surface as depicted on sheets SD-5 & CD-6.

Payments:

Submit Construction Shoring (soil Nailing) schedule of values as part of the CPM or monthly progress schedule to the project manager. Partial payments will be made in accordance with the approved Construction Shoring (soil Nailing) schedule of values.

Item No. 25 - New 4 Million Gallon Concrete Tank

Includes: all materials & labor to complete construction of the new 4 million gallon concrete tank structure including but not limited to: floor (slab), columns & footings, walls and pilasters, roof and drop panels and all required reinforcement.

Payments:

Submit Construction of the 4 Million Gallon Concrete Tank schedule of values as part of the CPM or monthly progress schedule to the project manager. Partial payments will be made in accordance with the approved Construction of the 4 Million Gallon Concrete Tank schedule of values

Item No. 26 - Tank Stairs

Includes: all materials and labor for final design (including engineered shop drawings with engineers seal), fabrication, shipping and installation of stairs as shown on sheets S-8 through S-10. The Manufacturer is responsible for final design.

Payments:

Submit Tank Stairs schedule of values as part of the CPM or monthly progress schedule to the project manager. Partial payments will be made in accordance with the approved Tank Stairs schedule of values.

Item No. 27 - Tank Access Hatches (Above stairs & inlet/outlet)

Includes: all materials and labor for installation of the tank roof access hatch as depicted in detail D/S11 on sheet S-11 including but not limited to: the 2' high concrete knee wall, concrete stairs, 3'-6" x 8'-0" Bilco Type KD Aluminum inner Assess door and the 7'-0" x 12'-0" Bilco Type D aluminum outer roof scuttle. Contractor to submit shop drawings of the entire access hatch assembly as described for approval.

Payments:

Submit access hatch schedule of values as part of the CPM or monthly progress schedule to the project manager. Partial payments will be made in accordance with the approved Access Hatch schedule of values.

Item No. 28 - Tank Access Hatches (Above Overflow)

Includes: all materials and labor for installation of the tank roof access hatch as depicted in detail L/S11 on sheet S-11 including but not limited to: the 2' high concrete knee wall, tank vents, and the 4'-0" Sq. Bilco Type F hatch and vents. Contractor to submit shop drawings of the entire access hatch assembly as described for approval.

Payments:

Submit access hatch schedule of values as part of the CPM or monthly progress schedule to the project manager. Partial payments will be made in accordance with the approved Access Hatch schedule of values.

Item No. 29 - Tank Backfill

Includes: all backfill around tank, on top of tank and any access slopes graded to the bottom tank for construction purposes. See section 31 23 23 of the technical specifications.

Item No. 30 - 4" Tank Foundation Drain Pipe

Includes: all materials and labor for installation of the 4" tank footing drain except the gravel around pipe witch is quantified in item NO. 32 – ¾" Crushed Rock Type B (Class 1 crushed stone) and the filter fabric around the gravel witch is quantified in item No. 34 – Filter Fabric.

Item No. 31 - Retaining Walls

Includes: all materials and labor for installation of the Keystone retaining wall system including the cap block but excluding Geogrid (as quantified in Item No. 32) and the ¾" crushed stone backfill and leveling pad (as quantified in Item No. 32).

Item No. 32 - ¾" Crushed Rock Type B (Class 1 crushed stone)

Includes: all materials and labor for installation of the ¾" crushed stone backfill for retaining wall, retaining wall leveling pad and the 4" tank foundation drain.

Item No. 33 - Geogrid

Includes: all materials and labor for installation of the Geogrid within the Keystone retaining wall system.

Item No. 34 - 24" Storm Drain Culvert Pipe

Includes: all materials and labor for installation of the 24" storm drain culvert pipe including but not limited to: Pipe, Pipe bedding, Trenching, warning tape, locate wire and backfill (see the New Mexico State Department of Transportation Standard Specifications for Highway and Bridge construction section 570).

Item No. 35 - 5' x 5' Median Drop Inlet

Includes: all material and labor for installation of the median drop inlet including but not limited to: excavation, installation, bedding and backfill (see the New Mexico State Department of Transportation Standard Specifications for Highway and Bridge Construction section 623).

Item No. 36 – Precast Concrete Manhole Type “E”

Includes: all material and labor for installation of the storm drain manhole including but not limited to: excavation, installation, bedding and backfill (see the New Mexico State Department of Transportation Standard Specifications for Highway and Bridge Construction section 662).

Item No. 37 - 24" Culvert Pipe End Section

Includes: all materials and labor for installation of culvert pipe end section (see the New Mexico State Department of Transportation Standard Specifications for Highway and Bridge Construction section 570).

Item No. 38 - Wire Enclosed Riprap (Class A) (see the New Mexico State Department of Transportation Standard Specifications for Highway and Bridge Construction section 602).

Includes: all materials and labor for installation of Class A rip rap including but not limited to: wire, rip-rap, filter fabric and steel stakes.

Item No. 39 - Inlet / Outlet Structure

Includes: all materials and labor for final design (shop drawings), fabrication and installation of the inlet/outlet structure as depicted in detail 1/D-7 on sheet D-7.

Item No. 40 - Overflow Structure

Includes: all materials and labor for installation of the overflow structure as depicted in detail 2/D-7 on sheet D-7, including but not limited to: 20" short radius 90 deg. bend FLG x Flare, 20" DIP pipe through tank wall and 20" D.I. 90 deg.

Item No. 41 - 24" D.I.P.

Includes: all materials and labor (excluding D.I. fittings) for installation of 24" D.I. pipe (see Technical Specifications section 33 11 00).

Item No. 42 - 20" D.I.P.

Includes: all materials and labor (excluding D.I. fittings) for installation of 20" DIP (see Technical Specifications section 33 11 00).

Item No. 43 - 24" DI 90° Bend

Includes: all materials and labor for installation of 24" DI 90° Bend (see Technical Specifications section 33 11 00).

Item No. 44 - 20" DI 90° Bend

Includes: all materials and labor for installation of 20" DI 90° Bend (see Technical Specifications section 33 11 00).

Item No. 45 - 24" DI 45° Bend

Includes: all materials and labor for installation of 24" DI 45° Bend (see Technical Specifications section 33 11 00).

Item No. 46 - 24" DI Restrained Mechanical Joint

Includes: all materials and labor for installation of 24" DI Restrained Mechanical Joint (see Technical Specifications section 33 11 00).

Item No. 47 - 20" DI Restrained Mechanical Joint

Includes: all materials and labor for installation of 20" DI Restrained Mechanical Joint (see Technical Specifications section 33 11 00).

Item No. 48 - 24" to 20" DI Reducer

Includes: all materials and labor for installation of 24" to 20" DI Reducer (see Technical Specifications section 33 11 00).

Item No. 49 - 2" HDPE Still Pipe

Includes: all materials and labor for installation of 2" HDPE Still Pipe and fiberglass unistruts for Supports as needed (see Technical Specifications section 33 11 00).

Item No. 50- Remove / Replace as needed Chain Link Fence

Includes: all materials and labor for removal and replacement of existing chain link fence around valve vault as needed for excavation and connection of tank inlet outlet lines.

Item No. 51 - Chain Link Fence (Around Tank Overflow Outlet)

Includes: all materials and labor for an 8' high chain link fence with a 4' pedestrian access gate around the drop inlet on the tank overflow line as detailed on sheet D-1.

Item No 52 - 1" Dia. Ultra High Molecular PE Tubing

Includes: all materials, labor fittings, bedding and backfill for installation of 1" PE tubing (see Technical Specifications section 33 11 00).

Item No 53 – Waterline Service Tap

Includes all materials and labor necessary for making the service tap connection to the municipal waterline (see Technical Specifications section 33 11 00).

Item No. 54 – Water Meter Assembly

Includes: all materials and labor for installation of the complete water meter assembly as depicted in detail 5 on sheet D-7 (see Technical Specifications section 33 11 00).

Item No. 55 4" Hot Mix Asphalt SP-111 (for patching water service line trench in road).

Includes: subgrade prep, base course, pavement and labor for patching the road (see DOT section 432).

Item No. 56 Frost Free Yard Hydrant Assembly

Includes: all materials and labor for installation of the complete yard hydrant assembly as depicted in detail 4 on sheet D-7 (see Technical Specifications section 33 11 00).

Valve Vault Plumbing

Item No. 57 - Remove/Salvage existing 8" Butterfly Valve

Includes: all materials and labor for removing, salvaging and delivery to city salvage yard as directed by the Owner's Representative

Item No. 58 - Remove/Salvage existing 24" Butterfly Valve

Includes: all materials and labor for removing, salvaging and delivery to city salvage yard as directed by the Owner's Representative

Item No. 59 - Remove existing 24" FCA W/Restraining Rods

Includes: all materials, labor and disposal cost associated with removal.

Item No. 60 - Remove / Salvage existing Pipe Support

Includes: all materials and labor for removing, salvaging and delivery to city salvage yard as directed by the Owner's Representative

Item No. 61 - Remove existing Plumbing Stub-out thru wall

Includes: all materials, labor and disposal cost associated with removal.

Item No. 62 - Patch Concrete Wall & cover w/ 60 mil waterproofing

Includes: all materials and labor for patching and water proofing 24" wall penetration.

Item No. 63 - 8" DIP Pipe

Includes: all materials, labor and disposal cost associated with removal (see Technical Specifications section 33 11 00).

Item No. 64 - 24" DIP Pipe

Includes: all materials, labor and disposal cost associated with removal (see Technical Specifications section 33 11 00).

Item No. 65 - 24"x24"x8" DI MJ Tee

Includes: all material and labor for installation of 24"x24"x8" DI MJ Tee (see Technical Specifications section 33 11 00).

Item No. 66 - 24"x24"x6" DI MJ Tee

Includes: all material and labor for installation of 24"x24"x6" DI MJ Tee (see Technical Specifications section 33 11 00).

Item No. 67 - 24"x24"x24" DI MJ Tee

Includes: all material and labor for installation of 24"x24"x24" DI MJ Tee (see Technical Specifications section 33 11 00).

Item No. 78 - 24" DIP Blind Flange

Includes: all material and labor for installation of 24" DIP Blind Flange (see Technical Specifications section 33 11 00).

Item No. 68 - 8" DI 90 deg MJ bend

Includes: all material and labor for installation of 8" DI 90 degree MJ bend (see Technical Specifications section 33 11 00).

Item No. 70 – 8” Butterfly Valve with Electronic Actuator

Includes: all materials, labor and calibration for installation of a functional valve (see Technical Specifications section 33 11 00).

Item No. 71 – 4” CLA-VAL Series 36 ARV or Series 38 VB/AR

Includes: all materials, labor and calibration for installation of a functional valve (see Technical Specifications section 33 11 00).

Item No. 72 – 34” Butterfly Valve with Electronic Actuator

Includes: all materials, labor and calibration for installation of a functional valve (see Technical Specifications section 33 11 00).

Item No. 73 - Pipe Supports

Includes: all material and labor for installation of Pipe Supports (see Technical Specifications section 33 11 00).

Item No. 74 - Pipe Nipple for Pressure Transmitter

Includes: all material and labor for installation of Pipe Nipple for Pressure Transmitter (see Technical Specifications section 33 11 00).

Site Grading and Landscaping

Item No. 75 - Final Site Grading

Includes: all materials and labor for final preparation for seeding and planting.

Item No. 76 - Juniperus Monosperma / One-Seed Juniper

Includes: all material and labor for installation of Juniperus Monosperma / One-Seed Juniper

Item No. 77 - Artemisia Tridentata / Tall Wester Sage

Includes: all material and labor for installation of Artemisia Tridentata / Tall Wester Sage

Item No. 78 - Atriplex Canescens / Four Wing Saltbrush

Includes: all material and labor for installation of Atriplex Canescens / Four Wing Saltbrush

Item No. 79 - Cercocarpus Ledifolius / Curlleaf Mountain Mahogany

Includes: all material and labor for installation of Cercocarpus Ledifolius / Curlleaf Mountain Mahogany

Item No. 80 - Chamaebatiaria Millefolium / Fernbush

Includes: all material and labor for installation of Chamaebatiaria Millefolium / Fernbush

Item No. 81 - Ericameria Nauseosa spp. / Chamisa

Includes: all material and labor for installation of Ericameria Nauseosa spp. / Chamisa

Item No. 82 - Fallugia Paradoxa / Apache Plume

Includes: all material and labor for installation of Fallugia Paradoxa / Apache Plume

Item No. 83 - Holodiscus Dumosus / Rock Spirea

Includes: all material and labor for installation of Holodiscus Dumosus / Rock Spirea

Item No. 84 - Krasheninikovia Lanata / Winterfat

Includes: all material and labor for installation of Krasheninikovia Lanata / Winterfat

Item No. 85 - Rhus Trilobata / Three-Leaf Sumac

Includes: all material and labor for installation of Rhus Trilobata / Three-Leaf Sumac

Item No. 86 - Ribes Aureum / Yellow Flowering Currant

Includes: all material and labor for installation of Ribes Aureum / Yellow Flowering Currant

Item No. 87 - Shepherdia Argentea / Silver Buffaloberry

Includes: all material and labor for installation of Shepherdia Argentea / Silver Buffaloberry

Item No. 88 - Yucca Baccata / Datil Yucca

Includes: all material and labor for installation of Yucca Baccata / Datil Yucca

Item No. 89 - 2' x 3' x 2.5' Boulders

Includes: all material and labor for installation of 2' x 3' x 2.5' Boulders

Item No. 90 - Irrigation Shut-off and Drain Valve

Includes: all material and labor for installation of Irrigation Shut-off and Drain Valve

Item No. 91 - FEBCO 860U 3/4" reduced pressure/backflow assembly

Includes: all material and labor for installation of FEBCO 860U 3/4" reduced pressure/backflow assembly

Item No. 92 - Controller, Rainbird ESP-4M and RSD Rain Sensor

Includes: all material and labor for installation of Controller, Rainbird ESP-4M and RSD Rain Sensor

Item No. 93 - Control valve, Rainbird LFV-100 & RBY100MPTX Filter

Includes: all material and labor for installation of Control valve, Rainbird LFV-100 & RBY100MPTX Filter

Item No. 94 - 3/4" PE irrigation Tubing

Includes: all material and labor for installation of 3/4" PE irrigation Tubing

Item No. 95 - 3" Sch. 40 PVC Sleeve (Under Parking area)

Includes: all material and labor for installation of 3" Sch. 40 PVC Sleeve (under drive)

Item No. 96 - Rainbird XB-10C 1 GPM Emitter w/Stake & Bug Cap

Includes: all material and labor for installation of Rainbird XB-10C 1 GPM Emitter w/Stake & Bug Cap

Item No. 97 - Rainbird PC-05 5 GPM Emitter w/Stake & Bug Cap

Includes: all material and labor for installation of Rainbird PC-05 5 GPM Emitter w/Stake & Bug Cap

Access Road and Parking Lot

Item No. 98 - Curb Cut (or remove and replace with laydown curb)

Includes: all materials and labor to either cut existing curb leaving a 2" lip or remove and replace with a new laydown curb. Also includes any and all disposal costs (see section 609 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 99 - Type B Barrier Curb

Includes: all materials and labor for installation of Type B Barrier Curb and Gutter (see section 609 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 100 - 5' Concrete Side Walk

Includes: all materials and labor for installation of 5' side walk (see section 608 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 101 - ADA Ramp

Includes: all materials and labor for installation of ADA ramp (see section 608 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 102 - Excavation

Includes: all labor and materials for all excavation for new roadway (without shrink or swell adjustments) (see section 203 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 103 - Fill

Includes: all labor and materials for all fill (embankment) for new roadway (without shrink or swell adjustments) (see section 203 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 104 - 6" Compacted subgrade

Includes: all materials and labor for processing and re-compaction of 6" of subgrade (see section 207 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 105 - 6" Base Course

Includes: all material and labor for installation of 6" base course (see section 303 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 106 - 4" Hot Mix Asphalt SP-111

Includes: all material and labor for installation of 4" of asphalt (see section 423 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 107 - 36" CMP

Includes: all materials and labor for installation of 36" culvert pipe (see section 570 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 108 - 36" end Section

Includes: all materials and labor for installation of 36" culvert pipe end sections (see section 570 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 109 - 1"-3" Coarse Aggregate - Off-Site Tracking Prevention

Includes: all materials and labor for installation of the "Off-Site Tracking Preventions" (see section 603 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 110 - 14'-0" Tubular Ranch Gate

Includes: all materials and labor for installation of a Tubular ranch gate as depicted on sheet NMDOT 607-01-1/4 (see section 607 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 111 - 14'-0" Road Closure Gate

Includes: all materials and labor for shop drawings, fabrication and installation of a road closure gate as depicted on sheet D-8.

Item No. 112 - Relocation of Electrical Box

Includes: all labor, materials, coordination with utility provider and any associated fees for relocation of existing electrical box.

Item No. 113 - Barbed Wire Fence

Includes: all material and labor for installation of barbed wire fence as depicted on NMDOT sheet 607-01-1/4. (See section 607 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 114 - DOT Access Permit

Includes: all labor and materials for preparation, submission and acquisition of a temporary construction road access permit from the New Mexico Department of Transportation.

Item No. 115 - W-Beam guardrail

Includes: all materials and labor for installation of the guardrail (see section 606 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Access Road Intersection Removal

Item No. 116 - Traffic Control

Includes: all materials and labor for preparation, NMDOT approval, implementation and administration of a traffic control plan (see section 618 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 117 - Remove existing curb & gutter

Includes: all materials and labor for demolition, removal and disposal of curb and gutter (see section 601 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 118 - Removal existing pavement

Includes: all materials and labor for demolition, removal and disposal of existing pavement (see section 601 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 119 - Remove existing 5' Concrete Sidewalk

Includes: all materials and labor for demolition, removal and disposal of existing sidewalk (see section 601 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 120 - Type B Barrier Curb

Includes: all material and labor for installation of Type B curb and gutter (see section 609 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 121 - 5' Concrete Side Walk

Includes: all material and labor for installation of 5' sidewalk (see section 608 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 122 – 4” Base Course

Includes: all materials and labor for installation of base course under new sidewalk (see section 303 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 123 - Re-grade site

Includes: all materials and labor to re-grade the site to match historic features prior to construction activities (see section 208 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Item No. 124 - Re-seeding

Includes: all materials and labor to re-seed the site with native seed mix (see section 632 of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction).

Tank Controls

Item No. 125 - Design / Build VCP and RTU

Includes: all materials and labor to design, fabricate and install the tank control in accordance with drawings SCADA-1 through SCADA-3. Contractor to provide shop drawings for approval.

Payments:

The bid schedule includes a predetermined sum to cover the cost of designing, fabricating, handling and installing the VCP and RTU assemblies per the Contract Documents.

- Contractor shall submit details regarding the proposed VCP and RTU, including a statement of qualifications of the manufacturer and installer, and a schedule of unit price

costs associated with the work to be completed under the allowance. Engineer may require the Contractor to solicit additional quotes if the proposed costs are not competitive.

- Costs Included in Allowance: Cost of purchasing, transporting, handling, storing, and installing the work.
- Costs Not Included in Allowance: Incidental labor and facilities required of Contractor to assist in the work.
- Costs will be drawn from the allowance and paid based on invoice(s) submitted to Contractor by VCP and RTU provider/installer, and reimbursed at cost, with no markup by Contractor. Contractor shall submit appropriate NTTC form to Subcontractor to assure tax is not included on invoices.

Item No. 126 – SCADA PLC Programming

Includes: all materials, software and labor required to program the VCP & RTU

Payments:

The bid schedule includes a predetermined sum to cover the cost of programming the VCP and RTU.

- Contractor shall submit details regarding the proposed programmer of the VCP and RTU, including a statement of qualifications of the manufacturer and installer, and a schedule of unit price costs associated with the work to be completed under the allowance. Engineer may require the Contractor to solicit additional quotes if the proposed costs are not competitive.
- Costs Included in Allowance: Cost of programming the VCP and RTU.
- Costs Not Included in Allowance: Incidental labor and facilities required of Contractor to assist in the work.
- Costs will be drawn from the allowance and paid based on invoice(s) submitted to Contractor by VCP and RTU programmer, and reimbursed at cost, with no markup by Contractor. Contractor shall submit appropriate NTTC form to Subcontractor to assure tax is not included on invoices.

Item No. 127 - 3/4" PVC coated RGC

Includes: all material and labor for installation of 3/4" PVC coated RGC.

Item No. 128 - 1" PVC coated RGC

Includes: all material and labor for installation of 1" PVC coated RGC.

Item No. 129 - 2" PVC coated RGC

Includes: all material and labor for installation of 2" PVC coated RGC.

Item No. 130 - #12 XHHW-2

Includes: all material and labor for installation of #12 THHN.

Item No. 131 - #14 XHHW-2

Includes: all material and labor for installation of #16 TFN.

Item No. 132 - 6 fiber cable

Includes: all materials and labor for pulling a new fiber optic line through an existing conduit from the valve vault to the altitude valve.

Item No. 133 - Belden 9342

Incudes: all material and labor for installation of Belden 9432.

Item No. 134 - Pull Box, SS NEMA-4

Incudes: all material and labor for installation of Pull Box, SS NEMA-4.

Item No. 135 - Junction Box, FS PVC coated

Incudes: all material and labor for installation of Junction box, FS PVC coated.

Item No. 136 - Connect irrigation control panel

Incudes: all material and labor for installation of Connect irrigation control panel.

Item No. 137 - 20A 1p CB in existing panel

Incudes: all material and labor for installation of 20A 1p CB in existing panel.

Item No. 138 - Connect Instrument

Incudes: all material and labor for installation of Connect Instrument.

Item No. 139 - Connect Motorized Valve

Incudes: all material and labor for installation of Connect Motorized Valve. Drain valve actuators shall have AI/AO card installed.

Item No. 140 - Terminate at VCP

Incudes: all material and labor for installation of Terminate at VCP.

Item No. 141 - Trench and backfill

Incudes: all material and labor for installation of Trench and backfill.

Item No. 142 - Coredrill Valve Vault

Incudes: all material and labor for installation of Coredrill Valve Vault.

Item No. 143 - Patch

Incudes: all material and labor for installation of Patch.

Item No. 144 - Removals

Incudes: all material and labor for removals as shown on electrical plans (Sheets E-1 thru E-3).

Item No. 145 - Tools

Incudes: an amount for Tools as itemized in Exhibit VI.

Item No. 146 - Spare Parts

Incudes: an amount for Spare Parts as itemized in Exhibit VI.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 02 41 16
STRUCTURE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes methods and procedures for demolition of structures, parts of tank structures.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Demolition and removal of existing concrete tank structure.
1. Basis of Measurement: By Lump Sum. Engineer will require a schedule of values for this Item.
 2. Basis of Payment: Includes demolition, removal and disposal of existing tank.
- B. Demolition, removal and salvage chain link fence.
1. Basis of Measurement: By linear foot.
 2. Basis of Payment: Includes removal, salvage and delivery to city salvage yard as directed by the Owner's Representative.
- C. Demolition and removal of existing valve vault and manhole
1. Basis of Measurement: By each.
 2. Basis of Payment: Includes demolition, removal and disposal of existing vault and manhole.
- D. Demolition and Removal of existing 20" tank overflow line and 24" tank inlet/outlet line.
1. Basis of Measurement: By linear foot.
 2. Basis of Payment: Included demolition, removal and disposal of existing waterlines.
- E. Demolition and removal of existing rip-rap at concrete curb rundown and salvage to the extent possible.
1. Basis of Measurement: Lump sum.
 2. Basis of Payment: Includes demolition, removal and salvage (to the extent possible) and store on site for use in new Rip-Rap.
- F. Demolition and removal of existing barbed wire fence.
1. Basis of Measurement: By linear foot.
 2. Basis of Payment: Includes demolition, removal and disposal of existing barbed wire fence.
- G. Demolition and removal of existing curb & gutter & storm water rundown.
1. Basis of Measurement: By linear foot.
 2. Basis of Payment: Includes demolition, removal and disposal of existing curb and gutter.

- H. Demolition and removal of existing pavement.
 - 1. Basis of Measurement: By square yard.
 - 2. Basis of Payment: Includes demolition, removal and disposal of existing asphalt pavement.

- I. Demolition and removal of existing light fixtures.
 - 1. Basis of Measurement: By each.
 - 2. Basis of Payment: Includes demolition, removal and disposal of existing light fixtures.

- J. Demolition and removal of existing electrical conduit and electrical wires.
 - 1. Basis of Measurement: By each.
 - 2. Basis of Payment: Includes coordination with utility provider, utility provider fees if applicable, demolition, removal and disposal of existing electrical conduit and wiring.

- K. Demolition and removal of existing electrical metering pedestal.
 - 1. Basis of measurement: By each
 - 2. Basis of Payment: Includes coordination with utility provider, utility provider fees if applicable, demolition, removal and disposal of existing electrical metering pedestal.

- L. Demolition and removal of existing waterlines.
 - 1. Basis of Measurement: By linear foot.
 - 2. Basis of Payment: Includes demolition, removal and disposal.

- M. Demolition and removal of existing perforated tank foundation and under drains.
 - 1. Basis of Measurement: By linear foot.
 - 2. Basis of Payment: Includes demolition, removal and disposal of pipe and gravel bedding material.

- N. Remove and Salvage of existing tank level sensor.
 - 1. Basis of Measurement: By each
 - 2. Basis of Payment: removal and coordination with owner representative for delivery to salvage yard.

1.3 REFERENCES

- A. Canadian Standards Association (CSA)
 - 1. CSA S350, Code of Practice for Safety in Demolition of Structures

1.4 QUALITY ASSURANCE

- A. Prior to start of Work arrange for site visit with Owner's Representative to examine existing site conditions adjacent to demolition work

- B. Hold project meetings every month.

- C. Ensure key personnel, site supervisor, project manager, subcontractor representatives, attend.

1.5 WASTE MANAGEMENT AND DISPOSAL

- A. Separate waste materials in accordance with Section 01 00 00 - Basic Requirements.

1.6 EXISTING CONDITIONS

- A. Should material resembling spray or trowel applied asbestos or any other designated substance be encountered in course of demolition, stop work, take preventative measures, and notify Owner's Representative immediately. Do not proceed until written instructions have been received.
- B. Structures to be partially demolished to be based on their condition on date that tender is accepted.
- C. Salvage items as identified by Owner's Representative. Remove, protect and store salvaged items as directed by Owner's Representative. Deliver to Owner as directed.

1.7 DEMOLITION DRAWINGS

- A. Where required by authorities having jurisdiction, submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.
- B. Submit drawings stamped and signed by qualified professional engineer licensed in New Mexico.

1.8 ENVIRONMENTAL PROTECTION

- A. Ensure work is done in accordance with Section 01 00 00 - Basic Requirements.
- B. Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, and landscaping, adjacent grades parts of existing building to remain.
- C. Support affected structures and, if safety of structure being demolished or adjacent structures or services appears to be endangered cease operations and notify Owner's Representative.
- D. Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.
- E. Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- F. Fires and burning of waste or materials are not permitted on site.
- G. Do not bury waste or materials on site.

- H. Do not dispose of waste or volatile materials such as mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.
- I. Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- J. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities' requirements.
- K. Protect trees, plants and foliage on site and adjacent properties where indicated.
- L. Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- M. Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

1.9 SCHEDULING

- A. Ensure project time lines are met without compromising specified minimum rates of material diversion. Notify Owner's Representative in writing of delays.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 PREPARATION

- A. Perform work in accordance with 01 00 00 - Basic Requirements.
- B. Disconnect electrical and telephone service lines entering buildings to be demolished. Post warning signs on electrical lines and equipment, which must remain energized to serve other properties during period of demolition.
- C. Disconnect and cap designated mechanical services.
 - 1. Sewer and water lines: remove to property line.
 - 2. Other underground services: remove and dispose of as directed by Owner's Representative.
- D. Do not disrupt active or energized utilities designated to remain undisturbed.
- E. Remove rodent and vermin as required by Owner's Representative.

3.2 SAFETY CODE

- A. Perform demolition work in accordance with Section 01 00 00 - Basic Requirements.
- B. Blasting operations not permitted during demolition.

3.3 DEMOLITION

- A. Demolish foundation walls to minimum of 300 mm below finished grade.
- B. Demolish foundation walls and footings, and concrete floors below or on grade.
- C. Break 100 mm holes per 10 m² area in concrete slabs which are not to be removed, to prevent accumulation of water. Keep floor drains open if permanent drainage still connected.
- D. Pieces of concrete and masonry not larger than 200 mm broken from demolition work may be used as backfill in open basements on excavations provided voids are filled. Keep demolition fill 300 mm below finished grade level. Do not backfill basement areas until inspected by Owner's Representative.
- E. Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- F. At end of each day's work, leave Work in safe and stable condition. Protect interiors of parts not to be demolished from exterior elements at all times.
- G. Demolish to minimize dusting. Keep materials wetted as directed by Owner's Representative.
- H. Remove structural framing.
- I. Contain all fibrous materials (e.g. Insulation) to minimize release of airborne fiber while being transported to waste disposal site or alternative disposal location.
- J. Only dispose of material specified by selected alternative disposal option as directed by Owner's Representative.
- K. Ensure that these materials will not be disposed of in landfill or waste stream destined for landfill.
- L. Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.
- M. Environmental:
 - 1. Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimized danger at site or during disposal.

2. Septic Tanks:
 - a. Pump out buried septic tanks, left in place. Fill with sand.
 - b. Remove tanks within area of new construction or under paved areas and slabs.

- N. Prior to the start of any demolition work remove contaminated or hazardous materials as defined by authorities having jurisdiction, from site and dispose of at designated disposal facilities.

- O. Prior to the start of any demolition work remove underground storage tanks and piping as directed.

- P. Use natural lighting to work by wherever possible. Shut off all lighting except those required for security purposes at the end of each day.

3.4 STOCKPILING

- A. Stockpile materials in a location as directed by Owner's Representative.

- B. Designate appropriate security resources/measures to prevent vandalism, damage and theft.

- C. Separate from general waste stream each of the following materials. Stockpile materials in neat and orderly fashion in location and as directed by Owner's Representative for alternate disposal. Stockpile materials in accordance with applicable fire regulations.
 1. Steel.
 2. Wood.

- D. Supply separate, clearly-marked disposal bins for all categories of waste material. Do not remove bins from site until inspected and approved by Owner's Representative.

- E. Provide collection areas for collection of miscellaneous metals in the area of demolition.

3.5 REMOVAL FROM SITE

- A. Notify Owner's Representative in writing of any materials identified as not suitable for alternate disposal. Provide reasons prior to approval for disposal.

- B. Dispose of materials as directed by Owner's Representative.

- C. Remove stockpiled material as directed by Owner's Representative when it interferes with operations of project construction.

- D. Remove stockpiles of like materials by an alternate disposal option once collection of materials is complete.

- E. Transport material designated for alternate disposal in accordance with applicable regulations.

- F. Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.6 REPORTING

- A. Record off-site removal of debris and materials and provide following information regarding removed materials to Owner's Representative within 24 hours.
 - 1. Time and date of Removal.
 - 2. Description of Material.
 - 3. Weight and Quantity of Materials.
 - 4. Breakdown of reuse, recycling, and landfill quantities.
 - 5. End Demolition of Materials.

3.7 COORDINATION

- A. Coordinate alternative disposal activities with Owner's Representative's on-site waste diversion representative.

END OF SECTION

SECTION 03 10 00

FORMWORK

PART 1 -- GENERAL

- 1.1 DESCRIPTION: This section covers furnishing, erecting and removing of forms for cast-in-place concrete.
- 1.2 QUALITY ASSURANCE:
- A. Reference Standards:
1. American Concrete Institute Standards (ACI)
 - a. 301 Specifications for Structural Concrete.
 - b. 347 Guide to Formwork
 - c. As modified herein.
- B. Design Criteria:
1. The Contractor shall design the formwork for the loads, lateral pressures and allowable stresses outlined in Chapter 1 of ACI 347.
- C. Maximum Allowable Tolerances:
1. Variation from Plumb
 - a. Lines and surfaces of columns, piers and walls
 - 1) In any 10 feet of length 1/4 inch
 - 2) Entire length 1 inch
 - b. Control-joint grooves, and other conspicuous lines
 - 1) In any 20 feet of length 1/4 inch
 - 2) In 40 feet or more 3/4 inch
 2. Variation from level or specified grade
 - a. Slabs, beams and roof
 - 1) In any 10 feet of length 1/4 inch
 - 2) In any 20 feet of length 3/8 inch
 - 3) Entire length 3/4 inch
 3. The maximum deflection of facing materials reflected in concrete surfaces exposed to view shall be 1/240 of the span between supporting members.
 4. Refer to ACI 301 for additional requirements.

PART 2 -- PRODUCTS

2-1 FORM MATERIALS:

A. General:

Where "Smooth Form Finish," or "Grout Cleaned Finish" is specified, use prefabricated plywood panel forms, job-built plywood forms, forms lined with plywood or fiberboard, or steel forms. Where "Rough Form Finish" is specified, unlined wooden forms may be used. Use maximum two-foot wide straight segments to form circular tank walls. The forms may be steel or plywood.

- B. Steel Forms:
Symons "Steel-Ply," Simplex "Industrial Steel FrameForms," Universal "Uniform" or equivalent.
- C. Plywood Forms:
Product Standard PS-1, - waterproof, ¾ inch MDO plywood or better.
- D. Fiberboard Forms:
Federal Spec LLL-B-810 - Type II tempered, waterproof, screenback, concrete form hardboard.
- E. Lumber (Including Board and Batten Forms):
Straight, uniform width and thickness, free from knots, offsets, holes, dents, and other surface defects. Lumber must be sufficiently sealed to prevent the absorption of water, form release agent, etc.
- F. Chamfer strips:
Clear white pine, surface against concrete planed.
- G. Form ties:
1. Removable end, permanently embedded body type with waterstop.
2. Sufficient strength and rigidity to support and maintain the form in proper position and alignment without the use of auxiliary spreaders.
3. When cones are provided on the outer ends the permanently embedded portion shall be back a minimum of one inch from concrete surface.
4. Permanently embedded type without threaded ends shall be so constructed so that removable ends are readily broken off (one inch back from concrete surface) without damage to the concrete.
5. Form ties in exposed surfaces shall be uniformly spaced and aligned in horizontal and vertical rows.
6. Taper ties may be used. Upon removal of taper ties holes will be sealed with an A58 sure plug capable of withstanding a hydrostatic pressure of 70 ft of liquid head.
- H. Joints: Joints shall be flat, not keyed, with expansive waterstops, unless otherwise shown on Drawings.
- I. Polyethylene Film: Product Standard PS17; 6 mil.
- J. Form Coating:
1. Non-staining chemical release agent that will not damage the concrete surfaces and appropriate for use in potable water structures.
2. For all exposed surfaces not in contact with earth backfill use Symons Corp. "Magic Kote", or equivalent.

PART 3 -- EXECUTION

3.1 ERECTION:

A. General:

1. Erect forms substantial and sufficiently tight to prevent leakage of mortar and braced or tied to maintain the desired position, shape and alignment before, during and after concrete placement. At vertical wall joints where forms overlay existing concrete, a mortar tight joint shall be required. Use a bead of silicone caulking or foam joint filler against concrete before placing form. Alternate methods shall be acceptable to the Engineer.
2. Use adequate walers, stiffeners and braces to insure proper alignment and stability until the wall construction is completed.
3. Provide temporary openings at the bottom of column and wall forms and at other locations where necessary to facilitate cleaning and inspection.
4. Temporary openings in wall or column forms used to limit the free fall of concrete to a maximum of 4 feet shall be located to facilitate placing and consolidation of the concrete. Such openings in walls shall not exceed 8 feet laterally to avoid moving concrete laterally more than 4 feet.
5. If tremies of proper length are used for depositing concrete in walls or columns, temporary openings for concrete placement will not be required.
6. Bring forms to a true line and grade, or provide a wooden guide strip at the proper location on the forms so that the top surface can be finished with a screed or template for concrete which is to have a specified elevation, slope or contour.
7. At horizontal construction joints in walls, do not extend the forms on one side more than 2 feet above the joint. Horizontal construction joints shall not be used in walls of water retaining structures or exposed walls, unless reviewed and accepted by the Engineer.

B. Embedded Items:

1. Anchor bolts, castings, steel shapes, conduits, sleeves, waterstops, masonry anchorage and other materials that are to be embedded in the concrete shall be accurately positioned in the forms and securely anchored.
2. Install conduits in walls or slabs with reinforcement in both faces between the two faces of reinforcing steel.
3. In walls or slabs which have only a single mat of reinforcing steel, place conduits near the center of the wall or slab.
4. Unless installed in pipe sleeves, provide anchor bolts with sufficient threads to permit a nut to be installed on the concrete side of the form or template.
5. Install a second nut on the other side of the form or template and adjust the two nuts so the bolt will be held rigidly in proper position.
6. Assure embedments are clean when installed.
7. After concrete placement, clean surfaces not in contact with concrete of concrete mortar and other foreign substances.

C. Preparation of Form Surfaces:

1. Remove mortar, grout, and other foreign material from form surfaces.
2. Coat form surfaces with form coating material before either the reinforcing steel or concrete is placed. Ensure that dimension lumber board and batten forms are properly sealed so that they do not absorb form coating or water.
3. Do not allow form coating to:

- a. Stand in puddles in the forms.
 - b. Come in contact with the reinforcing steel.
 - c. Come in contact with adjacent hardened concrete against which fresh concrete is to be placed.
- D. Edges and Corners:
1. Place chamfer strips in forms to bevel exposed edges and projecting corners. Tool the top edges of walls and slabs not indicated on the Drawings to beveled.
 2. Form beveled edges for all vertical and horizontal corners of equipment bases unless indicated otherwise on the Drawings.
 3. Chamfer strip shall be 3/4 inch unless indicated otherwise on the Drawings.
- E. Removal:
1. Do not remove or disturb forms until the concrete has attained sufficient strength to safely support all dead and live loads.
 2. For prestressed beams, slabs and similar sections the shores and supports shall remain in place until the concrete has reached 85 percent of the specified 28-day strength and the post-tensioning operation is complete. Determine strength from maturity meters or job cured cylinder breaks. Cylinders shall be job cured in same manner as the formed concrete.
 3. Retain shoring in place and reinforce as necessary to carry out construction equipment, materials or other loads in excess of cured strength. Brace walls and columns after removal of forms to resist wind and construction loads.
 4. Use care in form removal to avoid surface gouging, corner, or edge breakage, and other damage to the concrete.
 5. Do not commence form removal for concrete not yet supporting loads, earlier than the following schedule, unless field cured cylinders and/or maturity meters indicate the concrete has reached 85 percent of the specified 28-day strength:
 - a. Walls and columns 16 hours
 - b. Vertical sides of beams and girders 24 hours
 - c. Bottom forms and shoring for nonprestressed slabs, beams and girders under 10 feet clear span between permanent supports. 7 days
 - d. Bottom forms and shoring for nonprestressed slabs, beams and girders between 10 and 20 feet clear span between permanent supports. 14 days
 - e. Bottom forms and shoring for nonprestressed slabs, beams and girders over 20 feet clear span between permanent supports. 21 days
 - f. Refer to ACI 347, Chapter 2, for additional requirements.

END OF SECTION

SECTION 03 20 00

REINFORCEMENT

PART 1 -- GENERAL

1.1 DESCRIPTION

This section covers furnishing and installing steel bars and welded wire fabric for concrete reinforcement.

1.2 QUALITY ASSURANCE

A. Reference Standards:

1. American Concrete Institute Standards (ACI)
 - a. 301 Specifications for Structural Concrete.
 - b. 315 Manual of Standard Practice for Detailing Reinforced Concrete Structures.
 - c. 350 Code Requirements for Environmental Engineering Concrete Structures.
2. As modified herein or on the Drawings.

B. Allowable Tolerances:

1. Fabrication Tolerances
 - a. Sheared length: ± 1 inch
 - b. Depth of truss: +0, -1/4 inch for concrete thickness 24 inches or less and +0, -1/2 inch for concrete thickness over 24 inches.
 - c. Overall dimensions of stirrups, ties and spirals: +0, -1/4 inch for concrete thickness 24 inches or less and +0, -1/2 inch for concrete thickness over 24 inches.
 - d. All other bends ± 1 inch.
2. Placement Tolerances
See Section 3-2.C

C. Welding:

Do not weld reinforcement except where indicated on the Drawings for welded splices. Tack welding of reinforcement is not permitted, except where specified by the Engineer.

1.3 SUBMITTALS: All submittals shall be made in accordance with Section 01 00 00.

A. Shop Drawings:

1. Before fabrication of reinforcing steel, the Contractor shall review and approve shop drawings, bar lists, fabrication and setting drawings and shall submit the same to Engineer for review.

2. Show sizes, quantity and dimensions for fabrication and placing of reinforcing bars and bar supports. Indicate bar schedules, stirrup spacing, and diagrams of bent bars.
 - B. Certificates: Mill test certificates identifying chemical and physical analysis of each load of reinforcing steel delivered.
 - C. Manufacturer's Literature: Manufacturer's specifications and installation instructions for splice devices when these devices are called for on the Drawings.
- 1.4 PRODUCT DELIVERY, STORAGE AND HANDLING
- A. Deliver to site in bundles marked with metal tags indicating bar size and length.
 - B. Carefully handle and store on supports that will keep the steel from coming in contact with the ground or standing water.

PART 2 -- PRODUCTS

2.1 REINFORCEMENT BARS

- A. Bars: Steel reinforcement bars shall be new, deformed billet steel, meeting ASTM A 615; Grade 60 for reinforcing bars No. 4 and larger; Grade 40 for No. 3 reinforcing bars and designated reinforcement.
- B. Tie Wire: Annealed steel, Fed. Spec. QQ-W-461, 16 gauge minimum.
- C. Fabrication: In accordance with CRSI Manual of Standard Practice except for the allowable tolerances specified herein in 1-2B.

2.2 BAR SUPPORTS

- A. Conform to "Bar Support Specifications," CRSI Manual of Standard Practice.
- B. The portions of the supports or accessories within ½ inch of the concrete surface shall be coated with plastic at least 3/32-inch thick at points of contact with the formwork. Other requirements shall be in accordance with Class 1, maximum protection, plastic protected bar supports, in Chapter 3 of the Manual of Standard Practice by CRSI.
- C. The concrete block supports at the base of the wall and for the slab-on-grade shall be a minimum of 4000 psi compressive strength. They shall be 3- or 4-inches square, thickness as required.

PART 3 -- EXECUTION

3.1 PREPARATION

- A. Remove all mud, oil, loose rust or mill scale or other foreign materials that may reduce bond.
- B. Rust or mill scale that is "tight" will be permissible without cleaning or brushing provided weights, dimensions, cross-sectional area, and tensile properties meet requirements of ASTM A615.

3.2 INSTALLATION

- A. Bar Placement:
 - 1. Conform to CRSI-WCRSI "Placing Reinforcing Steel."
 - 2. Reinforcement shall be supported and wired together to prevent displacement by construction loads or the placing of concrete.
- B. Bar Supports:
 - 1. Provide at least the number of supports as required by ACI 315.
 - 2. All reinforcement shall be tied to chairs to secure them from displacement during concrete placement. Reinforcement shall be secured at a maximum distance of four feet on center. All chairs shall be stapled to wooden soffits. Staples and tie wire only shall be used to secure chairs to forms, except as reviewed by the Engineer.
 - 3. Do not use pebbles, pieces of broken stone, common or face brick, metal pipe or wood blocks to support reinforcement.
 - 4. Spacing of supports for the floor tendons and reinforcement shall be at the spacing of the bars, each way.
- C. Placement Tolerances:
 - 1. Clear distance to formed surface: See 3-2D Concrete Cover 1. and 2.
 - 2. Minimum spacing between bars: -1/4 inch
 - 3. Top bars in slabs and beams: See 3-2D Concrete Cover 1 and 2.
 - 4. Spacing crosswise of members: Spaced evenly within 2 inches.
 - 5. Lengthwise of members: ± 2 inches.
 - 6. Maximum bar movement to avoid interference with other reinforcing steel, conduits or embedded items: one bar diameter. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, the resulting arrangement of bars may be rejected by the Engineer.
- D. Concrete Cover:
 - 1. Except as otherwise indicated on the Drawings, provide the following minimum concrete cover for reinforcement.
 - a. Unformed surfaces adjacent to excavation
Non-prestressed Concrete 3 inches

- b. Formed or top surfaces exposed to weather or saturated air, submerged or in contact with earth
 - Non-prestressed Concrete 2 inches
 - Prestressed Concrete 1 ½ inches
- c. Other locations:
 - Bars in beams or columns, including stirrups & ties: 2 inches
- 2. Cover for reinforcing steel shall not be less than the minimum given above (no minus tolerance), and shall not exceed the minimum by more than 1/4 inch where concrete thickness is 24 inches or less, or more than ½ inch where the concrete thickness is more than 24 inches.
- 3. For circular columns and drilled piers, three equally spaced plastic disks (Plas-T-Clips) distributed by Spillman Company, Columbus, Ohio or equivalent (acceptable to Engineer) at 4 feet on center shall be used to space the column reinforcing away from the forms and drilled pier reinforcement away from the earth.
- E. Reinforcement Adjustment:
 - 1. Move only as stated under 3-2 C 6.
 - 2. Do not heat, bend or cut bars without Engineer's acceptance.
 - 3. Grade 60 bars shall not be bent after being partially embedded in hardened concrete.
- F. Splices:
 - 1. Do not splice bars except at locations shown on the Drawings without the Engineer's acceptance.
 - 2. Minimum lap distance shall be as shown on the Drawings. If not shown, splices shall be Class B tension lap splice as specified in ACI 350.
 - 3. Tie splices securely to prevent displacement by construction loads or during placement of concrete.
 - 4. Splices in horizontal wall reinforcement in circular tanks shall be staggered such that no more than one bar in two is spliced in any four foot wide vertical section.
 - 5. Reinforcement shall be continuous around corners or corner bars provided.
- G. Welding: Reference 1-2C, 1-3C and 2-1E.

END OF SECTION

SECTION 03 23 00

POST-TENSIONING TENDONS

PART 1 -- GENERAL

1.1 DESCRIPTION: This section covers the furnishing and installation of post-tensioning tendons and accessories and the stressing of the tendons.

1.2 QUALITY ASSURANCE:

A. Reference Standards:

1. American Concrete Institute (ACI) Standards:
 - a. 350 Code Requirements for Environmental Engineering Concrete Structures.
 - b. 315, Manual of Standard Practice for Detailing Reinforced Concrete
 - c. 301, Specifications for Structural Concrete
2. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice
3. Post-tensioning Institute (PTI), Post-Tensioning Manual
4. AWWA D115 Circular Prestressed Concrete Water Tanks With Circumferential Tendons
5. As modified by the Contract Documents

1.3 POST-TENSIONING SUPPLIER AND INSTALLER:

- A. In consideration of the unique nature of post-tensioned concrete construction, coordination between placement of both post-tensioning and plain reinforcement, and the requirements for proper structure performance, the following requirements shall be met:
1. Post-tensioning systems shall be produced by a Post-Tensioning Institute (PTI) Certified Plant owned and operated by the post-tensioning subcontractor. Post-tensioning systems shall be by VSL or equal, approved by engineer prior to bid.
 2. The sub-contractor that supplies the post-tensioning system shall be required to superintend and place with its own personnel both the post-tensioning and plain reinforcing steel.
 3. The superintendent shall be a full-time employee of the post-tensioning supplier/installer and be on the project full-time during all placing, stressing and grouting operations, and shall have superintended the construction of at least three prestressed concrete tendon tanks in the last five years. The superintendent shall be a holder of a current Certified Grouting Technician certificate from the American Segmental Bridge Institute. The superintendent's qualifications shall be submitted to the owner for approval; the owner reserves the right to have the individual replaced if experience requirements are inadequate.
 4. The post-tensioning subcontractor shall have in its full-time employ a professional engineer designee with a minimum of 10 years' experience in the construction of internal tendon prestressed concrete tanks available to assist in technical issues as required for the success of the project. The designee's qualifications shall be submitted to the engineer for approval; the owner reserves

the right to have the individual replaced if experience requirements are inadequate.

1.4 **SUBMITTALS:** All submittals shall be made in accordance with Section 01 00 00.

- A. Shop Drawings. Show tendon properties, sizes, spacing, quantities, dimensions, accessories, locations and anchorages on drawings. Indicate tendon coding, stressing sequence, initial and final forces and anticipated elongations. Provide support drawings showing all bars, chairs, blocks or other supports.
- B. Detailed computations clearly presented indicating minimum forces required, assumed prestressing losses, final working stresses and stressing sequence, to be submitted with shop drawings. Computations shall be performed by a registered professional engineer specializing in prestressed concrete design.
- C. Certificates: Certified mill reports on the prestressing steel used. Show ultimate strength, modulus of elasticity and percent elongation at rupture.
- D. Reports on three individual prior static tests and three individual prior dynamic tests made in accordance with Chapter 3, PTI Post-Tensioning Manual.
- E. Qualifications of post-tensioning subcontractor per section 1-3, prior to bid.

1.5 **PRODUCT DELIVERY, STORAGE AND HANDLING:**

- A. Tendons shall be delivered clearly identified for location. Each shipment shall be accompanied by a cutting list indicating number of tendons, length, code of tendons, anchorages, wedges, grommets and support chairs. Fabricate tendons in a sequence and quantity as to avoid project slow down or lengthy storage at the site.
- B. Tendons shall be protected at the site against weather and damage. Rusting will not be allowed. Damage to sheathing covering of tendons will not be allowed. Burning or welding shall not be done in vicinity of tendons.

PART 2 MATERIALS

2.1 **PRESTRESSING TENDONS**

- A. Strands shall be 0.5 or 0.6 inch diameter, 7-wire low relaxation strand, grade 270, conforming to ASTM A 416.
- B. Anchorages shall develop at least 95 percent of minimum specified ultimate strength of prestressing steel without exceeding anticipated set. The total elongation under ultimate load of tendon shall not be less than 2 percent measured in a minimum gauge length of 10 feet.

- C. All unbonded tendons shall be fully encapsulated in accordance with PTI Specifications for a corrosive environment and completely and permanently protected against corrosion by a properly applied coating of grease with rust inhibitor. Unbonded tendon anchorages shall be completely coated with plastic.
- D. Sheathing for unbonded tendons shall be extruded onto the greased strand and shall have a minimum thickness of 50 mils and sufficient strength and wear resistance to resist deterioration and unreparable damage. Sheathing shall be continuous over the tendon length, and shall prevent intrusion of cement paste and escape of coating material. All tears or holes in sheathing shall be repaired in a waterproof fashion acceptable to the Engineer prior to concrete placement.
- E. Grouted tendons shall be manufactured by VSL, or equivalent. The horizontal wall tendon ducts shall have waterproof connections. They may be covered by heat shrink plastic, 2-inch wide Tapecoat CT by the Tapecoat Company, Evanston, Illinois or equivalent acceptable to the Engineer. Connections shall also be mechanically coupled to prevent displacement.
- F. Ducts for Grouted Tendons. The horizontal wall tendons shall be enclosed in corrugated polyethylene ducts specially manufactured for post-tensioning tendons by VSL, or equivalent. The horizontal tendon ducts shall have a minimum 2-inch nominal inside diameter with 3/16-inch corrugations. The ducts for vertical tendons, when bonded, shall be flat ducts approximately 1-inch by 3-inches inside with similar corrugations.
- G. Vapor phase corrosion inhibitors for bonded tendons shall be VPI crystals, as manufactured by Shell Oil Co., or equivalent.
- H. Couplings shall not be used except at locations specifically indicated on Contract Documents, unless otherwise approved by the Engineer.
- I. Grout for injection grouting of bonded tendons shall be Prepackaged Class C per PTI Specifications.
- K. Epoxy Sealant. Epoxy sealant shall be two-component, moisture insensitive, low viscosity, solvent free, epoxy resin, Sikadur 35, Hi-Mod LV or equivalent acceptable to the Engineer.
- L. Bonding Agent. Bonding agent shall be either a two-component, moisture insensitive epoxy adhesive, Sikadur 32, Hi-Mod or equivalent acceptable to the Engineer, or neat cement grout.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Tendon supports shall be adequate to prevent displacement. Tie tendons to reinforcement or chairs to secure in proper location. Tendons are to be secured at a maximum of 4 foot centers except as noted for the floor slab tendons.
- B. Placement tolerances: Tendons are to be positioned in exact locations shown within the thickness of the member. Deviations, when required, shall be no more than $\pm 1/8$ inch.
- C. Bar Supports:
 - 1. Provide continuous #5 support bars at a maximum of four feet on center under the roof tendons.
 - 2. All reinforcement shall be tied to chairs to secure them from displacement during concrete placement. Reinforcement shall be secured at a maximum distance of four feet on center. All chairs shall be stapled to wooden soffits. Staples and tie wire only shall be used to secure chairs to forms, except as reviewed by the Engineer.
- D. Concrete shall be placed so that alignment of tendons remains unchanged.

3.2 STRESSING

- A. Score the tendon tails with a grinding wheel (or by another permanent marking method acceptable to the Engineer) at 10 inches (or other dimension outside of the gripper zone acceptable to the Engineer) from the anchorage prior to any stressing.
- B. Prestressing force shall be determined by both of the following methods:
 - 1. Measurement of tendon elongation.
 - 2. Reading of jacking force on calibrated gauge or load cell, or by use of a calibrated dynamometer.
- C. The cause of any difference in force determination between D-1 and D-2 greater than seven percent shall be ascertained and corrected. Accurate logs of actual tendon elongations and jacking forces shall be kept by the Contractor and submitted to the Engineer after completion of the stressing operation and prior to removing the stressing tails.

3.3 GROUTING OF STRESSING POCKETS

- A. The stressing pockets shall be grouted as soon as practicable after the Engineer's review of the elongation records. Coat the stressing pockets with bonding agent and fill with the specified non-shrink grout prior to setting or drying of the bonding agent.

END OF SECTION

SECTION 03 25 30

WATERSTOPS

PART 1 -- GENERAL

1.1 DESCRIPTION

This section covers the furnishing and installation of waterstops.

1.2 QUALITY ASSURANCE

Reference standards.

- A. U.S. Corps of Engineers, CRD C-572
- B. Tennessee Valley Authority (T.V.A.) Specification No. PF-1001.

1.3 PRODUCT HANDLING

- A. Protect waterstops from damage, sun and weather during storage.

1.4 INSPECTION

- A. Prior to concrete placement and after waterstops have been positioned, waterstops are to be inspected by the Engineer for correct splicing and for correct, secure, positioning.

PART 2 -- MATERIALS

2.1 MATERIALS

- A. Expansive rubber waterstops shall be Adeka MC-2010M, Spearfish SD, Greenstreak CJ-1020-2K Hydrotite, St. Louis MO, or equivalent acceptable to the Engineer unless noted otherwise on drawings.

PART 3 -- EXECUTION

3.1 PREPARATION FOR WATERSTOPS

- A. Waterstops shall be cut and/or spliced so that they are at least the full length of the concrete joint.

- B. End cuts shall be straight and square.

3.2 INSTALLATION OF EXPANSIVE WATERSTOPS

- A. Concrete surfaces shall be clean, dry, frost-free and primed in accordance with the manufacturer's recommendations.
- B. Waterstops shall be applied in accordance with the manufacturer's recommendations and shall adhere tenaciously to the primed concrete surface.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 -- GENERAL

1.1 DESCRIPTION

- A. This section covers cast-in-place concrete, including furnishing materials, transporting, placing, finishing, curing and other appurtenant items of construction.
- B. Inform Engineer at least 2 weeks in advance of time and places at which Contractor intends to place concrete. All preparation work for concrete placements shall be substantially completed at least 2 workdays prior to the scheduled start of concrete placement to allow for the Engineer's review and any necessary corrections.

1.2 QUALITY ASSURANCE

- A. Reference standards.
 - 1. Except as noted or modified in this Section, all concrete materials, transporting, placing, finishing and curing shall conform to requirements of following standard specifications:
 - a. American Concrete Institute Standards (ACI)
 - 1) 301 Specifications for Structural Concrete.
 - 2) 304 Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete.
 - 3) 304 Placing Concrete by Pumping Methods.
 - 4) 305 Recommended Practice for Hot Weather Concreting.
 - 5) 306 Recommended Practice for Cold Weather Concreting.
 - 6) 308 Standard Practice for Curing Concrete.
 - 7) 309 Recommended Practice for Consolidation of Concrete.
 - 8) 350 Code Requirements for Environmental Engineering Concrete Structures.
 - b. American Society for Testing and Materials (ASTM).
- B. Contractor shall keep at least one copy of above listed ACI publications, latest edition, in project field office at all times.
- C. Any material or operation specified by reference to the published specifications of a manufacturer shall be complied with unless directed otherwise by the Engineer.
- D. In case of a conflict between the referenced specifications or standards and this Specification, the one having the more stringent requirements, as determined by the Engineer, shall govern.

- 1.3 SUBMITTALS: All submittals shall be made in accordance with Section 01 00 00. Mix designs, shop drawings and catalog information shall be submitted for related equipment and components, in order to show that concrete and items selected and to be installed by the Contractor generally conform to the Contract Documents. Submittal information includes, but is not necessarily limited to the following:
- A. Miscellaneous product information.
 - 1. Catalog information and shop drawings for: waterstops, admixtures, bonding agents, membrane curing compound, joint sealer, embedded items, non-shrink grout, wedge-type expansion anchors, and other concrete appurtenances.

 - B. Proposed concrete mix design. (Note: Contractor shall be responsible for fully informing the concrete supplier of all specification requirements regarding the concrete mix before the proposed mix design is submitted.)
 - 1. The proportions of ingredients shall be selected to produce the proper workability (slump), durability (air content), strength, maximum water-cementitious materials ratio, time of set and other required properties of Sections 2-1 and 2-2. The proportion of ingredients shall be such as to produce a mixture with slump and durability that will work readily into the corners and angles of the forms and around reinforcement by the methods of placing and consolidation employed on the work. Do not permit the materials to segregate or excessive free water to collect on the surface.
An independent testing laboratory acceptable to the Engineer shall perform concrete trial mixtures and testing. The costs of the mix designs and testing shall be borne by the Contractor.
 - 2. Prior to commencing concrete work, submit and obtain Engineer's review of certified test reports describing proposed concrete mix design, which shall be prepared in compliance with ACI Standard 301, with concrete proportions established on the basis of previous field experience or laboratory trial batches, except as modified herein. Test reports shall also include:
 - a. Fine aggregates - Source, type, gradation, deleterious substances and bulk specific gravity on basis of weight of saturated surface-dry aggregate. ASTM C 128.
 - b. Coarse aggregate - Source, type, gradation, deleterious substances and bulk specific gravity on basis of weight of saturated surface-dry aggregate. ASTM C 127.
 - c. Ratio of fine to total aggregates.
 - d. Weight (saturated surface-dry) of each aggregate per cubic yard.
 - e. Total water content in gallons per cubic yard.
 - f. Slump on which design is based.
 - g. Brand, type and quantity of cement.
 - h. Brand, type and quantity of admixtures.
 - i. Water-cementitious materials ratio (shall be not greater than specified in Part 2-2).
 - j. Air content (which shall be within the upper half of the allowable range).
 - k. For the laboratory trial batches method, the determination of the cementitious materials content necessary to attain the required strength and other properties, without exceeding the maximum

water-cementitious materials ratio, shall be by preliminary tests in accordance with the following procedures:

Concrete trial mixtures having proportions and consistency suitable for the work shall be made using at least three different cementitious materials contents which will produce a range in strengths encompassing those required for the work.

Proportions of ingredients shall be determined and tests conducted in accordance with the basic relationships and procedures outlined in "Recommended Practice for Selecting Proportions for Normal and Heavy-Weight Concrete (Part I):" (ACI 211.1).

For each cementitious materials content, at least three specimens for each age to be tested shall be made and cured in accordance with "Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Laboratory" (ASTM C 192) and tested for strength at 1, 7, and 28 days. Tests shall be conducted in accordance with "Method of Test of Compressive Strength of Molded Concrete Cylinders" (ASTM C 39).

From the results of these tests, a curve shall be plotted showing the relationship between cementitious materials content and the average 28-day compressive strength. The minimum cementitious materials content to be used shall be that value shown by the curve to produce a strength of at least 1500 psi in 24 hours and at least 1200 psi greater than the 28-day strength specified. In any case, the minimum cementitious materials content shall not be less than that specified in Part 2-2.

If the previous field experience method is used in proportioning, the strengths shall be in compliance with ACI 301. In addition, the Contractor shall demonstrate the ability of the proposed mixture proportions to produce concrete meeting all the requirements of these Specifications.

1. Maturity meter calibration curves.
 3. In addition to the test data described above, when it is expected that concrete will be placed under hot weather concrete conditions as defined in Section 03 30 00, Part 1-6.C, trial batches shall be tested at the maximum temperature that the concrete is expected to be placed. Alternatively, sufficient records may be submitted that show field concrete performance under these temperatures and which are acceptable to Engineer.
- C. Cylinder compression test reports.
1. Submit 2 copies of certified test reports to Engineer for 1-3.B.2.K.

- D. Ready-mix delivery tickets.
 - 1. Submit delivery tickets for each load at time of delivery indicating following:
 - a. Quantity delivered with Mix Identification Number.
 - b. Quantity of each material in batch.
 - c. Outdoor temperature in shade.
 - d. Time at which water was added.
 - e. Elapsed time between when water was added and concrete load was in place.
 - f. Amounts of initial and supplemental water added, including any corrections for water in aggregate. Note: Total water amount shall result in a water-cementitious materials ratio not greater than the maximum permissible.
 - g. Name of individual authorizing supplemental water.
 - h. Numerical sequence of delivery by indicating cumulative yardage delivered on each ticket.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Cementitious materials.
 - 1. Store in weather-tight enclosures and protect against dampness, contamination and warehouse set.
 - 2. Do not use cementitious materials that have become caked or lumpy.
- B. Aggregates.
 - 1. Stockpile to prevent excessive segregation, or contamination with other materials or other sizes of aggregates.
 - 2. Use only one supply source for each aggregate stockpile.
 - 3. The bottom 6 in. of all aggregate piles in contact with ground shall not be used.
 - 4. Frozen or partially frozen aggregates shall not be used.
- C. Admixtures.
 - 1. Store to prevent contamination, evaporation, or damage.
 - 2. Protect liquid admixtures from freezing or harmful temperature ranges.
 - 3. Agitate emulsions prior to use.
- D. Rubber and plastic materials.
 - 1. Store in cool place away from direct sunlight.
- E. Mixing and transporting ready-mixed concrete.
 - 1. Maximum elapsed time from time water is added to mix until concrete is in place shall not exceed 1-1/2 hours when concrete is transported in revolving drum truck bodies unless all other provisions of these specifications can be met, including maximum water-cementitious materials ratio, workability, strength and air content. Comply with ASTM C 94.

1.5 JOB CONDITIONS

A. Environmental requirements:

1. Do not place concrete during rain, sleet, or snow unless adequate protection is provided and Engineer's approval is obtained.
2. Do not allow rainwater to increase mixing water or damage surface finish.
3. For cold or hot weather concreting conditions, lab cured cylinder tests may not be an accurate indication of field achieved strengths. Under these weather conditions, the Engineer may require job cured cylinder breaks to determine field strength (cylinders to be job cured in same manner as the in-place concrete.) The Contractor shall pay for testing. Refer to Section 03 30 00, part 3-10 for related items to be furnished by Contractor. If cold or hot weather concreting practices specified in Sections 1-6.B and 1-6.C are not adhered to, the Engineer may require Contractor, at Contractor's expense, to provide additional pullout tests in accordance with ASTM C 900, job cured cylinder tests, or 2-inch diameter cored samples from areas in question to determine field strengths achieved.
4. Changes in temperature of the concrete shall be as uniform as possible and shall not exceed 10 Degrees F. in any 1-hour or 45 Degrees F. in any 24-hour period.

B. Cold Weather Concreting. Conform to ACI 306, "Cold Weather Concreting" in addition to this specification.

1. Temperature of concrete when placed shall not be less than following:

Air Temp. <u>Degrees F</u>	Minimum Concrete Temp, C.	
	<u>Under 12 in.</u>	<u>12 in. and Over</u>
30 to 45	60	50
0 to 30	65	55
Below 0	70	60

If water or aggregate has been heated, the water and aggregate shall be combined in the mixer before cementitious materials are added. Cementitious materials shall not be added to mixture of water and aggregate when the temperature of the mixture is greater than 95 F.

2. When placed, heated concrete shall not be warmer than 80 F.
3. Prior to placing concrete, all ice, snow, surface and subsurface frost shall be removed, and temperature of surfaces to be in contact with new concrete shall be raised to a minimum of 35 F.
4. Protect concrete from freezing during specified curing period. See Part 3-9, Curing, for temperature to be maintained during initial curing period.
5. When the mean daily temperature of the atmosphere is less than 40 F., forms shall be left in place a minimum of 5 days to aid in retaining heat.
6. Heated enclosures shall be strong and windproof to insure adequate protection of corners, edges and thin sections.
7. Do not permit heating units to locally heat or dry concrete.
8. Do not use combustion heaters during first 24 hours unless concrete is protected from exposure to exhaust gases, which contain carbon dioxide.
9. If air temperatures drop below 35 F., the Contractor shall install a high-low temperature gauge into the most exposed portion of concrete during the curing protection period. The gauge shall be equipped to register the lowest overnight

- temperature. If the concrete temperature drops below the specified temperature, the curing period shall be extended until the degree-days (Part 3-9) are satisfied.
10. Refer to ACI 306 for further requirements.
- C. Hot Weather Concreting: Conform to ACI 305, "Hot Weather Concreting" in addition to this specification.
1. Take precautions when ambient air temperature is 90 F. or above. These measures may include installation of windbreaks, shading, fog spraying, sprinkling, ponding, or wet covering of a light color. If daytime highs are expected to exceed 100 F., floor and roof slab concrete shall be placed overnight, with placement commencing not prior to 3 hours before sunset.
 2. Temperature of concrete when placed shall not exceed 85 F.
 3. Cool forms and reinforcing to a maximum of 90 F. by spraying with water prior to placing concrete.
 4. Do not use cementitious materials that have reached a temperature of 105 F. or more at the time they enter the concrete mix.
 5. Prevent plastic shrinkage cracking due to rapid evaporation of moisture.
 6. Do not place concrete when evaporation rate (actual or anticipated) is 1.0 kg per square m per hour or above, as determined by Figure 2.1.5 of ACI 305.
 7. Set-retarding and water-reducing admixtures may be used when the ambient air temperature is 90 F. or above to offset accelerating effects of high temperature.
 8. Refer to ACI 305 for further requirements.
- D. Protection from Mechanical Injury: During the curing period, the concrete shall be protected from damaging mechanical disturbances particularly load stresses, heavy shock and excessive vibration. All finished concrete surfaces shall be protected from damage caused by construction equipment, materials, or methods and by rain or running water. Self-supporting structures shall not be loaded in such a way as to over-stress the concrete.

PART 2 -- PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement shall conform to the "Standard Specification for Portland Cement," ASTM C 150, Type II low-alkali. Once cement type is chosen, the type and source shall remain the same throughout the project.
- Fly ash shall be Class F (ASTM C 618).
- B. Aggregates.
1. Fine aggregate - ASTM C 33.
 2. Coarse aggregate - ASTM C 33 Size No. 57 or 67.
 3. Once aggregates are chosen, the same source and type of aggregates shall be used throughout the project.

- C. Water.
 - 1. Shall be clean, fresh and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete or reinforcement.

- D. Admixtures.
 - 1. Use only as specified or reviewed and acceptable to Engineer.
 - 2. Include any admixtures to be used in the proposed concrete mix designs.
 - 3. Calcium chloride is not permitted as an admixture or as an ingredient of an admixture.
 - 4. Air-entraining Admixture: ASTM C 260.
 - 5. Water-Reducing and Retarding: ASTM C 494. Use high range water reducing admixture only as specified or if acceptable to the Engineer.

- E. Tests for Chloride Ions.
 - 1. For all concrete in which aluminum or galvanized metal is to be embedded, it shall be demonstrated by tests in accordance with AASHTO T-260 that the hardened concrete, including the aggregates, cementitious materials and any admixtures used, will not contain more than 0.06 percent water soluble chloride ions by weight of cement.

2.2 CONCRETE PRODUCTION

- A. Ready-mixed concrete.
 - 1. Mixed and delivered, ASTM C 94.
 - 2. Retempering. Indiscriminate addition of water to increase slump shall be prohibited.

Concrete shall be mixed only in quantities required for immediate use. Concrete that has partially set shall not be retempered, but shall be discarded.

When concrete arrives at the project with slump below that suitable for placing, first the concrete shall be remixed for at least one minute at mixing speed. If the slump is still too low, water may be added only if neither the maximum permissible water-cementitious materials ratio nor the maximum slump is exceeded. The water must be incorporated by additional mixing equal to at least half of the total mixing required. The Engineer must review such addition.

- B. Batching and mixing equipment.
 - 1. Conform to "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete," ACI 304.

- C. Proportioning.
 - 1. Proportion ingredients to produce a well-graded mix of high density and maximum workability consistent with the accepted mix design.
 - 2. Entrained air, $6 \pm 1\frac{1}{2}$ percent for ASTM C 33 Size 67 or 57 coarse aggregate. Refer to ACI 301 for air entrainment required for other coarse aggregate sizes.
 - 3. Time of Set.

- Six hours plus or minus one hour.
4. Strength and General Requirements.

Design and proportion concrete to meet the following minimum compressive strengths and other criteria:

	Design Strength 28-Day <u>(psi)</u>	ASTM C 33 Aggregate <u>Size No.</u>	Slump <u>± 2.0 in.</u>	Minimum Cement Content <u>lb/yd³</u>	Minimum Fly Ash Content <u>lb/yd³</u>	Maximum W-C Materials <u>Ratio*</u>
<u>Location</u>						
All Tank Concrete	4,500	57 or 67	5.0	525	100	0.40
Cold Weather Slabs	4,500	57 or 67	5.0	600	0	0.40

*The maximum water-cementitious materials ratio by weight, which shall be based on all water in the mix, including correction for moisture in aggregates, and shall be based on the total cementitious materials including cement and fly ash, if any.

2.3 CONCRETE ACCESSORY MATERIALS

- A. Curing Materials.
1. Sheet material: ASTM C 171
 2. Liquid membrane: membrane-curing compound shall be in accordance with ASTM C 309. Membrane curing compound shall be sprayable, 18% minimum solids content, US Spec Max Cure Resin Clear High Solids or equivalent acceptable to Engineer.
- B. Joint Sealers.
1. Joint Sealer: Joints indicated on Drawings, shall be sealed with a polyurethane joint sealer material of uniform, non-sag or self-leveling consistency as indicated. The sealant shall, when installed, tenaciously adhere to primed concrete surfaces and shall remain permanently elastomeric.
- The material shall be of a type that will, when properly installed, effectively and permanently seal joints subject to minor movements. Install with primer and cure in accordance with the manufacturer's instructions and recommendations.
- Except as noted on the Drawings, joint sealer shall be Sikaflex 2C-NS or 2C-SL Elastic Sealant/Adhesive, as manufactured by Sika Chemical Corporation or other material acceptable to the Engineer. Add color as required to match adjacent surfaces where exposed to view.
- C. Non-Shrink Grout: Non-shrink grout shall be "Masterflow 713" or equivalent acceptable to the Engineer. Grouts with iron filings are not acceptable. The grout shall be compatible with the surface to be bonded.
- D. Epoxy Bonding Agent: Bonding agent shall be a two component moisture insensitive epoxy adhesive, Sikadur 32, Hi-Mod or equivalent acceptable to the Engineer.

- E. Expansion Joint Filler Material: Joint filler material shall be closed cell neoprene or rubber conforming to ASTM D 1056, Grade 2A3. Material shall be glued securely to concrete surfaces.
- F. Wedge-Type Expansion Anchors: Expansion bolts and anchors fastened to concrete shall be stainless steel; "KWIK-BOLT" manufactured by Hilti, Inc., Phillips Red Head wedge anchors, or equivalent acceptable to Engineer.
- G. Epoxy Sealant: Epoxy sealant shall be a two-component, moisture insensitive, low viscosity, solvent free, epoxy resin, Sikadur 35, Hi-Mod LV or equivalent acceptable to the Engineer.
- H. Concrete Support Blocks: Concrete support blocks for the floor reinforcement and the support of the vertical reinforcement at the base of the wall shall be a mixture of portland cement, sand and water with a minimum compressive strength of 4000 psi.
- J. Waterstops: Expansive waterstops shall be Adeka or Greenstreak, size as indicated on the drawings, see Spec. Section 03 25 30.

PART 3 -- EXECUTION

3.1 INSPECTION

- A. General.
 - 1. Assure that excavations and formwork are completed.
 - 2. Assure that dirt, mud, encrusted concrete, debris and excess water have been removed.
 - 3. Check that reinforcement is properly positioned and secured in place.
 - 4. Verify that expansion joint material, anchors, and other embedded items are secured in proper position.

3.2 PREPARATION

- A. General.
 - 1. Remove any hardened concrete and foreign material from inner surface of conveying equipment.
 - 2. Prepare slab subgrade in accordance with ACI 301 and ACI 350, appendix H.
 - 3. Designate limits of each placement and obtain Engineer's review of entire installation prior to proceeding.
- B. Concrete placed against gravel or crushed stone.
 - 1. Prevent loss of water from concrete with a minimum 2 in. layer of material having 25 percent fines passing a No. 4 sieve.
- C. Concrete placed against hardened or existing concrete.
 - 1. Prior to placing fresh concrete against surface of hardened concrete, complete the following:

- a. Remove all laitance, foreign substances (including curing compound), wash with clean water, and thoroughly wet hardened surface before placing fresh concrete.
- b. Apply bonding agent at blockouts, cutouts and in locations directed by Engineer.

3.3 PLACEMENT

A. Conveying.

1. Convey concrete from mixer to final position as rapidly as practicable without segregation or loss of material.
2. Use only metal or metal-lined chutes with maximum length of 20 ft, having a maximum slope of 1 vertical to 2 horizontal, and a minimum slope of 1 vertical to 3 horizontal.
3. Provide a hopper at the end of long-belt conveyors and chutes not meeting the requirements in 2. above.
4. Conveying by pumping methods shall conform to ACI 304, Chapter 9.

B. Depositing in Walls.

1. Deposit concrete in a continuous operation until section is completed.
2. Place concrete in approximately horizontal layers 2 ft maximum thickness.
3. Each layer of concrete shall be plastic when covered with following layer.
4. Rate of vertical rise not more than 2 ft per hour, unless formwork is designed for higher pressures.
5. Provide placement capacity as necessary to comply with these requirements with construction and other joint locations shown on the Drawings.
6. Maximum height of concrete free fall, 4 ft.
7. Pump concrete or use a tremie having varying lengths for placing concrete in columns and walls to prevent free fall of more than 4 ft.
8. Concrete shall not be dropped through reinforcing steel nor subjected to any other procedure that will cause segregation.
9. Place concrete in wall or column forms at least 24 hours prior to the time concrete or any reinforcing steel is placed in the system to be supported by such walls or columns except as noted below.
10. Do not exceed 6 ft of vertical height for any portion of a wall or column placed monolithically with floor or roof slab.
11. Allow concrete to thoroughly settle before top is finished. Remove all laitance, debris, and surplus water from surfaces at tops of forms by screeding, scraping, or other effective means.
12. Overfill forms wherever top of a wall will be exposed to weathering and after concrete has settled, screed off excess.
13. See section 3-4 C. for preparation of construction joints prior to placing wall concrete.

C. Depositing in Floor and Roof Slabs.

1. Deposit concrete in a continuous operation until section is completed.
2. Concrete shall be deposited as nearly as practicable to its final position to avoid segregation due to rehandling or flowing.

3. Concrete shall be covered with 6 mil thick plastic 12 ft wide or Burlene, overlapped approximately 1.5 ft, prior to the development of plastic shrinkage cracks, Confilm or other evaporation retarders may be used in lieu of plastic sheeting.

D. Consolidation

1. During and immediately after placement, thoroughly compact and work around all reinforcements, embedments, and into corners of forms, eliminating all air or stone pockets that may cause honeycombing, pitting, or planes of weakness.
2. Use mechanical vibrators that will maintain at least 9,000 cycles per minute when immersed in concrete.
3. Minimum horsepower per vibrator shall be 1-1/2.
4. Number and type of vibrators shall be as acceptable to Engineer. A spare vibrator will be available at all times in case of mechanical problems.
5. Over-vibrating and the use of vibrators to transport concrete laterally in forms will not be allowed.
6. Vertically insert vibrators at points approximately 2 ft apart and to a depth to penetrate 6 in. into the preceding layer.
7. Vibrate each location for a length of time to obtain adequate consolidation (generally 5 to 15 seconds).

3.4 JOINTS

A. Watertight joints.

1. Use at all locations where water is to be contained, groundwater is to be resisted and as shown on Drawings.

B. Expansion and contraction (control) joints.

1. At locations shown on Drawings.
2. Extend reinforcement continuously through joints, except "Expansion Joints," unless specifically shown on Drawings.
3. Form joint with felt, ASTM D 2475, where "bond breaker" is indicated.
4. Flexible joint filler material as indicated in Part 2-3, shall be used in Expansion Joints.
5. Expansion and contraction joints shall be caulked with a joint sealer as indicated in Part 2-3.

C. Construction joints.

1. Provide where shown on Drawings.
2. Obtain Engineer's approval for proposed locations of construction joints not shown on Drawings or for proposed elimination of construction joints shown on Drawings.
3. Locate joints to least impair the strength and serviceability of the structure, generally as follows:
 - a. Columns and walls.
 - 1) At underside of beams, girders, haunches, drop panels, slabs, and at floor levels.

- 2) All haunches and drop panels shall be considered as parts of supported floor or roof and shall be placed monolithically therewith.
- b. Suspended slabs.
 - 1) At or near mid-span in flat slab construction.
- c. Construction joints in walls, beams, girders, and slabs shall be perpendicular to planes of their surfaces, with expansive rubber waterstops, and shall not be keyed except as shown on Drawings.
- d. Maximum length of wall segments without construction joints shall be 500 ft or as shown on the Drawings.
4. The surfaces of concrete to be cast against shall be thoroughly cleaned and all laitance removed. Concrete shall be vibrated adequately to prevent honeycombing at the joint.
5. Construction joints shall require bond.
6. Joints where indicated on Drawings or where directed by the Engineer to receive an epoxy bonding agent shall have been prepared and the bonding agent applied in accordance with the manufacturer's recommendations prior to placing fresh concrete.

3.5 EMBEDDED ITEMS

- A. Refer to Concrete Formwork — Section 03 10 00 - Part 3-1B.

3.6 FINISHING EXPOSED SURFACES

- A. Finishing unformed surfaces.
 1. Slabs for aprons, slabs-on-grade, and tops of walls.
 - a. Provide surface conforming to proper elevation and contour. Except as noted otherwise on the Drawings, all walks and slabs shall slope 2 percent away from buildings. All other walks, exterior concrete steps, etc. shall be pitched to drain out with a slope of $\frac{1}{4}$ in. per ft. Tops of retaining walls shall be pitched back (into the backfill) 0.25 in. per ft unless designated otherwise by the Engineer. All aggregates shall be completely embedded in mortar by screeding.
 - 1) Screeded surfaces shall be free of surface irregularities.
 - 2) Maximum variation from a plane surface in any 10 ft section shall be $\frac{1}{4}$ in.
 2. Coordination of Finishing and Placement.
 - a. Mixing and placing shall be carefully coordinated with finishing. Concrete shall not be placed on the subgrade or forms more rapidly than it can be spread, straight edged, and bull floated. These operations must be performed before bleeding water has an opportunity to collect on the surface.
 - b. To obtain good surfaces and avoid cold joints, the size of placing and finishing crews shall be planned with due regard for the effects of concrete temperature and atmospheric conditions on the rate of hardening of the concrete.

- c. All flatwork finishers on the project shall have experience and supervised by ACI Certified flatwork finishers.
3. Jointing and Edging.
 - a. Joints in slabs shall be located and detailed as indicated on the Drawings and in the Specifications.
 - b. Edge exposed edges of floated or troweled surfaces with a tool having a $\frac{1}{4}$ in. corner radius, unless these edges are specified to be beveled.
4. Consolidation.

Concrete in slabs shall be thoroughly consolidated. Internal vibration shall be used in beams and girders of framed slabs and along the bulkheads of slabs on grade. Consolidation of slabs shall be obtained with vibrating screeds, roller pipe screeds, internal vibrators, or other acceptable means. The concrete surfaces shall not be manipulated prior to finishing operations.
5. Finishes.
 - a. Unless selection of finishes is made in the Specifications or on the Drawings, the following finishes shall be used, as applicable.
 - 1) Floated Finish - Use for tank floor and roof, walls, footings, pile caps, etc.
 - 2) Troweled Finish - Use for floors in finished areas and where called for on Drawings.
 - 3) Broom Finish - Use for concrete stairs, landings, sidewalks, concrete path, curb and gutters.
 - 4) Raked Finish - Use for slabs to receive topping or secondary concrete
 - b. The following finishes shall be utilized on this project unless specified or detailed otherwise.
 - 1) Floated Finish.

After the concrete has been placed, consolidated, struck-off, and leveled by bull floating, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared and/or when the mix has stiffened sufficiently to permit the proper operation of a power-driven float. The surface shall then be consolidated with power-driven floats of the impact type, except in thin sections, such as pan slabs, which shall be floated by hand. Hand floating with wood or cork-faced floats shall be used in locations inaccessible to the power-driven machine. Trueness of surface shall be rechecked at this stage with a 10-foot straightedge applied at not less than two different angles. All high spots shall be cut down and all low spots filled during this procedure to produce planes checking true under the straightedge in any direction, with tolerances not exceeding $\frac{1}{4}$ in. in 10 ft. The slab shall then be refloated immediately to a uniform, smooth, granular texture.
 - 2) Troweled Finish.

Where a troweled finish is specified, the surface shall be finished first with impact power floats, as specified above where applicable, then with power trowels and finally with hand trowels. The first troweling after power floating shall be done by

a power trowel and shall produce a smooth surface that is relatively free of defects, but which may still contain some trowel marks. Additional troweling shall be done by hand after the surface has hardened sufficiently. The final troweling shall be done when a ringing sound is produced as the trowel is moved over the surface. The surface shall be thoroughly consolidated by the hand troweling operations. The finished surface shall be free of any trowel marks and shall be uniform in texture and appearance, with tolerances not exceeding ¼ in. in 10 ft. On surfaces that support floor coverings, any defects of sufficient magnitude to show through the floor covering shall be removed by grinding.

3) Broom Finish.

Slabs shall be given a coarse transverse-scored texture by drawing a broom across the surface. This operation shall follow immediately after bull floating operations and hand floating as required to close the surface. Provide a uniform abrasive texture of constant color. On paths, broom at right angles to normal traffic direction.

3.7 REPLACEMENT, REPAIRING AND PATCHING OF DEFECTIVE CONCRETE

A. Removal and replacement of defective concrete

1. After forms have been removed, any concrete that is not formed as shown on the Drawings, is out of alignment or level beyond the required tolerance, shows a defective surface that cannot be properly repaired or patched, or cannot be shown to prevent water migration through concrete surfaces or joints, shall be removed and replaced at the Contractor's expense.
2. Liquid retaining concrete walls, slabs, beams, etc., cannot have any honeycombing, cold joints, cracks greater than 0.005 in. wide, or leakage of water through the concrete thickness or joints. If in the opinion of the Engineer the honeycombing, cold joints, cracks or leakage are excessive, the Contractor shall be required to remove the complete concrete segment and replace it. Where minor honeycombing, cold joints, cracks or leakage occurs, it shall be repaired as indicated in Part 3-7.B and C below.

B. Repair of tie holes, blockouts, cutouts and defective concrete.

1. Immediately after form removal, repair, to the satisfaction of the Engineer, all repairable surface defects, including tie holes, in concrete surfaces. In all cases, repair work shall be completed within 24 hours of removal of the forms.
2. Replace, to satisfaction of Engineer, within 48 hours after adjacent forms have been removed, all other honeycombed and defective concrete areas that cannot be immediately repaired as noted in item 1 above.
3. Cut out and remove to sound concrete, with edges square-cut to avoid feathering, all honeycombed or otherwise defective concrete.
4. Repair work shall conform to ACI 301 and these specifications. At all blockouts, tie-holes and cutouts, after being thoroughly cleaned, apply an epoxy-bonding

agent and fill with non-shrink grout, as specified in the materials section of this specification. Color shall be added to match surrounding concrete.

5. Perform in a manner that will not interfere with thorough curing of surrounding concrete.
6. Adequately cure all repair work.

C. Repair of cracks and minor honeycombed areas.

All cracks, minor honeycombed concrete or other areas of apparent leakage, including wet spots on the wall, shall be sealed with Epoxy Sealant injection or other acceptable means so that the concrete is watertight as defined in Specification Section 03 90 00 "WATERTIGHTNESS TESTING."

3.8 FINISHING FORMED SURFACES

A. Finishing.

1. Rough form finish - All surfaces not exposed to view such as surfaces in contact with earth.
 - a. Chip off all fins and other surface projections greater than ¼ in. high.
 - b. Fill all tie holes and repair and patch all defects.
2. Smooth form finish - All exposed surfaces not generally exposed to view including interior surfaces of tank.
 - a. Use form facing to produce a smooth, hard uniform surface.
 - b. Keep number of seams to a minimum.
 - c. Remove all fins and projections.
 - d. Clean, coat, and fill all tie holes.
 - e. Repair and patch all defects.

3.9 CURING

A. General.

1. Freshly deposited concrete shall be protected from premature drying and excessively hot or cold temperatures and shall be maintained without drying at a relatively constant temperature for the period of time necessary for the hydration of the cementitious materials and proper hardening of the concrete. A list of all intended curing methods including a description of materials shall be submitted to the Engineer for review.
2. Initially, the concrete temperature shall be maintained at or above 70 F. for 3 days or at or above 50 F. for 5 days. Continue curing as required to achieve the specified 28-day strength. See Part 1-5 Job Conditions for additional information.
3. Use membrane-curing compound as noted below.

B. Membrane curing compound (conforming to ASTM C 309).

1. Shall be used prior to placement of plastic sheeting on concrete floor and roof slabs, walls and other miscellaneous concrete areas where acceptable to Engineer.

2. Spray-apply in 2 coats perpendicular to each other at coverage recommended by manufacturer.
3. Cover unformed surfaces with curing compound within 30 minutes after final finishing.
4. Apply curing compound immediately to formed surfaces if forms are removed before end of specified curing period. Curing compound sprayed in tie holes is to be cleaned out before patching tie holes. Forms may be left in place for all or part of the curing period; wood forms shall be kept wet.
5. Protect compound against abrasion during curing period.

C. Film Curing (conforming to ASTM C 171).

1. Concrete placed early in the concrete placing operation shall not be allowed to dry out. Apply Membrane Curing Compound, or other material acceptable to the Engineer, as noted above prior to placing the polyethylene film or other coverings.
2. Begin as quickly as possible after initial set of concrete.
3. Cover surfaces completely with polyethylene sheeting.
4. Overlap edges for proper sealing and anchorage.
5. Cover joints between sheets with dunnage as required to prevent displacement due to wind or other factors.
6. Promptly repair all tears, holes, and other damage.
7. Anchor continuously all edges and anchor surface as necessary to prevent billowing.

3.10 QUALITY CONTROL

A. Concrete tests.

1. Shall be in accordance with the requirements of ACI 301, except as noted or modified in this Section. Test specimens shall be taken by an ACI Certified Concrete Field Testing Technician - Grade 1 in accordance with the "Standard Method of Making and Curing Concrete Test Specimens in the Field," ASTM C 31.

a. Strength test.

- 1) Mold and laboratory cure seven cylinders from each sample.
- 2) Test two cylinders at 7 days per ASTM C 39. Test two cylinders at 28 days for acceptance. Keep the remaining as a spares or to be tested as directed by Engineer.
- 3) The spare cylinders for each sample may be eliminated after the first several concrete placements of each type of concrete if, in the opinion of the Engineer, test results are consistent and within specifications.

b. Minimum samples.

Collect the following minimum samples for each 28-day strength concrete used in the work for each day's placing:

<u>Concrete Quantity</u>	<u>Number of Samples</u>
50 yds ³ or less	one
50 to 100 yds ³	two

- 100 yds³ or more two plus one sample for each additional 100 yds³ c.
- 1) Conduct test for each strength test sample and whenever consistency of concrete appears to vary.
 - 2) Slump tests shall be made using "Method of Test for Slump of Portland Cement Concrete" (ASTM C 143).
- d. Air content.
- 1) Conduct test from one of first three batches mixed each day and for each strength test sample.
 - 2) Samples indicating low air contents by the pressure method air content tests in accordance with ASTM C 231 shall be verified by the gravimetric method, ASTM C 138, and the volumetric method, ASTM C 173, before adding additional air entraining admixture in the field.
2. The Contractor shall provide the following to the Owner and the Testing Agency at no additional cost to the Owner:
- a. Incidental labor required to facilitate testing.
 - b. Minimum one day's advance notice when concrete is to be placed.
 - c. Storage facilities for concrete test cylinders; including, when necessary, a specially prepared box with high-low thermometer and thermostatically controlled heating devices in accordance with Section 9.2 of ASTM C 31 for storage of the cylinders for the first 24 hours after molding.
 - d. Materials, samples, and access to materials as required for testing.
 - e. The use of testing services shall in no way relieve the Contractor of his responsibility to furnish materials and construction in full compliance with the Drawings and Specifications.
- B. Acceptance of Concrete.
1. If the early strength tests fall below the early strengths deemed necessary to achieve the specified 28-day strength, the Engineer shall have the right to require conditions of temperature and moisture necessary to secure the required strength. The Engineer may also require pull out tests in accordance with ASTM C 900 or core tests in accordance with ASTM C 42.
 2. Strength level of concrete will be considered satisfactory so long as average of all sets of two consecutive strength test results equals or exceeds specified 28-day strength and no individual strength test result falls below the specified strength by more than 500 psi.
- C. Failure of Test Cylinder Results.
1. Upon failure of the 28-day test cylinder results, Engineer may require Contractor at his expense, to obtain and test cored samples from area in question.
 2. Concrete will be considered adequate if average of three core tests is at least 85 percent of, and if no single core is less than 75 percent of the specified 28-day strength.
 3. Upon failure of the core test results, Engineer may require Contractor, at his expense, to perform load tests as specified in ACI 318, Chapter 20.
 4. In the event an area is found to be structurally unsound, the Engineer may order removal and replacement of concrete as required. The cost of the pullout or core

tests, and the load test and the structural evaluation shall be borne by the Contractor.

5. Fill all core holes as specified for repairing defective concrete.

3-11 SPECIAL TESTING REQUIREMENTS:

- A. Further concrete testing, in addition to Quality Control Testing and testing for proposed mix designs, may become necessary during the project. Testing shall be provided under the conditions stated in each specification section and shall be in accordance with the requirements of ACI 301 and this specification. Refer to Parts 3-10B and 3-10C for acceptance criteria and procedures upon failure of tests.
- B. In all cases, the Contractor shall provide the Owner and the testing agency, at no additional cost to the Owner, with the items listed in Part 3-10.A.2.
- C. Sampling and Test Groups.
 1. When job cured cylinders are used, samples shall be obtained as specified in Section 03 30 00, Parts 3-10A.1.a, 3-10A.1.b and 3-10A.1.c, unless directed otherwise by the Engineer.
 2. When core tests are used, samples shall be obtained in accordance with ASTM C 42 and as directed by the Engineer.

END OF SECTION

SECTION 03 35 00

POST-TENSIONED CONCRETE TANKS

PART 1 -- GENERAL

1.1 DESCRIPTION:

- A. This section covers general requirements for construction of the post-tensioned concrete tank, including contractors' qualifications and construction procedure.
- B. Inform Engineer at least 72 hours in advance of time and places at which Contractor intends to place concrete. All preparation work for concrete placements shall be substantially completed at least 4 work-day hours prior to the scheduled start of concrete placement to allow for the Engineer's review and any necessary corrections.

1.2 QUALITY ASSURANCE:

- A. Reference standards.
 - 1. Except as noted or modified in this Section, all concrete materials, transporting, placing, finishing and curing shall conform to requirements of the American Water Works Association (AWWA) D115 Standard for Circular Prestressed Concrete Water Tanks With Circumferential Tendons.
- B. Contractor shall keep at least one copy of above listed ACI publications, latest edition, in project field office at all times.
- C. Any material or operation specified by reference to the published specifications of a manufacturer shall be complied with unless directed otherwise by the Engineer.
- D. In case of a conflict between the referenced specifications or standards and this Specification, the one having the more stringent requirements, as determined by the Engineer, shall govern.

1.3 SUBMITTALS: All submittals shall be made in accordance with Section 01 00 00. Submittal information includes, but is not necessarily limited to the following:

- A. Miscellaneous product information not otherwise specified in these Specifications.
- B. Proposed construction joints and procedures not consistent with these Specifications.

PART 2 -- PRODUCTS

Not Applicable

PART 3 -- EXECUTION

3.1 TANK POST-TENSIONING AND CONSTRUCTION REQUIREMENTS:

- A. Description. The provisions covered by this section consist of special materials and procedures in connection with the construction of the circular concrete tanks in accordance with this Specification and Drawings.
- B. General. The tank shall conform to all applicable provisions of these Specifications and all applicable provisions of the American Water Works Association (AWWA) D115 Standard for Circular Prestressed Concrete Water Tanks with Circumferential Tendons.
- C. Guarantee. Two-year guarantee for Contract work shall be in accordance with the General Conditions.
- D. Procedure.
 - 1. Construct the wall footing and floor slab monolithically. The floor slab shall be constructed with only those construction joints shown on the drawings (if any). No construction joints in the floor slab will be allowed except as shown or reviewed by the Engineer. Floors, and roofs, shall be stressed in two stages as follows:
 - a. Post-tensioning operation shall not begin until maturity meters and field cured cylinders, or equivalent acceptable to the Engineer, have been tested and indicate that concrete has attained 2000 psi for the initial stressing of floor and roof slab tendons, 3000 psi for the final stressing of unbonded tendons and 3500 psi for bonded tendons, unless otherwise called for in the Contract Documents.
 - b. The floor and roof post-tensioning operation shall begin within 12 hours of when the maturity meters and cylinders have been tested and indicate that the concrete has attained 2000 psi, which shall be within 32 hours of the beginning of the placement of the concrete in the slabs. All tendons shall be stressed to 16 kips from one end (alternate stressing ends of two-end stressed tendons) within 48 hours of the beginning of the placement of the concrete in the slabs. Complete stressing of tendons to 33 kips when concrete compressive strength reaches 3,500 psi, which shall be within 7 days of the concrete placement. Submit the final elongation records to the Engineer for review within one day of completing the stressing and, as soon as possible, but within 7 days, after the review, remove stressing tails, place grease-filled end caps and grout pockets at stressing ends.
 - 2. Construct the column footings, columns and wall. The tank requires a formed, cast-in-place concrete wall with horizontal and vertical post-tensioning tendons. The wall is left temporarily unconnected to the floor slab and wall footing by a sliding joint.
 - 3. Prestress the vertical tendons in the tank wall in proper sequence, if applicable.
 - 4. Prestress the horizontal tendons in the tank wall in the proper sequence. Submit the vertical and horizontal elongation records to the Engineer for review. As soon as possible after the review of the elongation records by the Engineer the horizontal and vertical wall tendons shall be grouted as applicable. Horizontal and grouted vertical tendons shall be grouted from their lowest points until pure grout is ejecting from the tops of their standpipes at the high end.

The grouting operation shall be completed within 14 days of placing the prestressing steel in the ducts or special corrosion preventative measures acceptable to the Engineer, such as introducing a vapor-phase corrosion inhibitor into the ducts, shall be taken. Follow all safety recommendations of the manufacturer if vapor-phase corrosion inhibitors are used.

5. Construct the post-tensioned roof slab monolithically, without construction joints. No construction joints in the roof slab will be allowed except as shown or reviewed by the Engineer. Roofs shall be stressed in two stages, as described above.
 6. Place the waterstops and concrete in the curbs at the base of the wall. For circular tanks, and rectangular tanks with rounded corners, allow at least 28 days between the time the horizontal wall tendons are fully stressed and the concrete placing operation in the curbs is begun.
 7. Perform watertightness testing of the tank in accordance with Section 03 90 00, "WATERTIGHTNESS TESTING."
 8. Backfill in accordance with Section 31 23 23 Backfil of the Technical Specifications herein, and the Soils Engineer's recommendations.
- E. All tie holes, cut-outs and block-outs, after being cleaned and a bonding agent applied, shall be filled with a non-shrink grout. Stressing tails shall be removed and block-outs patched as soon as practicable after review of the elongation records by the engineer, but not longer than 7 days.
- F. No welding or burning will be permitted in the vicinity of any tendons.

3.2 BACKFILLING:

- A. Backfilling shall not begin until the tank is complete and has passed the watertightness tests.
- B. Backfill around tank wall shall be built-up in maximum 8-inch loose lifts and compacted as required. Heavy mechanical equipment shall not be allowed to compact backfill within 5 feet of the tank wall. Hand or light mechanical equipment (5,000 lbs. GVW max.) shall be used for compaction within this area.
- C. Heavy mechanical equipment shall not be allowed on the tank roof to place or compact backfill, if any. Hand or light mechanical equipment (10,000 lbs. GVW max.) shall be used in this area.

END OF SECTION

SECTION 03 90 00

WATERTIGHTNESS TESTING

PART 1 -- GENERAL

1.1 DESCRIPTION

- A. Furnish all labor, equipment, and materials necessary to test the water tanks for watertightness.

PART 2 -- PRODUCTS

2.1 MATERIALS

- A. Water, clean and free of deleterious substances.

PART 3 -- EXECUTION

3.1 PREPARATION

- A. After construction of the reservoir or tank has been completed, and before backfilling, the floor and inside of the walls shall be broom-cleaned. The floor shall be squeegeed of curing water and washed with clean water. After the sweeping and the removal of all debris, any cracks greater than 0.010 in. wide and joints shall be properly sealed in accordance with provisions of Section 03 30 00, 3-7. Completely hose down the interior surfaces of the reservoir with water under pressure.

3.2 TESTING

- A. Watertightness testing shall be performed. Two tests are required. The first test shall be made on the overall watertightness of the tank. The second test shall be made on the visible surfaces of the tank.
- B. Overall Watertightness Testing
 1. Fill to the overflow and allow tank or basin to stand full for at least 24 hours. During the first 24 hours, the surface of the water may drop, and shall be refilled to the overflow.
 2. The water level elevation shall be determined by using a surveyor's level and level rod or other acceptable means. Measure the drop in water level over the

next 5 days to determine the water volume loss for comparison with the acceptance criteria. Floating “evaporation and precipitation pans” shall be used to remove these effects from the test. The liquid loss for each period of 24 hours shall not exceed 0.000125 of the tank capacity (or height), which shall be translated to the nearest 1/16 in. in the 5-day period.

- C. Visible Surface Testing
 - 1. Wet spots on the exterior wall surface or flowing water on the wall base shall not be permitted. Wet spots are defined as spots where moisture can be picked up on a dry hand. Wet spots shall be repaired in accordance with Section 03 30 00, Part 3-7.

- D. If the watertightness testing fails to meet the above requirements, the Engineer may require the reservoir or tank to be drained, repaired and again tested for watertightness.

END OF SECTION

SECTION 22 05 29

HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe hangers and supports.
 - 2. Hanger rods.
 - 3. Inserts.
 - 4. Flashing.
 - 5. Equipment curbs.
 - 6. Sleeves.
 - 7. Mechanical sleeve seals.
 - 8. Equipment bases and supports.

- B. Related Sections:
 - 1. Section 03 30 00 - Cast-in-Place Concrete

1.2 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME B31.1 - Power Piping.
 - 2. ASME B31.5 - Refrigeration Piping.
 - 3. ASME B31.9 - Building Services Piping.

- B. ASTM International:
 - 1. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E119 - Method for Fire Tests of Building Construction and Materials.
 - 3. ASTM E814 - Test Method of Fire Tests of Through Penetration Firestops.
 - 4. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.

- C. American Welding Society:
 - 1. AWS D1.1 - Structural Welding Code - Steel.

- D. FM Global:
 - 1. FM - Approval Guide, A Guide to Equipment, Materials & Services Approved By Factory Mutual Research For Property Conservation.

- E. Manufacturers Standardization Society of the Valve and Fittings Industry:
 - 1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
 - 2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
 - 3. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

- F. Underwriters Laboratories Inc.:
 - 1. UL 263 - Fire Tests of Building Construction and Materials.
 - 2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
 - 3. UL 1479 - Fire Tests of Through-Penetration Firestops.
 - 4. UL - Fire Resistance Directory.
- G. Intertek Testing Services (Warnock Hersey Listed):
 - 1. WH - Certification Listings.

1.3 SUBMITTALS

- A. Section 01 00 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate system layout with location including critical dimensions, sizes, and pipe hanger and support locations and detail of trapeze hangers.
- C. Product Data:
 - 1. Hangers and Supports: Submit manufacturers catalog data including load capacity.
- D. Manufacturer's Installation Instructions:
 - 1. Hangers and Supports: Submit special procedures and assembly of components.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 00 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.5 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

- A. Manufacturers:
 - 1. Flex-Weld, Inc.
 - 2. Glope Pipe Hanger Products Inc.
 - 3. Michigan Hanger Co.
 - 4. Superior Valve Co.

5. Substitutions: Permitted.

B. Plumbing Piping - Water:

1. Conform to ASME B31.9.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Carbon steel, adjustable swivel, split ring.
3. Hangers for Cold Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.
4. Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hook.
5. Wall Support for Pipe Sizes 4 inches and Larger: Welded steel bracket and wrought steel clamp.
6. Vertical Support: Steel riser clamp.
7. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

2.2 SLEEVES

- A. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage thick galvanized steel.
- B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gauge thick galvanized steel.
- C. Sleeves for Round Ductwork: Galvanized steel.
- D. Sleeves for Rectangular Ductwork: Galvanized steel or wood.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive sleeves.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- B. Remove incompatible materials affecting bond.
- C. Do not drill or cut structural members.

3.3 INSTALLATION - INSERTS

- A. Install inserts for placement in concrete forms.
- B. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches and larger.

- D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.4 INSTALLATION - PIPE HANGERS AND SUPPORTS

- A. Install in accordance with ASTM F708.
- B. Support horizontal piping as scheduled.
- C. Install hangers with minimum 1/2 inch space between finished covering and adjacent work.
- D. Place hangers within 12 inches of each horizontal elbow.
- E. Use hangers with 1-1/2 inch minimum vertical adjustment.
- F. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
- G. Support vertical piping at every other floor. Support vertical cast iron pipe at each floor at hub.
- H. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
- I. Support riser piping independently of connected horizontal piping.
- J. Provide copper plated hangers and supports for copper piping sheet, lead packing between hanger or support and piping.
- K. Design hangers for pipe movement without disengagement of supported pipe.
- L. Prime coat exposed steel hangers and supports. Refer to Section 09 90 00. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- M. Provide clearance in hangers and from structure and other equipment for installation of insulation.

3.5 INSTALLATION - SLEEVES

- A. Exterior watertight entries: Seal with mechanical sleeve seals.
- B. Set sleeves in position in forms. Provide reinforcing around sleeves.
- C. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

- D. Extend sleeves through floors 1-inch above finished floor level. Caulk sleeves.

END OF SECTION

SECTION 25 01 00

PROCESS TRANSMITTERS AND SWITCHES

PART 1 GENERAL

1.1 SUMMARY

- A. This Section specifies requirements for process variable transmitters and switches. Modifications may be required to the existing electrical and process interfaces to facilitate installation of the new instruments. The Contractor shall be responsible for determining the extent of these modifications and providing all work required for connections in accordance with the instrument manufacturer's instructions.
- B. Approximate locations of the instruments are indicated on the project drawings.

1.2 SUBMITTALS

- A. General: Submittals shall be in accordance with the submittals section of the general specifications
- B. Compliance Submittals and Shop Drawings: Manufacturer's product data and fully developed catalog numbers shall be submitted for review and approval.
- C. Calibration Standards and Tools: Submit a list of the recommended calibration tools and required for each transmitter. List shall include recommended quantities for a 1 year supply and the associated cost of each.
- D. Configuration Submittal: Complete configuration data for each instrument shall be submitted prior to commissioning the instrumentation. The submittal shall identify the Contractor's recommended settings for all instrument configuration parameters. This submittal shall be provided to the Engineer thirty (30) days prior to the scheduled commissioning of the first instrument.
- E. Operation and Maintenance Manuals:
 - 1. Manufacturer's technical and instruction manuals shall be provided for each instrument. Manuals shall address installation, configuration, maintenance, and troubleshooting procedures.

PART 2 PRODUCTS

2.1 GENERAL

- A. Unless otherwise specified, process variable transmitters and switches shall comply with the following requirements:

1. Transmitters and switches shall be provided with integral indicators where noted. Indicators shall be calibrated in process units, and said units shall be engraved on the indicator scale plate.

2.2 TRANSMITTERS

- A. Pressure Indicating Transmitter (Hospital Tank Valve Vault)
 1. Use existing recently installed pressure transmitter
- B. Pressure Indicating Transmitter (Altitude Valve Vault)
 1. Manufacturer/Model: IFM, PI2793
 2. Features:
 - a. Stainless Steel housing with local LED display.
 - b. Protection: IP 68
 - c. Measuring Range [PSI]: -14...362
 - d. Operating Temperature [C]: -25...80
 - e. Power Requirement: 24VDC
 - f. Output [mA]: 4...20
 - g. Provide with appropriate process fitting
- C. Temperature Indicating Transmitter
 1. Manufacturer/Model: Endress+Hauser, TH13
 2. Features:
 - a. Aluminum housing without local display
 - b. Operating Temperature [C] -200...600
 - c. Power Requirement 24VDC
 - d. Output [mA] 4...20
 - e. Provide with appropriate process fitting, probe depth and thermowell
- D. Hydrostatic Level Transmitter
 1. Manufacturer/Model: Endress+Hauser, Deltapilot FMB52
 2. Features:
 - a. Rod type sensor suspension. Final length to be determined by Contractor.
 - b. Protection: IP 68
 - c. Operating Temperature [C]: -10...70
 - d. Power Requirement: 24VDC
 - e. Output [mA]: 4...20
 - f. Provide with appropriate process fitting

2.3 SWITCHES

- A. Leak Detector
 1. Manufacturer/Model: Flowline, LH29

2. Features:
 - a. Foamed Polypropylene Construction
 - b. Protection: IP 68
 - c. Operating Temperature[C]: -40...105
 - d. Power Requirement: N/A
 - e. Output: Contact Output Normally Closed

- B. Intrusion Switch
 1. Manufacturer/Model: Sentrol, 2507A
 2. Features:
 - a. Aluminum Housing
 - b. Power Requirement: N/A (Magnetically Actuated)
 - c. Output: Contact Output Normally Closed or Normally Open

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine areas and conditions under which instruments are to be installed, and process connections to which instruments are to be interfaced. Notify Contractor in writing of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

- B. The Contractor shall be responsible for inspecting the existing process and electrical interfaces serving each instrument and determining the extent of the modifications required to properly interface with the new instrument.

3.2 PROTECTION

- A. Protect installed components from damage. Replace damaged items prior to final acceptance.

3.3 INSTALLATION OF PROCESS TRANSMITTERS AND ANALYZERS

- A. Process variable transmitters and analyzers shall be installed in accordance with the manufacturer's instructions. Unless otherwise specified, new instruments shall be installed in the same location as the existing instrument that is to be replaced.

- B. Raceway Connections: Final connections between rigid raceway systems and instruments shall be made with liquid-tight flexible metal conduit with a maximum length of 2 feet.

- C. Modify existing process piping as required to mate with specified process connections for each instrument type.

- D. Instruments shall be oriented such that ports and adjustments are accessible for in-place testing and calibration.

- E. Instruments shall be mounted for unobstructed access but mounting shall not obstruct walkways, hatches, doorways, etc.
- F. Instruments shall not be mounted where shock or vibration will impair its operation.
- G. Instruments supported directly by concrete or concrete block walls shall be spaced out not less than 5/8 inch by framing channel between instrument and wall.

3.4 CONFIGURATION, ADJUSTMENTS AND TESTING

- A. Commissioning: Instruments shall be configured, calibrated, and tested in accordance with the manufacturer's instructions and Specification Section.
- B. Individual Component Calibration and Test:
 - 1. Each receiving and transmitting instrument and final elements shall be field calibrated in accordance with the manufacturer's recommended procedure.
 - 2. Each analog instrument shall be calibrated at 0, 25, 50, 75, and 100 percent of its specified full scale range. Each signal sensing trip and process sensing switch shall be adjusted to the required setting. All test data shall be recorded on test forms in compliance with this specification.
 - 3. Final element alignment shall be tested and adjusted to verify that each final element operates smoothly over its range in response to the specified process control signals.
 - 4. Any component which fails to meet the specified tolerances shall be repaired by the manufacturer or replaced, and the above tests repeated until the component is within tolerance.
 - 5. A calibration sticker shall be placed on each instrument following successful calibration. The calibration sticker shall indicate the date of calibration and the name of the testing company and personnel who calibrated the instrument.

END OF SECTION

SECTION 25 02 00

TELEMETRY SYSTEM

PART 1 GENERAL

1.1 SUMMARY

- A. This Section specifies requirements for the telemetry system. Modifications may be required to the existing telemetry interfaces to facilitate installation of the new equipment. The Contractor shall be responsible for determining the extent of these modifications and providing all work required for connections in accordance with the instrument manufacturer's instructions.

1.2 SUBMITTALS

- A. General: Submittals shall be in accordance with the submittals section of the general specifications
- B. Compliance Submittals and Shop Drawings: Manufacturer's product data and fully developed catalog numbers shall be submitted for review and approval.
- C. Calibration Standards and Tools: Submit a list of the recommended calibration tools and required for each transmitter. List shall include recommended quantities for a 1 year supply and the associated cost of each.
- D. Configuration Submittal: Complete configuration data for each instrument shall be submitted prior to commissioning the instrumentation. The submittal shall identify the Contractor's recommended settings for all instrument configuration parameters. This submittal shall be provided to the Engineer thirty (30) days prior to the scheduled commissioning of the first instrument.
- E. Operation and Maintenance Manuals:
 - 1. Manufacturer's technical and instruction manuals shall be provided for each instrument. Manuals shall address installation, configuration, maintenance, and troubleshooting procedures.

PART 2 PRODUCTS

2.1 GENERAL

- A. Unless otherwise specified, process variable transmitters and switches shall comply with the following requirements:

2.2 RADIO EQUIPMENT

- A. Unlicensed 900MHz Radio
 - 1. Manufacturer/Model: Xetawave, Emancipator+
 - 2. Features:
 - a. Board Level unlicensed 902-928MHz Radio
 - b. SMA Antenna Connector
 - c. Data Rate: 57 kbps...2.6Mbps
 - d. Operating Temperature[C]: -40...85
 - e. Power Requirement: 10-32 VDC
 - f. Data Interface: One Serial Port, One Ethernet Port
 - g. Provide with appropriate DIN rail mounting kit

- B. Yagi Direction Antenna
 - 1. Manufacturer/Model: Kathrein, TY-900
 - 2. Features:
 - a. Anodized 6061/T6 Aluminum
 - b. Frequency Range: 890-960 MHz
 - c. Front to Back Ratio: > 20dB
 - d. Max Input Power: 100W
 - e. Connector: N Female

- C. Antenna Feedline
 - 1. Manufacturer/Model: Andrew, FSJ4-50B
 - 2. Features:
 - a. ½ in. Superflexible Corrugated Copper PE Jacket
 - b. Impedance: 50 Ohm
 - c. Frequency Range: 1-10200 MHz
 - d. Operating Temperature[C]: -55...85
 - e. Attenuation @ 960MHz: 3.522 dB/100ft

- D. Antenna Jumper Cable
 - 1. Manufacturer/Model: Times Microwave, LMR-240-UF
 - 2. Features:
 - a. ¼ in. UltraFlex Coaxial Copper PE Jacket
 - b. Impedance: 50 Ohm
 - c. Frequency Range: 1-10200 MHz
 - d. Operating Temperature[C]: -55...85
 - e. Attenuation @ 900MHz: 9.1 dB/100ft

- E. Lightening Arrestor
 - 1. Manufacturer/Model: Polyphasor, IS-50NX-C2
 - 2. Features:
 - a. Flange Mounted DC Surge Arrestor
 - b. Connectors: N Female
 - c. Frequency Range: 125 MHz...1000 MHz
 - d. Operating Temperature[C]: -50...50
 - e. Attenuation @ 900MHz: < 0.1 dB

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine areas and conditions under which radios are to be installed, and network connections to which instruments are to be interfaced. Notify Contractor in writing of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- B. The Contractor shall be responsible for inspecting the existing electrical interfaces serving each radio and determining the extent of the modifications required to properly interface with the new radio.

3.2 PROTECTION

- A. Protect installed components from damage. Replace damaged items prior to final acceptance.

3.3 INSTALLATION OF TELEMETRY EQUIPMENT

- A. Telemetry Equipment shall be installed in accordance with the manufacturer's instructions.
- B. Yagi Antenna shall be installed not below that indicated by the telemetry path study provided by the Engineer
- C. Yagi Antenna shall be aligned to the San Mateo Office master radio as indicated in the telemetry path study provided by the Engineer

3.4 CONFIGURATION, ADJUSTMENTS AND TESTING

- A. Commissioning: Radios shall be configured, and tested in accordance with the manufacturer's instructions and Specification Section. The radios shall be configured to optimize throughput to the San Mateo master radio.

END OF SECTION

SECTION 26 05 00

GENERAL PROVISIONS

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment and incidentals as shown on the Drawings, specified, and required to complete the electrical Work.
2. Contractor shall attend the prebid meeting as scheduled in the Contract documents. The prebid meeting will provide additional information not indicated on the Contract Documents. This prebid meeting provides an opportunity for the Contractor to examine existing conditions. Some of these existing conditions are not indicated on the Contract Documents.

B. Coordination:

1. Review installation procedures, drawings and schedules under other Sections and coordinate with other trades the installation of electrical items that must be installed with or within formwork, walls, partitions, ceilings and panels.
2. Contractor shall be responsible for the installation of all conduits, inserts, and other items to be embedded in the concrete, or built into walls, partitions, ceilings or panels constructed by other contractors. Contractor shall provide other contractors with detailed plans or sketches of the location of said conduits and other built-in items as may be required. Contractor shall keep himself fully informed of the construction where conduits and other built-in items are to be installed. Contractor shall install said conduits and other built-in items in such a manner and within such time periods as will not unnecessarily delay the work of the other contractors.

C. General:

1. Interpretation of Drawings:
 - a. Dimensions shown on the Drawings that are related to equipment are based on the equipment of one manufacturer. Confirm the dimensions of the equipment furnished to the space allocated for that equipment.
 - b. The Drawings show the principal elements of the electrical Work. They are not intended as detailed working drawings for the electrical Work, but as a complement to the Specifications to clarify the principal features of the electrical systems.
 - c. It is the intent of the Drawings and Specifications that all equipment and devices, furnished and installed under this Contract, be properly connected and interconnected with other equipment and devices so as to render the installations complete for successful operation, regardless of whether all the connections and interconnections are specifically mentioned in the Specifications or shown on the Drawings.

- d. It also is the intent of the Contract Documents that similar products be provided by the same manufacturer for uniformity on the Project.

- D. Related Sections: Contractor shall coordinate the requirements of the Work in this Section along with the requirements of the Sections listed below which includes, but is not necessarily limited to, Work that is directly related to this Section.
 - 1. Refer to Division 1, Technical Submittals.
 - 2. Refer to Division 1, Transportation and Handling of Materials and Equipment.
 - 3. Refer to Division 1, Project Record Documents.

- E. Temporary Power and Lighting:
 - 1. Refer to Division 1, Temporary Electricity, for temporary power during construction.
 - 2. Refer to Division 1, Temporary Lighting, for temporary lighting during construction.

1.02 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. Permits: Obtain all permits and pay fees required to commence Work and, upon completion of the Work, obtain and deliver to Engineer a Certificate of Inspection and Approval from the State Board of Fire Underwriters or other authority having jurisdiction.
 - 2. Codes: Material and equipment shall be installed in accordance with the current standards and recommendations of 2011 State of New Mexico Electrical Code, the National Electrical Safety Code and with local codes which apply. Where discrepancies arise between codes, the most restrictive regulation shall apply.
 - 3. Tests by Independent Regulatory Agencies: Electrical material and equipment shall be new and shall bear the label of the Underwriters' Laboratories, Inc., or other nationally-recognized, independent testing laboratory, wherever standards have been established and label service regularly applies.
 - 4. Utilities:
 - a. Work in connection with the electric service and utility metering shall be done in strict conformance with the requirements of the utility company (PNM.)

- B. Reference Standards: Electrical material and equipment shall conform in all respects to the latest approved standards of the following:
 - 1. National Electrical Manufacturers Association.
 - 2. The American National Standards Institute.
 - 3. The Institute of Electrical and Electronic Engineers.
 - 4. Insulated Power Cable Engineers Association.
 - 5. National Electrical Code (NEC).
 - 6. National Electrical Safety Code (NESC).

1.03 SUBMITTALS

- A. Refer to Division 1, Shop Drawing Procedures, and the General Conditions.

- B. Shop Drawings shall include the following information to the extent applicable to the particular item:
 - 1. Manufacturer's name and product designation or catalog number.
 - 2. Electrical ratings.
 - 3. Conformance to applicable standards or specifications of ANSI, ASTM, ICEA, IEEE, ISA, NEC, NEMA, NFPA, OSHA, UL, or other organizations.
 - 4. Dimensioned plan, section, elevations and panel layouts showing means for mounting, conduit connection, and grounding.
 - 5. Materials and finish specification, including paints.
 - 6. List of components including manufacturer's names and catalog numbers.
 - 7. Internal wiring diagram and drawings indicating all connections to components and numbered terminals for external connections.

1.04 PROJECT CLOSEOUT

- A. Operation and Maintenance Data: Submit complete manuals including:
 - 1. Copies of all Record Drawings and Wiring Diagrams, test reports, maintenance data and schedules, description of operation, and spare parts information.
 - 2. Furnish Operation and Maintenance Manuals in conformance with the requirements of Division 1.
- B. Red Line as-built Drawings:
 - 1. Furnish Red line as-built Drawings in accordance with the requirements of Division 1, including:
 - a. System Red line as-built Drawings: Include the following:
 - 1) One line wiring diagram of the distribution system.
 - 2) Actual in place conduit and cable layouts with schedule of conduit sizes and number and size of conductors.
 - 3) Layouts of the power and lighting arrangements and the grounding system.
 - 4) Control schematic diagrams, with terminal numbers and all control devices identified, for all equipment.
 - b. Point-to-Point Interconnection Wiring Diagram Drawings: Include the following:
 - 1) External wiring for each piece of equipment, panel, instrument and other devices and conduit wiring to control stations, lighting panels and motor controllers.
 - 2) Numbered terminal block identification for each wire termination.
 - 3) Identification of the assigned wire numbers for all interconnections.
 - 4) Identification of all conduit wiring by the conduit tag in which the wire is installed.
 - 5) Terminal and pull boxes through which wiring is routed.
 - 6) Identification of all equipment and the Shop Drawing transmittal numbers for equipment from which the wiring requirements and termination information was obtained.
 - 2. The Red line as-built Drawings shall reflect final equipment and field installation information.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials: Contractor shall instruct the manufacturers and vendors as to the maximum shipping sizes of equipment that can be accommodated at the site.
- B. Storage of Materials: Conform to the requirements of Division 1, Storage of Materials and Equipment.
- C. Handling of Materials: Conform to the requirements of Division 1, Transportation and Handling of Materials and Equipment.

1.06 JOB CONDITIONS

- A. Existing Conditions:
 - 1. Contractor shall examine the site and existing facilities in order to compare them with the Contract Documents with respect to the conditions of the premises, location of and connection to existing facilities and any obstructions which may be encountered.
 - 2. Contractor shall perform the Work with due regard to safety and in a manner that will not interfere with the existing equipment or in any way cause interruption of any of the functions of the existing Valve Vault.
 - 3. Work shall be carried out with a minimum amount of disruption to the operation of the existing Valve Vault and with prior approval of Owner. Contractor shall submit, for approval by Owner, a detailed written procedure for work which affects operation of the existing plant, a detailed procedure for modifying any existing electrical equipment, and anticipated time required to complete the Work and the required shutdown time, if any.
 - 4. Where the Work of Contractor ties in with existing installations, Contractor shall take prior precautions and safeguards in connecting the Work with the existing operating circuits so as to prevent any interruption to the existing operating circuits. The tying in of Work installed under this Contract, with the existing circuits shall be performed only in the presence of Owner. Advance notice will be required before any equipment is removed from service. Contractor shall notify Owner, in writing, of his intention to do such work, providing full details.

1.07 CONTROL CABINETS AND PANELS

- A. All control cabinets and panels located in wet or corrosive environments shall be NEMA 4X, stainless steel, unless otherwise specified or noted on the Drawings. All outdoor panels shall be provided with sunshade structures.

1.08 ELECTRICAL EQUIPMENT

- A. All electrical equipment shall be capable of operating successfully at full-rated load, without failure, with an ambient outside air temperature of 0°F to 110°F and an elevation of 5000 feet (MSL).
- B. All electrical devices and equipment shall have ratings based on 75°C terminations.

1.09 AREA CLASSIFICATIONS

- A. Materials and equipment shall conform to the area classification(s) shown on the Drawings, specified and required.
- B. Wet/Corrosive Locations: The following areas shall be considered wet/corrosive locations:
 - 1. Inside valve vault
 - 2. All outdoor areas.
 - 3. All indoor areas below grade.
 - 4. Areas indicated on the Drawings.

Materials, equipment and incidentals in areas identified as wet locations shall meet NEC and NEMA requirements for wet or corrosive locations. All equipment enclosures including pull boxes installed in wet or corrosive locations shall be NEMA 4X, Type 316 stainless steel, unless otherwise indicated. Conduits shall be PVC coated galvanized rigid steel and shall be terminated at enclosures with watertight, threaded hubs.

All equipment enclosures including pull boxes installed indoor shall be NEMA Type 4.

1.10 SCHEMATIC DIAGRAMS

- A. Schematic diagrams are provided for Contractor's guidance in fulfilling the operational intent of the Contract Documents.
- B. It shall be Contractor's responsibility to meet all safety and electrical codes, and to provide all equipment, appurtenances and specialty items required to provide for complete and operable systems.
- C. Review of control schemes submitted by Contractor shall not relieve Contractor of his contractual responsibility to provide complete and successfully operating systems.

PART 2 PRODUCTS

2.01 NAMEPLATES

- A. Material: Laminated phenolic, incised to show 3/8-inch high letters, Gothic. The letters shall be black with white background or match existing unless indicated otherwise.
- B. Border: Minimum 1/8-inch around engraved print with extra length for fastening devices.
- C. Fasteners: Secured with #4-40, round-head, stainless steel, self-tapping screws.

2.02 WIRE MARKERS

- A. Refer to Section 26 12 20, 600 Volt Cable.

2.03 CONDUIT TAGS

- A. Refer to Section 26 13 10, Rigid Conduit.

PART 3 EXECUTION

3.01 EQUIPMENT, CONDUIT, AND CIRCUIT IDENTIFICATION

- A. Provide identification of each electrical item, in addition to the manufacturer's nameplates, to identify the item's function and the equipment or system which it serves or controls.
- B. Identify equipment by means of nameplates. Re-label existing equipment whose designation has been changed.
- C. Color code and identify ALL wires and cables by means of wire markers.
1. Power Circuits (90V and above): Identify conductors by circuit number, labeled at power source and at the equipment.
 2. Control and Instrumentation Circuits: Identify each control, signal and status wire by a unique number. Example:

FROM	TO
Panel L, Ckt 1	Control Valve
Pressure Xmtr	SCADA Panel

- D. Allow for three lines, each 25 characters, Times New Roman, 0.1 inch font. Submit a spreadsheet indicating all Equipment, Conduit, and Circuit identifications to review by the Engineer. The actual designations used shall be documented on the point-to-point wiring diagrams. Tag each spare wire with conduit number and wire number.
- E. Identify pull and terminal boxes with nameplates. Identify each box by a unique number. Numbering system shall reflect the actual designations used in the field and as documented on wiring diagrams.

END OF SECTION

SECTION 26 05 10

UTILITY WORK

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope:
1. This section specifies general requirements for the electrical utility work.
 2. This section specifies several requirements that are not indicated on the Drawings.
- B. Coordination:
1. Pre-Bid Coordination: In addition to the minimum requirements indicated on the Contract Drawings, prior to bid, the Contractor shall contact the Utility Company (PNM) and investigate any additional requirements that are necessary for this project.
 2. The Contractor shall examine PNM's electrical utility specifications prior to the bid. Examine and become intimately familiar with the PNM's electrical utility requirements.
 3. Construction-Phase Coordination: Contractor shall coordinate all work with the utility companies. This coordination shall include, but is not limited to, the following:
 - a. Pre-construction meeting and coordination
 - b. Demolition work
 - c. Ductbank work
 - d. Power pole work
 - e. Transformer work
 - f. Metering enclosure work
 - g. Utility company inspection
 - h. Utility energization work
- C. Related Sections:
1. Contractor shall coordinate the requirements of the Work in this Section along with the requirements of the Sections listed below which includes, but is not necessarily limited to, Work that is directly related to this Section.
 - a. Division 1, Submittals.
 - b. Division 1, Record Documents
 - c. Section 26 06 10, Grounding
 - d. Section 26 13 10, Rigid Conduit

1.02 JOB CONDITIONS

- A. Existing Conditions:
1. Contractor shall examine the site and existing facilities in order to become familiar with the conditions of the premises, location of and connection to existing utilities and any obstructions which may be encountered.
 2. Contractor shall perform the Work with due regard to safety and in a manner that will not interfere with the existing equipment or in any way cause interruption of any of the functions of the facility.
 3. Work shall be carried out with a minimum amount of disruption to the operation of the existing facility and with prior approval of Owner. Contractor shall submit, for approval by Owner, a detailed written procedure for work which affects operation of the existing facility, a detailed procedure for modifying any existing electrical equipment, and anticipated time required to complete the Work and the required shutdown time, if any.

1.03 DEMOLITION

- A. Utility Demolition: All utility demolition work shall be coordinated with the utility company. At no time shall the facility be without utility power.

1.04 ELECTRIC UTILITY POWER WORK

- A. The Contractor shall furnish and install all electrical power work in accordance with the utility company's requirements. All work shall be coordinated with the utility company prior to start of work. The Contractor shall obtain the latest copy of the utility company's specifications. The Contractor shall bid and construct all work as required per the utility company's specifications. All work shall be performed by the Contractor unless specifically indicated to be performed by the utility company.
- B. Material and Installation: All material used and all installations shall be in accordance with the utility company's requirements. Include pull boxes as specified by the utility company.
- C. Inspection: All work requiring inspection by the utility company shall be inspected and approved by the utility company.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. All material used shall be in accordance with the utility company's requirements.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All installation shall be in accordance with the utility company's requirements unless noted otherwise.

3.02 INSPECTION

- A. All installations shall be inspected by the utility company. The Contractor shall obtain the utility company's acceptance of the work prior to covering the underground work. All work shall be coordinated with the utility company.

END OF SECTION

SECTION 26 06 10

GROUNDING SYSTEMS

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install complete grounding for the electrical systems, structures and equipment.

1.02 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:

1. NEC Article 250, Grounding.
2. UL Standard No. 467, Electrical Grounding and Bonding Equipment.

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Manufacturer's technical information for grounding materials proposed for use.
2. Listing of grounding connector types identifying where they are to be used.
3. Layouts of each structure ground grid.
4. Test point construction details.
5. Ground resistance test procedure.
6. Results of ground resistance tests at each test point.

PART 2 PRODUCTS

2.01 MATERIALS

A. Bare Ground Cable:

1. Material: Annealed, bare, stranded copper, No. 4/0 AWG minimum size or as otherwise shown on the Drawings.
2. Product and Manufacturer: Provide ground cable of one of the following:
 - a. Cablec Corporation.
 - b. General Cable Corporation.
 - c. Rome Cable Company.
 - d. Or Approved Equal.

B. Ground Rods:

1. Material: Copperclad rigid steel rods, 3/4-inch diameter, ten feet long.
2. Product and Manufacturer: Provide ground rods of by one of the following:
 - a. Copperweld, Bimetallics Division.

- b. ITT Blackburn Company.
 - c. Or Approved Equal.
- C. Grounding Connectors:
- 1. Material: Pressure connectors shall be copper alloy castings, designed Specifically for the items to be connected, and assembled with Durium or silicone bronze bolts, nuts and washers. Welded connections shall be by exothermic process utilizing molds, cartridges and hardware designed specifically for the connection to be made.
 - 2. Product and Manufacturer: Provide grounding connectors of one of the following:
 - a. Pressure Connectors:
 - 1) O.Z./Gedney, Division of General Signal Corporation.
 - 2) Burndy Corporation.
 - 3). Or Approved Equal.
 - b. Welded Connections:
 - 1) Cadweld by Erico Products, Incorporated.
 - 2) Therm-O-Weld by Burndy Corporation.
 - 3) Or Approved Equal.

PART 3 EXECUTION

3.01 STRUCTURE GROUND SYSTEM

- A. Provide grounding and bonding as shown on the Drawings.
- B. Install No. 4/0 bare copper cable around the exterior perimeter of structures, minimum 2 feet-6 inches below grade, unless otherwise shown on the Drawings.
- C. Install ground rods where shown on the Drawings. Install additional ground rods, if necessary, to attain a resistance to ground of less than five ohms for each ground grid.
- D. For structures with steel columns, install No. 4/0 ground cable from grid to each column around the perimeter of the structure. Connect cable to steel using exothermic welds.
- E. Connect grids to a continuous underground water pipe system.
- F. Provide accessible test points for measuring the ground resistance of each grid.
- G. Weld all buried connections, except for test points.

3.02 EQUIPMENT GROUNDING

- A. Ground all electrical equipment in compliance with the National Electrical Code.

- B. Equipment grounding conductors shall be bare stranded copper cable of adequate size installed in metal conduit where necessary for mechanical protection. Ground conductors, pulled into conduits with non-grounded conductors, shall be insulated. Insulation shall be green.
- C. Control panels grounding conductors shall be bare stranded copper cable of adequate size to the ground grid from the AC ground bus and an insulated stranded copper cable of adequate size to the ground grid from the DC ground bus.
- D. Connect ground conductors to conduit with copper clamps, straps or with grounding bushings.
- E. Connect to piping by welding or brazing. Use copper bonding jumpers on all gasketed joints.
- F. Connect to equipment by means of lug compressed on cable end. Bolt lug to equipment frame using holes or terminals provided on equipment specifically for grounding. Do not use hold-down bolts. Where grounding provisions are not included, drill suitable holes in locations designated by Engineer.
- G. Connect to motors by bolting directly to motor frames, not to sole plates or supporting structures.
- H. Connect to service water piping by means of copper clamps. Use copper bonding jumpers on gasketed joints.
- I. Scrape bolted surfaces clean and coat with a conductive oxide-resistant compound.

3.03 TESTING

- A. The grounding system shall be tested by a third party entity (not the Contractor or the supplier).
- B. Test the completed ground systems for resistance to ground using an electrical ground resistance tester. The grounding system maximum resistance shall not exceed five ohms under normally dry conditions when measured by the resistance tester. Resistance values above five ohms shall be brought to the Engineer's attention.
- C. Test all grounded cables and metal parts for continuity of connection.
- D. Test shall be witnessed by the Owner or Engineer. Provide a report to the Engineer.

END OF SECTION

SECTION 26 12 10

INSTRUMENTATION CABLE

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install instrumentation and telephone cables.
2. The types of cable include the following:
 - a. Shielded Instrument Cable.

1.02 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Manufacturer's technical information for instrumentation cable proposed for use.

PART 2 PRODUCTS

2.01 MATERIALS

A. Single Shielded Pair Instrument Cable:

1. 600 volts, bare, soft annealed copper, seven strand, PVC insulated conductors, No. 16 AWG minimum, twisted with aluminum-polyester shield, stranded tinned 16 AWG copper drain wire and PVC outer jacket. Color: black and red. Colors for 24VDC power shall be Blue (+) and white with blue stripes (-).
2. Product and Manufacturer: Provide one of the following:
 - a. 9342 Series by Belden Company.
 - b. No Equal.

B. Cable Terminals:

1. Provide barrel compression fittings or solder dipped, or fork type copper compression terminals with nylon insulation for termination of cable at all terminal blocks. Where insulation is removed, all cable shall have black heat shrink at panel termination. Tape will not be acceptable.
2. Product and Manufacturer: Provide one of the following:
 - a. T&B Sta-Kon.
 - b. Burndy Insulug.
 - c. Or Approved Equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in conduit separate from power cables, unless otherwise noted.
- B. Ground shield of shielded cables at one end only and as recommended by instrument manufacturer.
- C. Terminate stranded conductors with pre-insulated crimp type spade or barrel compression fitting terminals properly sized to fit fastening device and wire size.
- D. Install and terminate vendor furnished cable in accordance with vendor equipment requirements.
- E. Contractor shall coordinate the installation and termination of the telephone cables with the telephone company.
- F. Install in conformance with the National Electrical Code.
- G. DC Signal cables (i.e. 4-20 mA and under 50V DC) shall be separated from AC voltage cables by a minimum of 12 inches.

3.02 TESTING

- A. Test all 600 volt wiring in accordance with the requirements of Section 26 12 20, 600 Volt Cable.
- B. Test shielded instrumentation cable shields with an ohmmeter for continuity along the full length of the cable and for shield continuity to ground. The tests shall be witnessed by the Owner and Engineer.

END OF SECTION

SECTION 26 12 20

600 VOLT CABLE

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope:
 - 1. Contractor shall provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install 600 volt cable.
 - 2. The types of cable required include the following:
 - a. Insulated cable for installation in raceways.
 - b. Cable for installation in trays.
 - c. Direct burial cable.
 - d. Direct burial cable duct.
- B. Related Sections: Contractor shall coordinate the requirements of the Work in this Section along with the requirements of the Sections listed below which includes, but is not necessarily limited to, Work that is directly related to this Section.
 - 1. Section 26 12 10, Instrumentation Cable.

1.02 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Comply with applicable provisions of Regulatory Agencies below and others having jurisdiction:
 - 1. Codes: Install cable in accordance with the National Electrical Code and applicable local codes.
 - 2. Tests by Independent Regulatory Agencies: Cable shall bear the label of the Underwriters' Laboratories, Inc.
- B. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:
 - 1. ASTM B3, Soft or Annealed Copper Wire.
 - 2. ASTM B8, Concentric-Lay-Stranded Copper Conductors, Hard, Medium-hard or Soft.
 - 3. ICEA S-66-524, Cross-linked-thermosetting- polyethylene-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
 - 4. National Electrical Code.
 - 5. UL Standard No. 44, Wires and Cables, Rubber-Insulated.
 - 6. UL Standard No. 83, Wires and Cables, Thermoplastic-Insulated.
 - 7. IEEE Standard 971.
- C. Factory Production Tests:
 - 1. All wire and cable shall be factory tested in accordance with the requirements of Underwriters' Laboratories.

1.03 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 - 1. Manufacturer's literature, specifications, and engineering data for 600 volt insulated cable proposed for use.
 - 2. Manufacturer's literature for cable markers.
- B. Test Records: Submit for review copies of written records of field insulation resistance test results.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Insulated Cable In Raceways:
 - 1. Material: Single conductor copper cable conforming to ASTM B3 and B8 with flame-retardant, moisture and heat resistant cross-linked polyethylene or thermoset insulation rated 90°C in dry locations and 90°C in wet locations and listed by UL as Type XHHW-2.
 - 2. Application: Use Type XHHW-2 for all sizes, unless otherwise indicated.
 - 3. Wire Sizes: Not smaller than No. 12 AWG for power and lighting and No. 14 AWG for 120 volt control circuits.
 - 4. Stranding: All 600 volt cable shall be stranded.
 - 5. Colors for 120VAC: Red (Line) with White (Neutral). Internal line voltage shall be black.
 - 6. Colors for 24VDC: shall be Blue (+) and white with blue stripes (-).
 - 7. Product and Manufacturer: Provide one of the following:
 - a. Okonite Company.
 - b. The Southwire Company.
 - c. Or Approved Equal.
- B. Cable Connectors, Solderless Type:
 - 1. For wire sizes up to and including No. 6 AWG, use compression type. Alarm and control wire shall be terminated using forked type connectors at terminals. If terminal block is crimp type, then the wire shall be terminated with a crimped barrel lug or solder dipped.
 - 2. Product and Manufacturer: Provide one of the following:
 - a. T & B Sta-Kon.
 - b. Burndy Hylug.
 - c. Or Approved Equal.
 - 3. For wire sizes No. 4 AWG and above, use either compression type or bolted type with silver-plated contact faces.
 - 4. For wire sizes No. 250 kcmil and larger, use connectors with at least two cable clamping elements or compression indents and provision for at least two bolts for joining to apparatus terminal.
 - 5. Properly size connectors to fit fastening device and wire size.

- C. Cable Splices:
1. For wire sizes No. 8 AWG and larger, splices shall be made up with compression type copper splice fittings. Splices shall be taped and covered with materials recommended by the cable manufacturers, to provide insulation equal to that on the conductors.
 2. For wire sizes No. 10 AWG and smaller, splices may be made up with preinsulated spring connectors.
 3. For wet locations, splices shall be waterproofed. Compression type splices shall be waterproofed by a sealant-filled, thick wall, heat shrinkable, thermosetting tubing or by pouring a thermosetting resin into a mold that surrounds the joined conductor. Spring connector splices shall be waterproofed with a sealant-filler.
 4. Product and Manufacturer: Provide one of the following:
 - a. Compression-Type Splices:
 - 1) Burndy Hylink.
 - 2) T&B Color-Keyed Compression Connectors.
 - 3) Or Approved Equal.
 - b. Spring Connectors:
 - 1) Buchanan B-Cap.
 - 2) T&B Wire Connector.
 - 3) Or Approved Equal.
- D. Cable Markers:
1. Provide only heat shrinkage type cable identification, which shall be type- written.
 2. Product and Manufacturer: Provide the following:
 - a. Omni-Grip by W.H. Brady Company. PART 3EXECUTION

3.01 INSTALLATION

- A. Install all cables complete with proper identification and terminations at both ends. Check and correct for proper phase sequence and proper motor rotation.
- B. Pulling:
1. Use insulating types of pulling compounds containing no mineral oil.
 2. Pulling tension shall be within the limits recommended by the wire and cable manufacturer.
 3. Use a dynamometer where mechanical means are used.
 4. Cut off section subject to mechanical means.
- C. Bending Radius: Limit to a minimum of six times cable overall diameter.
- D. Slack: Provide maximum slack at all terminal points.
- E. Splices:
1. Where possible, install cable continuous, without splice, from termination to termination.
 2. Where required, splice where shown on the Drawings or as approved by the

Engineer and also where required for cable installation. All splices below grade, in manholes, handholes and wet locations shall be waterproofed.

3. Splices are not allowed in conduits.
4. All splices shall be pre-approved by Engineer.

F. Identification:

1. Each cable and conductor shall be identified in each pullbox, manhole and each termination point with circuit identification markers, which shall include the conduit number and wire number. The markers shall be self-laminating vinyl on white background and shall be printed using a Brady "XC Plus" printer or Approved Equal.

G. Phase Identification/Color Coding:

1. All three phase circuits shall be identified, which shall include the conduit number and phase, at switchgear, motor control centers, manholes (5 KV), cables and panelboards as "PHASE A"," PHASE B", and "PHASE C". All conductors not identified with a tag number shall be identified with a tag indicating the source.
2. Three phase 480 volt systems shall be color coded as follows:
 - a. Phase A - Brown.
 - b. Phase B - Orange.
 - c. Phase C - Yellow.
 - d. Neutral (if applicable) - White.
3. Single phase, 120/240 volt circuits shall be color coded as follows:
 - a. Phase A - Black.
 - b. Phase B - Red.
 - c. Neutral - White.
4. Three phase, 208 volt systems shall be color coded as follows:
 - a. Phase A - Black.
 - b. Phase B - Red.
 - c. Phase C - Blue.
 - d. Neutral - White.
5. No. 6 AWG and Smaller: Provide conductors with colored insulation.
6. No. 4 AWG and Larger: Provide conductors with colored insulation.
7. Color code power cables in accordance with Owner's standards.
8. Ground conductors shall have green colored insulation.

3.02 TESTING

- A. Test each electrical circuit after permanent cables are in place to demonstrate that the circuit and connected equipment perform satisfactorily and that they are free from improper grounds and short circuits.
- B. Individually test 600 volt cable mechanical connections after installation and before they are put in service with a calibrated torque wrench. Values shall be in accordance with manufacturers' recommendations.
- C. Individually test 600 volt cables for insulation resistance between phases and from each phase to ground. Test after cables are installed and before they are put in service

with a Megger whose rating is suitable for the tested circuit. Tests shall meet with the applicable specifications of IPCEA S-66-524 and NEMA WC7-1971. Tests shall be witnessed by the Engineer.

- D. The insulation resistance for any given conductor shall not be less than the value recommended by the IPCEA or a minimum of one megohm for 600 volt and less service, if not IPCEA listed. Any cable not conforming to the recommended value or which fails when tested under full load conditions shall be replaced with a new cable for the full length.
- E. Install in accordance with the National Electrical Code.
- F. Where existing cables are spliced to cables provided under this Contract, the existing cables shall be tested prior to splicing. Test cables at 1,000 volts DC for one minute. The entire spliced cable installation shall be re-tested after the splice is completed. Any existing cable which fails or has a value less than two megohms shall be brought to the Engineer's attention and the splicing shall not proceed. Tests shall be witnessed by the Engineer.
- G. Provide a copy of the test report to the Engineer.

3.03 WIRING ALLOWANCES

- A. Contractor shall include allowance of necessary conductors and termination to provide any and all motorized equipment, electrical outlets, fixtures, communication outlets, instruments, and devices within 10 linear feet of location shown on the Drawings.
- B. Prior to installation of any raceway or related items identified in paragraphs A above, the Owner shall have the right to make changes related to preferred location, at no additional cost.

END OF SECTION

SECTION 26 13 10

RIGID CONDUIT

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope:
1. Contractor shall provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install conduit and fittings to provide complete, coordinated and grounded raceway systems.
 2. Conduit routings for various systems within buildings and other areas may not be shown on the Drawings, but shall be established by Contractor based upon single line, riser and interconnection diagrams and other information shown on the Drawings. Contractor shall provide for the proper installation of all conduits for each system.
 3. The conduit types and the installation methods shall conform to the following:
 - a. PVC-coated-GRS for corrosive areas and areas inside the valve vault.
 - b. Galvanized Rigid Steel conduit for exposed outdoor conduit runs.
 - c. PVC 40 conduit for underground ductbanks. The 90 degree turn ups shall be taped GRS.
- B. Coordination:
1. Conduit runs shown are diagrammatic. Coordinate conduit installation with piping, ductwork, lighting fixtures and other systems and equipment and locate so as to avoid interferences.
 2. For conduits to be embedded in concrete slabs, confirm adequate slab thickness and coordinate location of conduits with placement of reinforcing steel, water stops and expansion joints.
- C. Related Sections: Contractor shall coordinate the requirements of the Work in this Section along with the requirements of the Sections listed below which includes, but is not necessarily limited to, Work that is directly related to this Section.
1. Division 3, Cast-In-Place Concrete.
 2. Division 9, Special Coatings.
 3. Section 26 13 20, Flexible Conduits.

1.02 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified.
1. NEC Article 346, Rigid Metal Conduit.
 2. NEC Article 347, Rigid Nonmetallic Conduit.
 3. UL Standard No. 6, Rigid Metal Electrical Conduit.
 4. UL Standard No. 514, Electrical Outlet Boxes and Fittings.

5. UL Standard No. 651, Schedule 40 and 80 PVC Conduit.
6. UL Standard No. 886, Electrical Outlet Boxes and Fittings for Use in Hazardous Locations.
7. ANSI C80.1, Specification for Zinc Coated Rigid Steel Conduit.
8. NEMA TC2, Electrical Plastic Tubing, Conduit and Fittings.
9. NEMA TC3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.
10. NEMA TC14A, Filament-Wound Reinforced Thermosetting Resin Conduit and Fittings.

1.03 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 1. Manufacturer's catalog cuts for the conduit, fittings, supports, identification tags and warning ribbon proposed for use.
 2. Construction details of conduit racks and other conduit support systems.
 3. Layout drawings showing proposed routing of exposed conduits, conduits embedded in structural concrete and conduits directly buried in earth. Drawings shall show locations of pull boxes and penetrations in walls and floor slabs. Drawings of embedded conduits shall include cross-sections showing the thickness of the concrete slabs and the locations of conduits with respect to reinforcing steel and waterstops.
 4. Conduit identification numbering system for the conduit systems.
- B. Red line as built Drawings:
 1. Show the actual routing of exposed and concealed conduit runs on the Record Drawings conforming to the requirements of Division 1.

PART 2 PRODUCTS

2.01 MATERIALS

- A. PVC Coated Rigid Metal Conduit:
 1. Conduit, Elbows and Couplings:
 - a. Material: Rigid, heavy wall, mild steel, interior coating of 2-mil thick urethane, tapered threads, carefully reamed ends, 3/4-inch NPS minimum size for exposed, 1 inch for embedded, encased, or otherwise inaccessible, with a factory exterior coating of 40-mil thick polyvinyl chloride.
 - b. Color: All PVC coated materials shall be standard dark gray.
 - c. Tools: Power drives, chucks, z-wrenches, vises, and cutting or bending tools shall follow recommendations for tooling in manufacturer's installation guide. Use touch-up compounds recommended by the manufacturer for repair of minor damage to interior urethane or exterior PVC factory coatings.
 - d. Manufacturer: Provide conduit and fittings of one of the following:
 - 1) Robroy Industries, "Perma-Cote".
 - 2) Robroy Industries, "Plasti-Bond".
 - 3) OCAL Inc.

2. Fittings and Outlet Bodies:
 - a. Material and Construction: Cast gray iron alloy, cast malleable iron bodies and covers with a factory coating of 40-mil thick polyvinyl chloride, an interior coating of 2-mil thick urethane and Form 7 tongue-in-groove V-seal gasket on sizes ½” through 2”. Conduit or fittings having areas with thin or no coating shall be unacceptable. Do not use "LB" fittings for conduit sizes of 1¼” or larger. Use type "LBD" fittings wherever the use of fittings for conduit sizes of 1¼” or larger is unavoidable. All units shall be threaded type with five full threads. Material shall conform to ANSIC80.4.
 - b. Use: Provide conduit fittings and outlet bodies in all corrosive locations.
 - c. Manufacturer: Provide PVC coated conduit fittings and outlet bodies of one of the following:
 - 1) Robroy Industries, “Perma-Cote”.
 - 2) Robroy Industries, “Plasti-Bond”.
 - 3) OCAL Inc.
 3. Conduit Hubs:
 - a. Material: Threaded conduit hub, vibration proof, weatherproof with captive O- ring seal, zinc metal with insulated throat and factory coating of 40-mil thick polyvinyl chloride and smooth urethane interior coating.
 - b. Use: Provide for all PVC coated conduit terminations to boxes, cabinets and other enclosures located in all areas.
 - c. Locknuts are not allowed. Use hubs only.
 - d. Manufacturer: Provide one of the following:
 - 1) Robroy Industries, “Perma-Cote”.
 - 2) Robroy Industries, “Plasti-Bond”.
 - 3) OCAL Inc.
- B. Galvanized Rigid Steel Conduit, Elbows and Couplings:
1. Material: Rigid, heavy wall, mild steel, hot dip galvanized, smooth interior, tapered threads and carefully reamed ends; ¾-inch NPS minimum size.
 2. Manufacturer: Provide conduit and fittings of one of the following:
 - a. Allied Tube and Conduit.
 - b. Republic Steel Corporation
 - c. Or Approved Equal.
- C. Non-metallic Conduit and Fittings:
1. PVC Plastic Conduit:
 - a. Material: Schedule 40 PVC plastic, 90°C rated, conforming to NEMA TC-3 and UL No. 514 and 651.
 - b. Fittings: Form elbows, bodies, terminations, expansions and fasteners of same material and manufacturer as base conduit. Provide cement and primer by same manufacturer as base conduit.
 - c. Manufacturer: Provide conduit and fittings of one of the following:
 - 1) Amoco Chemicals Corporation.
 - 2) Carlon Electrical Products.
 - 3) Or Approved equal.

- D. Conduit Hubs:
1. Material: Threaded conduit hub, vibration proof, weather proof with captive O-ring seal, zinc metal with insulated throat and bonding screw.
 2. Use: Provide for all conduit terminations to boxes, cabinets and other enclosures located in areas designated as wet locations.
 3. Manufacturer: Provide one of the following:
 - a. Myers Electrical Products Company
 - b. Thomas and Betts.
 - c. Or Approved equal.
- E. Conduit Bushings and Locknuts:
1. Insulated Bushings: Malleable iron body with plastic liner. Threaded type with steel clamping screw. Provide with bronze grounding bushing, as required.
 2. Locknuts: Steel for sizes 3/4-inch thru 2-inch and malleable iron for sizes 2-1/2-inches through 4-inches.
 3. Use: Provide for all conduit terminations to boxes, cabinets and other enclosures, except threaded type located in areas designated as dusty locations.
 4. Manufacturer: Provide one of the following:
 - a. O-Z/Gedney.
 - b. Appleton Electric Company.
 - c. Or Approved equal.
- F. Conduit Tags:
1. Conduit tags shall be yellow, 1-1/2-inches round, aluminum tags. Print shall be 1/4- inch Gothic. The conduit tags shall be manufactured by Brady, Catalog No. 49900, or Approved Equal.
 2. Each tag shall be attached with nylon-coated 48-mil stainless steel wire and fasteners, as manufactured by Brady, Catalog No. 23310 or Approved equal, and brass wire clamps, double ferrule design, as manufactured by Brady Catalog No. 23312, or approved equal, to secure the stainless steel wire.
- G. Warning Ribbon:
1. Material: Three-inch wide, four-mil polyethylene or polyvinyl chloride tape, with metal for tracing capability, permanently imprinted with "CAUTION BURIED ELECTRIC LINE BELOW".
 2. Use: Provide over ALL buried conduits.
 3. Manufacturers: Provide one of the following:
 - a. Seton.
 - b. Ideal Industries.
 - c. Or Approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in conformance with National Electrical Code.

- B. Supports:
1. Rigidly support conduits by clamps, hangers or Unistrut channels.
 2. Support single conduits by means of one-hole pipe clamps in combination with one- screw back plates, to raise conduits from the support surface. Support multiple runs of conduits on trapeze type hangers with steel horizontal members and threaded hanger rods, Kindorff or approved equal. Rods shall be not less than 3/8-inch diameter, and shall be Type 316 stainless steel.
 3. For PVC coated galvanized rigid steel conduit runs, supports and hardware shall have a factory applied PVC coating or be stainless steel.
- C. Fastenings: Fasten raceway systems rigidly and neatly to supporting structures by the following methods:
1. To Wood: Wood screws.
 2. To Hollow Masonry Units: Toggle bolts.
 3. To Brick Masonry: Price expansion bolts, or Approved equal.
 4. To Concrete: Phillips; Hilti Corporation; or Approved equal, anchors.
 5. To Steel: Type 316 stainless steel welded threaded studs, beam clamps or bolts with lock-washers or locknuts.
- D. Exposed Conduit:
1. Install parallel or perpendicular to structural members or walls.
 2. Wherever possible, run in groups. Provide conduit racks of suitable width, length and height and arranged to suit field conditions. Provide support at every ten feet minimum.
 3. Install on structural members in protected locations.
 4. Locate clear of interferences.
 5. Maintain 6-inches from hot fluid lines and 1/4-inch from walls.
 6. Install vertical runs plumb. Unsecured drop length not to exceed 12 feet.
 7. Painting conduits shall conform to the requirements of Section 09800, Special Coating.
 8. Provide necessary reducers where equipment furnished cannot accept 3/4-inch conduit.
- E. Conduit Embedded in Structural Concrete:
1. Separation: Three times outer diameter of larger conduit center to center.
 2. Minimum Slab Thickness: Confirm that concrete slab thickness is sufficient for embedding conduits.
 - a. For embedding conduit sizes up to 1-1/2 inches, the minimum slab thickness shall be 7-inches plus the outer diameter of the conduit or conduits, where conduits cross.
 - b. For embedding conduits larger than 1-1/2 inches, the minimum slab thickness shall be five times the outer diameter of the conduit where conduits do not cross and six times the outer diameter of the larger conduit where conduits do cross.
 3. Run conduits in center of slab, where applicable.
 4. Run conduits above waterstops.

5. Before concrete is placed, make the necessary location measurements of the conduits to be embedded so that the information is available to prepare Record Drawings.
 6. All conduits entering or exiting concrete shall be PVC coated galvanized rigid steel conduit, a minimum of 12-inches on each side of air/concrete interface.
- F. Underground Conduits:
1. Use Schedule 40 PVC conduit for underground conduit runs.
 2. Install individual underground conduits a minimum of 24-inches below grade, unless otherwise shown on the Drawings or as required to avoid existing obstructions.
 3. Perform all excavation, bedding, backfilling and surface restoration including pavement replacement, where required.
 4. Install a warning ribbon 12-inches below finished grade over all conduits carrying cables of 120 volts and higher.
 5. Make conduit connections watertight.
 6. Final 90 degree bend for transition between underground PVC conduits to above ground GRS conduit shall be GRS. Protect this GRS bend conduit from corrosion by one of the following means:
 - a. Provide minimum 3-inches of red colored concrete all around conduits.
 - b. Tape conduits with an all-weather polyvinyl chloride plastic tape with a high tack adhesive formulated to resist corrosion, Scotchrap Brand 50, or Approved Equal.
 - c. Apply two coats of a bitumastic coating.
- G. Empty Conduits:
1. Install nylon pull wire in each empty conduit and cap conduits not terminating in boxes with permanent fittings designed for the purpose.
 2. Identify each empty conduit with a conduit tag conforming to the requirements of Paragraph 2.1.F., above, showing the conduit number shown on the Drawings.
- H. Field Bends: No indentations. Diameter of conduit shall not vary more than 15 percent at any bend. Maximum total amount of bends shall not exceed 270°.
- I. Joints:
1. Apply conductive compound to all joints before assembly.
 2. Make up joints tight and ground thoroughly.
 3. Use standard tapered pipe threads for conduit and fittings.
 4. Cut conduit ends square and ream to prevent damage to wire and cable.
 5. Use full threaded couplings. Split couplings not permitted.
 6. Use strap wrenches and vises to install conduit. Replace conduit with wrench marks.
 7. Apply zinc-rich paint to exposed threads and other areas of galvanized rigid steel conduit system where the base metal is exposed.
- J. Terminations:
1. Install insulated bushings on conduits entering boxes or cabinets, except when threaded hubs are used.

2. Provide locknuts and grounding bushings on both inside and outside of enclosure, except when threaded hubs are used.
3. Do not use bushings in lieu of locknuts.
4. Install conduit hubs on conduits entering boxes, enclosures or cabinets in wet and corrosive areas.

K. Moisture Protection:

1. All conduits shall have a low point drain entry into field device.
2. Plug or cap conduit ends at time of installation to prevent entrance of moisture or foreign materials.
3. Make underground and embedded conduit connections water-tight.
4. Through Wall Seals and Conduit Sealing Bushings: Install for all conduits passing through concrete slabs, floors, walls or concrete block walls.
 - a. For conduits and cables in new construction and passing through exterior subsurface walls and exterior concrete walls, use Type WSK and WSCS through wall seals as manufactured by O-Z/Gedney, or approved equal.
 - b. For conduits and cables in new construction and passing through concrete floors and floor slabs, use Type FSK and FSCS floor seals, as manufactured by O-Z/Gedney, or approved equal.
 - c. For conduits passing through new exterior block walls or through core-drilled holes in existing exterior subsurface walls, exterior concrete walls, floor slabs and roof slabs, use Type CSMI sealing bushing at the inside of the structure and Type CSMC sealing bushing at the outside of the structure. Sealing bushings shall be as manufactured by O-Z/Gedney, or approved equal.
 - d. For conduits passing through existing interior concrete walls or floors and interior block walls, provide CSMC or CSMI type sealing bushings as manufactured by O-Z/Gedney, or approved equal.
5. Drainage: Pay particular attention to drainage for conduit runs. Wherever possible, install conduit runs so as to drain to one end and away from buildings. Avoid pockets or depressions in conduit runs. Where conduits enter buildings below grade, seal inside of conduit to form a watertight seal around cables to prevent the entry of water into building. Sealant shall be Silicone and shall form an elastomeric compression seal. Sealant shall be Fire Barrier 2001 Silicone RTV Foam, or approved equal.
6. Seal all conduit openings within control and instrumentation panels and distribution equipment with Type DUX - Duct Sealing Compound, as manufactured by O-Z/Gedney, or approved equal, to provide a water/bug-tight seal.

L. Corrosion Protection:

1. Conduit Curb:
 - a. For conduits routed in concrete slabs or floors and stub-ups through the floor, provide a 2-inch high concrete curb, extending 2-inches from the outer surface of the conduit penetrating the floor, to prevent corrosion. For floor-mounted equipment, the concrete equipment base shall be in lieu of the concrete curb.
 - b. Conduit stub-ups shall be a 90 degree PVC coated galvanized rigid steel conduit elbow. PVC coated elbow shall extend slightly above the top of the concrete curb or equipment base. Should the elbow not reach this height,

- provide PVC coated conduit extension to accommodate requirements. Provide coupling/fitting for transition from galvanized rigid steel conduit or PVC coated galvanized rigid steel conduit in slab to PVC coated elbow.
 - c. For conduits stubbing up and terminating at equipment enclosure mounted on a concrete equipment base, provide insulated grounding bushing on the PVC coated elbow.
 - d. For conduits stubbing up and extending to boxes, cabinets and other enclosures above the concrete curb in wet and dusty areas, provide conduit coupling/fittings between the PVC coated elbow and galvanized rigid steel conduit for transition between the two conduit types.
 - e. For conduits stubbing up and extending to boxes, cabinets and other enclosures above the concrete curb or equipment base in corrosive areas, continue the conduit system with PVC coated galvanized rigid steel conduit.
 - 2. Dissimilar Metals:
 - a. Take every action to prevent the occurrence of electrolytic action between dissimilar metals.
 - b. Do not use copper products in connection with aluminum work, and do not use aluminum in locations subject to drainage of copper compounds on the bare aluminum.
 - c. Back paint aluminum in contact with masonry or concrete with two coats of aluminum-pigmented bituminous paint.
- M. Core drill for individual conduits passing through existing concrete slabs and walls. Obtain authorization from Owner prior to core drilling. Prior to core drilling, drill sufficient number of small exploratory holes to establish that the area to be core drilled is free of existing embedded conduits. Seal spaces around conduit and the wall penetration.
- N. Non-metallic Conduit:
 - 1. Install in accordance with manufacturer's recommendations.
 - 2. Join sections in accordance with manufacturer's installation procedures for push-fit, bell and spigot type joints, if applicable, or with manufacturer's recommended cement and primer.
 - 3. During installation provide expansion fittings for expansion and contraction to compensate for temperature variations. Expansion fittings shall be watertight and of the type suitable for direct burial.
 - 4. Make transition to PVC coated galvanized rigid steel conduit before making turn up to enclosures.
 - 5. Provide watertight expansion/deflection fittings at all wall and floor penetrations of all buildings and equipment concrete pads.

3.02 TESTING

- A. Test conduits by pulling through each conduit a cylindrical mandrel not less than two pipe inside diameters long, having an outside diameter equal to 90 percent of the inside diameter of the conduit.
- B. Maintain a record, by number, of all conduits testing clear.

3.03 IDENTIFICATION

- A. Tag all conduits at the ends and in all intermediate boxes, chambers, handholes and other enclosures per Paragraph 2.1.F above. Fasten tags to conduits with nylon-coated 48-mil stainless steel wire. Where this method is not practical, fasten to the adjacent masonry by means of expansion bolts.
- B. Use numbers on all conduits as designated in the Block diagram and record the conduit numbers and the cable content by cable designation, size, quantity, origin and termination of conductors, and name of equipment served. Assign numbers to unidentified conduits such as home runs to panelboards. This information shall be included with the Red line as-built Drawings described in Section 01072.

3.04 RACEWAYS ALLOWANCES

- A Contractor shall include allowance of necessary raceways and supports to provide any and all motorized equipment, electrical outlets, fixtures, communication outlets, instruments, and devices within 10 linear feet of location shown on the Drawings.
- B. Prior to installation of any raceway or related items identified in paragraph A above, the Owner shall have the right to make changes related to preferred location, at no additional cost.

END OF SECTION

SECTION 26 13 20

FLEXIBLE CONDUITS

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install flexible metallic conduit and fittings.

1.02 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified.

1. NEC Article 350, Liquid-Tight Flexible Metal Conduit.
2. UL Standard No. 360, Liquid-Tight Flexible Steel Conduit.

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Manufacturer's catalog cuts and technical information for flexible conduit and fittings proposed for use.

PART 2 PRODUCTS

2.01 MATERIALS

A. Flexible Conduit:

1. Material: Flexible galvanized steel core with smooth, abrasion resistant, liquid-tight, polyvinyl chloride cover. Continuous copper ground built in for sizes 3/4-inch through 1-1/4-inch. Material shall be UL listed. Flexible conduits shall be no longer than 3 feet.
2. Product and Manufacturer: Provide one of the following:
 - a. Sealtite UA by Anaconda Metal Hose Division, Anaconda American Brass Company.
 - b. Liguatite Type L.A. by Electric-Flex Company.
 - c. Or approved equal.

B. PVC Coated Conduit Fittings:

1. Material and Construction: Malleable iron with standard finish and 40-mil PVC exterior coating. Fittings shall adapt the conduit to standard threaded connections, shall have an inside diameter not less than that of the corresponding standard conduit size.

2. Use: Provide on flexible conduit in areas designated as corrosive or wet locations.
3. Product and Manufacturer: Provide one of the following:
 - a. Robroy Industries.
 - b. Permacote Industries.
 - c. OCAL Incorporated.
 - d. Or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install at motors, transformers and equipment which are subject to vibration or require movement for maintenance purposes. Provide necessary reducer where equipment furnished cannot accept 3/4-inch size flexible conduit.
Limit flexible conduit length to three feet maximum, unless authorized by Owner.
- B. Install in conformance with National Electrical Code.

END OF SECTION

SECTION 26 13 50

PULL BOXES

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install pull boxes.

1.02 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:

1. NEC Article 370, Outlet, Switch and Junction Boxes, and Fittings.
2. UL Standard No. 50, Electrical Cabinets and Boxes.
3. UL Standard No. 886, Electrical Outlet Boxes and Fittings for Use in Hazardous Locations.

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Manufacturer's technical information for pull boxes proposed for use.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pull Boxes: Provide boxes based upon location in accordance with NEMA requirements and as required for the area classification specified in Section 26 05 00, General Provisions.

1. Material and Construction:

- a. Cast gray iron alloy with hot-dip galvanized finish or cast malleable iron bodies and covers.
- b. Neoprene gaskets. Gaskets shall be of an approved type designed for the purpose. Improvised gaskets are not acceptable.
- c. Stainless steel cover bolts.
- d. External mounting lugs.
- e. Drilled and tapped conduit holes.
- f. Boxes where conduits enter a building below grade shall have 1/4-inch drain hole.

2. Product and Manufacturer: Provide pull boxes of one of the following:

- a. Appleton Electric Company.
- b. O-Z/Gedney Company.

- c. Hoffman Engineering Company.
 - d. Or approved equal.
-
- 3. Large boxes not generally available in cast construction may be fabricated of copper-free aluminum alloy or Type 316 stainless steel as required by location.
 - 4. Boxes for installation in areas classified as hazardous locations shall be explosion- proof and shall comply with the requirements of UL Standard No. 886.
 - 5. For flush-mounted pullboxes in slabs or pavement, provide vehicular traffic-bearing covers, where shown on the Drawings.
 - 6. Pull boxes embedded in concrete slabs shall be cast iron. Pull boxes located in wet, corrosive or outdoor areas shall be NEMA 4X, Type 316 stainless steel. All other areas shall be NEMA 12.
 - 7. All boxes shall be identified in accordance with Section 26 05 00, General Provisions.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Mount boxes so that sufficient access and working space is provided and maintain a minimum of 1/4-inch from walls.
- B. Securely fasten boxes to walls or other structural surfaces on which they are mounted. Provide independent stainless steel or FRP supports where no walls or other structural surface exists.
- C. Install pull boxes where shown on the Drawings. In addition, install pull boxes in conduit runs containing more than three 90 degree bends and in runs exceeding 200 feet.
- D. Provide removable, flame-retardant, insulating cable supports in all boxes with any dimension exceeding three feet.
- E. Field apply PVC touch up to scratched PVC boxes damaged as a result of installation. All touch up work shall be in strict conformance with manufacturer's recommendations and instructions.
- F. Size pull boxes in accordance with the requirements of New Mexico Electrical Code.

END OF SECTION

SECTION 26 13 60

OUTLET BOXES

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope:
 - 1. Contractor shall provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install outlet boxes for mounting wiring devices and lighting fixtures.

1.02 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:
 - 1. NEC Article 314, Outlet, Switch and Junction Boxes and Fittings.
 - 2. UL Standard No. 514, Electrical Outlet Boxes and Fittings.

1.03 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 - 1. Manufacturers technical information for outlet boxes proposed for use.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Device Boxes:
 - 1. Material: Cast gray iron alloy, or cast malleable iron, with zinc electroplate finish in wet locations and zinc-coated sheet steel in dusty locations. Cast boxes shall be hub type and include external mounting lugs. In corrosive locations, boxes shall include a factory applied 40-mil PVC coating. In dusty locations, where conduit is installed concealed, boxes shall be steel galvanized and shall include suitable extension rings and covers, as required.
 - 2. Device Cover Plates:
 - a. Stainless steel Type 302 alloy for indoor finished areas.
 - b. Gasketed spring door type for wet and corrosive locations.
 - c. Plates in corrosive locations shall include a factory applied 40-mil PVC coating.
 - d. Stainless steel screws and hardware.
 - 3. Manufacturer: Provide device boxes of one of the following:
 - a. Crouse-Hinds Company.
 - b. Appleton Electric Company.
 - c. Or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Fasten boxes rigidly and neatly to supporting structures.
- B. For units mounted on masonry or concrete walls, provide suitable 1/2-inch spacers to prevent mounting back of box directly against wall.
- C. Leave no open conduit holes in boxes. Close unused openings with capped bushings.
- D. Label each circuit in boxes and identify in accordance with Section 26 12 20, 600 Volt Cable.
- E. Install in conformance with National Electrical.

END OF SECTION

SECTION 26 13 70

UNDERGROUND DUCT BANKS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. Provide all labor, materials, equipment and incidentals as required per Drawings, Specifications, and/or required to furnish and install underground duct banks.
- B. Coordination: Duct bank routing on the Drawings is diagrammatic. Coordinate installation with piping and other underground systems and structures and locate clear of interferences.

1.2 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the National Electrical Code and National Electrical Safety Code.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 - 1. Layouts showing the proposed routing of duct banks and the locations of manholes, handholes and areas of reinforcement.
 - 2. Profiles of duct banks showing crossings with piping and other underground systems.
 - 3. Typical cross sections.
 - 4. Installation procedures.
- B. Red lined as-built Drawings: Include the actual routing of underground duct runs on Record Drawings in accordance with Record Documents requirements in Division 1.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Duct: Schedule 40 PVC conduit and fittings in accordance with Section 26 13 10, Rigid Conduit.
- B. Galvanized Rigid Steel Conduit: Galvanized rigid steel conduit and fittings in accordance with Section 26 13 10, Rigid Conduit, if required.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide excavation and backfilling required for ductbank installation.
- B. Make duct bank installations and penetrations through foundation walls watertight.
- C. Top of duct banks shall be a minimum of 24-inches below grade, unless otherwise approved by the Engineer.
- D. Assemble duct banks using non-magnetic saddles, spacers and separators. Position separators to provide 3-inch minimum concrete separation between the outer surfaces of the ducts. Provide side forms for each duct bank.
- E. Provide a 3-inch minimum concrete covering on both sides, top and bottom of concrete envelopes around conduits. Concrete covering size shall be as shown on the Drawings. Add red dye to concrete for easy identification during subsequent excavation. Red dye concrete shall include the entire duct bank, top and bottom.
- F. Firmly fix ducts in place during placing of concrete. Carefully place and vibrate the concrete to ensure filling of all spaces between ducts.
- G. Make bends with sweeps of not less than 48-inch radius or five degree angle couplings.
- H. Make a transition from non-metallic to galvanized rigid steel conduit where duct banks enter buildings, manholes, handholes and outdoor pads. Provide expansion/ deflection fittings.
- I. Terminate ducts in insulated grounding bushings. Continue ducts inside buildings with rigid steel conduit.
- J. Where ducts enter structures such as manholes, handholes, pullboxes, transformer and switchgear compartments, or buildings, terminate the ducts in suitable end bells, insulated bushings or couplings on steel conduits.
- K. Do not backfill with material containing large rock, paving materials, cinders, large or sharply angular substances, corrosive material or other materials which can damage or contribute to corrosion of ducts or cables or prevent adequate compaction of fill.
- L. Slope duct runs for drainage toward manholes and away from buildings with a slope of approximately 3-inches per 100 feet.
- M. Install a bare stranded copper duct bank ground cable in each duct bank envelope. Make ground electrically continuous throughout the entire duct bank system. Connect ground cable to building and station ground grid or to equipment ground buses. In addition, connect ground cable to steel conduit extensions of the underground duct system. Provide ground clamp and bonding of

each steel conduit extension, where necessary to maintain continuity of the ground system. Terminate ground cable at last manhole or handhole for outlying structures.

- N. After completion of the duct bank and prior to pulling cable, pull a mandrel, not less than 12- inches long and with a cross section approximately 1/4-inch less than the inside cross section of the duct, through each duct. Then pull a rag swab or sponge through to make certain that no particles of earth, sand or gravel have been left in the duct.
- O. Install a warning ribbon approximately 12-inches below finished grade over all underground duct banks carrying cables of 120 volts and higher. The identifying ribbon shall be a PVC tape, 3-inches wide, yellow color, permanently imprinted with "CAUTION BURIED ELECTRIC LINE BELOW" in black letters.
- P. Plug and seal empty spare ducts entering buildings and structures. Seal watertight all ducts in use entering buildings and structures with 0-Z/Gedney Type DUX duct sealing compound or Approved Equal.
- Q. Reused Existing Ducts:
 - 1. Pull rag swab through duct to remove water and to clean duct prior to installing new cable.
 - 2. Repeat swabbing until all foreign material is removed.
 - 3. Pull mandrel through duct, if necessary, to remove obstructions.
- R. Install duct banks in conformance with National Electrical Code and National Electrical Safety Code.

END OF SECTION

SECTION 26 13 80

MANHOLES AND HANDHOLES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: Provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install manholes and handholes.
- B. Coordination: Coordinate manhole and handhole installation with piping, sheeting and other underground systems and structures and locate clear of interferences.

1.2 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:
 - 1. National Electrical Code (NEC) 2011.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 - 1. Manufacturer's technical information for manholes, handholes and accessories proposed for use.
 - 2. Drawings showing interior and exterior dimensions and details of openings, jointing, inserts and reinforcing.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Material and Construction:
 - 1. Precast type of reinforced concrete.
 - 2. Minimum interior dimensions as shown on the Drawings.
 - 3. Duct entrances sized and located to suit duct banks.
 - 4. Handholes and Manholes must have a bottom.
- B. Accessories:
 - 1. Frames and Covers:
 - a. Material: Cast iron conforming to ASTM A 48, Class 30A.
 - b. Covers: Watertight, sealed type marked "ELECTRICAL" in raised 2-inch letters. Identify covers as shown on the Drawings.
 - c. Frame shall be grouted on the manhole or handhole.

- d. Product and Manufacturer: Provide frames and covers of one of the following:
 - 1) Neenah Foundry Company.
 - 2) Campbell Foundry Company.
- 2. Frames and Covers:
 - a. Material: Covers and frames shall be cast aluminum alloy, Class H-20 highway rated.
 - b. Covers: Watertight, sealed type marked "ELECTRICAL" in raised 2-inch letters. Identify covers as shown on the Drawings.
 - c. Frame shall be grouted on the manhole or handhole.
 - d. Product and Manufacturer: Provide frames and covers of one of the following:
 - 1) Neenah Foundry Company.
 - 2) Campbell Foundry Company.
- 3. Pulling Irons:
 - a. Material: Galvanized steel.
 - b. Cast in the wall opposite to the centerline of each incoming duct bank and 12- inches below centerline of bottom line of ducts.
 - c. Product and Manufacturer: Provide one of the following:
 - 1) Catalog No. 8119 by A.B. Chance Company.
 - 2) Catalog No. DU2T3 by McGraw Edison Company.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install manholes and handholes where shown on the Drawings. Verify final locations in field. Responsibility belongs to Contractor for all excavation and backfilling required for installation.
- B. Complete installation of manholes and handholes so that structures are watertight. Apply foam sealant to all openings and penetrations. Seal all conduit openings to provide a water/bug-tight seal.
 - 1. Product and Manufacturer: Provide one of the following:
 - a. Type DUX - Duct Sealing Compound, as manufactured by O-Z/Gedney
 - b. Type FST Foam Sealant, as manufactured by American Polywater Corp
- F. Provide grading rings for manholes when required to adjust cover to proper grade. Grading ring shall be minimum of 12-inches in height, constructed on the roof slab or cone section on which the manhole frame and cover shall be placed. The height of the grading ring shall be such as is necessary to bring the frame to the proper grade.

END OF SECTION

SECTION 26 14 10

RECEPTACLES

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope:
 - 1. Contractor shall provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install receptacles.
- B. Related Sections: Contractor shall coordinate the requirements of the Work in this Section along with the requirements of the Sections listed below which includes, but is not necessarily limited to, Work that is directly related to this Section.
 - 1. Section 26 13 60, Outlet Boxes.

1.02 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:
 - 1. National Electrical Code.
 - 2. UL Standard No. 1010, Electrical Receptacle - Plug Combinations for Use in Hazardous Locations.

1.03 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 - 1. Manufacturer's technical information for receptacles proposed for use.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Receptacles for Non-Hazardous Locations:
 - 1. Duplex grounding receptacle, two pole, three wire, 125 volt AC, 20 amperes.
 - a. Product and Manufacturer: Provide one of the following:
 - 1) Catalog No. 5362, for dry indoor locations and Catalog No. 53CM62, for wet and corrosive locations, by Harvey Hubbell Incorporated.
 - 2) Catalog No. 5362, for dry indoor locations and Catalog No. 5362-CR, for wet and corrosive locations, by Arrow-Hart Incorporated.
 - 3) Or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install receptacles at locations as shown on the Drawings in outlet or device boxes in accordance with Section 26 13 60, Outlet Boxes, in non-hazardous locations.
- B. Mount receptacles 18-inches above finished floor, or in accordance with the Building Construction Code, in non-hazardous locations and 4 feet-6 inches above finished floor in hazardous locations, unless otherwise noted.
- C. Identify each conductor with the circuit number and the lighting panel number. Identification shall conform to the requirements of Section 26 12 20, 600 Volt Cable.
- D. Identify each receptacle with a permanent self-adhesive label. Approximate size 3/8" x 1 1/4". The label shall include the panel name and circuit number.
 - 1. Product and Manufacturer: Provide one of the following:
 - a. Catalog No. PTL-45422 by Brady.
 - b. Or approved equal.

END OF SECTION

SECTION 26 28 50

SURGE PROTECTION DEVICES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes Requirements for:
 - 1. High-energy transient voltage surge suppression systems.

1.02 SUBMITTALS

- A. Product Data:
 - 1. Furnish complete product data confirming detailed compliance or exception statements to all provisions of this Specification.
 - 2. Submit independent test data from a nationally recognized testing laboratory verifying the following:
 - a. Lifecycle testing.
 - b. Overcurrent protection.
 - c. UL 1449.
 - d. Surge current capacity.
- B. Shop Drawings:
 - 1. Provide Electrical and Mechanical Drawings by the Manufacturer that Detail:
 - a. Unit dimensions.
 - b. Weights.
 - c. Components.
 - d. Field connection locations.
 - e. Mounting provisions.
 - f. Connection details.
 - g. Wiring diagram.
- C. Operation and Maintenance Manuals:
 - 1. Provide the manufacturer's manual with installation, start-up, spare parts lists, and operating instructions for the specified system.
 - 2. A toll-free or local phone number with 24/7 emergency monitoring/call back is required.

1.03 QUALITY ASSURANCE

- A. Provide SPD units that are designed, manufactured, tested and installed in compliance with the following codes and standards:
 - 1. Institute of Electrical and Electronic Engineers (IEEE C62.41, C62.45).
 - 2. Federal Information Processing Standards Publication 94 (FIPS PUB 94).
 - 3. National Electrical Manufacturer Association (NEMA LS-1 1992).
 - 4. National Fire Protection Association (NFPA 20, 75 and 780).

5. National Electric Code (NFPA 70).
6. Underwriters Laboratories (UL 1449 2nd Edition and UL 1283).
7. International Electrotechnical Commission (IEC 801).

- B. Provide a transient voltage suppression system that is suitable for application in IEEE C62.41 Category A, B and C3 environments, as tested by IEEE C2.11, C62.45.

1.04 WARRANTY

- A. Extended Warranty:
1. Furnish a manufacturer's full 5-year parts and labor warranty from date of shipment against any part failure when installed in compliance with manufacturer's written instructions, UL Listing requirements, and any applicable national, state, or local electrical codes.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. One of the Following:
1. Liebert, Cutler Hammer, Square D, or General Electric.

2.02 MANUFACTURED UNITS

- A. Electrical Requirements:
1. SPD ratings are to be consistent with the nominal system operating voltage, phase, and configuration as indicated on the Drawings.
 2. Maximum Continuous Operating Voltage (MCOV):
 - a. For the SPD and all components in the suppression path (including all MOVs, SADs, and selenium cells): greater than 115 percent of the nominal system operating voltage.
 3. Operating Frequency:
 - a. Forty-seven to 63 hertz.
 4. Short Circuit Rating:
 - a. Minimum SPD rating of 200,000 AIC at system voltage without the use of a fused disconnect switch.
- B. Protection Modes:
1. Provide SPD protection modes as follows:
 - a. Line to Neutral (L-N) where applicable.
 - b. Line to Ground (L-G).
 - c. Neutral to Ground (N-G), where applicable.
- C. The following table details the maximum UL 1449 2nd Edition Suppressed Voltage Rating (SVR). The SPD unit, including disconnect for each of the specified protection modes, shall not exceed the following:

	Nominal Voltage	Configuration	L-N (Volts)	N-G (Volts)	L-G (Volts)
Wye Models	120/240	Grounded Neutral	400	400	400
	120/208	Grounded Wye	400	400	400
	277/480	Grounded Wye	800	800	800
	347/600	Grounded Wye	1200	1200	1200
DELTA	240	Delta			800
	480	Delta			1500
	600	Delta			2000

D. Enclosure:

1. External mounting:
 - a. NEMA 3R enclosure:
 - b. Hinged cover requiring a tool for internal access.
 - c. Internal drawing pocket.
 - d. All monitoring indications must be visible without opening the door.

E. Internal Connections:

1. Provide Low Impedance Copper Plates for Intra-Unit Connections:
 - a. Attach surge modules using bolted connections to the plates for low impedance connections.
2. Size all connections, conductors, and terminals for the specified surge current capacity.

2.03 COMPONENTS

A. Surge Diversion Modules:

1. Metal Oxide Varistors (MOV):
 - a. Where multiple MOVs are used in parallel, utilize computer matched MOVs to within 1 volt variance and tested for manufacturer's defects.

B. Overcurrent Protection:

1. Individually fuse all components, including suppression, filtering, and monitoring components:
 - a. Rated to allow maximum specified surge current capacity:
 - b. For every 100 kiloamperes of Surge Current Capacity, provide 120 amps RMS of internal fusing.
2. Fuse individual surge components at a maximum of 7-1/2 amps to prevent violent failure:
 - a. UL listed to be capable of interrupting up to 100 kiloamperes symmetrical fault current with 600 VAC applied.
 - b. Overcurrent protection that limits specified surge currents is not acceptable.

- C. Connections:
 - 1. Provide terminals to accommodate wire sizes up to #1 AWG.

2.04 ACCESSORIES

- A. Unit Status Indicators:
 - 1. Provide red and green solid-state indicators, with printed labels, on the hinged front cover to redundantly indicate on-line unit status:
 - a. The absence of the green light and the presence of the red light indicates that surge protection is reduced and service is needed to restore full operation.
- B. Dry Contacts for Remote Monitoring:
 - 1. Electrically isolated Form C dry contacts (10A/125VAC) for remote monitoring of system integrity, and indication of under voltage, phase and/or power loss.
- C. Provide on-line circuit which tests and redundantly monitors individual components in all protection modes including neutral to ground:
 - 1. Units that require external test sets or equipment are unacceptable.
- D. Provide adjustable transient counter to count transient voltage surges:
 - 1. Minimum of a 7-digit LCD readout located on the unit's hinged front cover.
 - 2. Provide the counter reset switches that may be inhibited and are remotely located.
 - 3. Counter to utilize batteries with a 10 year nominal life to maintain accurate counts in the event of total power loss.

2.05 SOURCE QUALITY CONTROL

- A. Permanently affix surge rating to the SPD.
- B. Duty life cycle test the SPD system to survive 20 Kilovolts, 10 kiloamperes, IEEE C62.41 Category C3 surge current with less than 5 percent degradation of clamping voltage. In compliance with the following table:

Device Surge Rating		<u>Minimum Number of Life Cycle Surges</u>		
		Per Mode		
Per Mode	Per Phase	L-N	L-G	N-G
100 kA	200 kA	5,000	5,000	5,000

- C. Test the system at the component and fully assembled level, under surge conditions with alternating current power applied for a minimum of 1 hour:
 - 1. Testing Includes but Not Limited to:
 - a. Quality control checks.
 - b. Dielectric voltage withstand test per UL requirements.
 - c. UL ground continuity tests.
 - d. Operational and calibration tests.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with the manufacturer's recommendations and National Electric Code requirements.

END OF SECTION

SECTION 26 40 00

SERVICE ENTRANCE

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope:
1. Contractor shall provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install service meter and main disconnect breaker. The service meter and its main disconnect breaker shall be meet or exceed PNM requirements.
- B. Related Sections: Contractor shall coordinate the requirements of the Work in this Section along with the requirements of the Sections listed below which includes, but is not necessarily limited to, Work that is directly related to this Section.
1. Section 26 05 00, General Provisions.
 2. Section 26 05 10, Utility Work.

1.02 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:
1. NEC Article 408, Switchboards and Panelboards.
 2. NEMA 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
 3. UL Standard 50, Electrical Cabinets and Boxes.

1.03 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
1. Manufacturer's technical information for service meter proposed for use.
 2. Information to substantiate approval from the utility company.
 3. Information to substantiate UL listing.
 4. Information to indicate short circuit rating.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Service Entrance:
1. The assembly shall be rated to withstand mechanical forces exerted during short-circuit conditions when connected directly to a power source having available fault current 65,000 amperes symmetrical at rated voltage unless indicated otherwise on the drawings.
 2. The meter socket shall be rated for a fault current of 65,000 amperes symmetrical at rated voltage or as indicated on the plans. The meter sockets and associated branch protective

device positions shall be completely pre-wired and shipped ready for installation of the meter. Meter socket shall include covers with sealing provisions.

3. Mechanical-type terminals or crimp-type termination provisions (as required by the Utility Company) shall be provided for all line terminations suitable for copper or aluminum cable and rated at 75 degrees C. Lugs shall be provided in the incoming line section for connection of the main grounding conductor.
4. Main circuit breaker shall be molded case construction suitable for service disconnecting means. The Main circuit breaker shall be UL listed and rated for 22,000 AIC minimum.
5. The service entrance equipment shall be manufactured by one of the following:
 - a. Milbank
 - b. Cutler Hammer
 - c. General Electric Company
 - d. Square D Company
 - e. Or Approved Equal.

2.02 SURGE PROTECTION DEVICES

A. Surge Protection Devices (STD):

1. Furnish and install a Surge Protection Devices at the service entrance equipment. Refer to Specification Section 26 28 50 for additional requirements.

PART 3 - EXECUTION

3.01 INSTALLATION

- #### A.
- Install equipment in accordance with the manufacturer's recommendations and as required per National Electric Code.

END OF SECTION

SECTION 26 44 20

LIGHTING, INSTRUMENTATION AND DISTRIBUTION PANELBOARDS

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope:
1. Contractor shall provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to furnish and install lighting, instrumentation and distribution panelboards.
- B. Related Sections: Contractor shall coordinate the requirements of the Work in this Section along with the requirements of the Sections listed below which includes, but is not necessarily limited to, Work that is directly related to this Section.
1. Section 26 05 00, General Provisions.

1.02 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:
1. NEC Article 408, Switchboards and Panelboards.
 2. NEMA PB1, Panelboards.
 3. NEMA 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
 4. UL Standard 50, Electrical Cabinets and Boxes.
 5. UL Standard 67, Electric Panelboards.
 6. UL Standard 698, Circuit Breaker Panelboard Assembly.
 7. UL Standard 943, Ground Fault Circuit Interrupters.

1.03 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
1. Manufacturer's technical information for panelboards proposed for use.
 2. Listing of the panelboards to be furnished with an identification of their proposed location, and number and rating of branch circuit breakers.
 3. Lighting, instrumentation and distribution panelboards load calculations.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Panelboards:
1. Rating: Voltage rating, current rating, number of phases, number of wires and number of poles shall be as shown on the Drawings.

2. Circuit Breakers: Molded case, bolt-in thermal magnetic type with number of poles and trip ratings as shown on the Drawings.
3. Main and branch circuit breakers shall be fully rated with interrupting capacities as follows:
 - a. 65,000 amps for 480/277 volt circuit breakers.
 - b. 22,000 amps for 120/240 volt circuit breakers.
4. Bus Bars: 98 percent conductivity copper, tin plated. All 4 wire panelboards shall have a solid neutral bar. All panels shall have ground bus.
5. Main: All panelboards shall have a main circuit breaker, unless Drawings specifically call for main lugs only.
6. Branch circuit breakers connected for sequence phasing.
7. Construction: Code grade steel, NEMA 12, ample gutter space, flush door, flush snaplatch and lock for dry indoor locations. NEMA 4X stainless steel for outdoor or damp indoor locations.
8. Trim: Surface or flush, as required.
9. Directory: White card, minimum card stack 90 lb., maximum size 8" x 5", placed in a 9" x 5 1/2" self-adhesive vinyl pocket. Directory information to be a copy of the as-built panel schedule as provided on the contract drawings.
10. Identification: Nameplate identifying the panel number and voltage.
11. Product and Manufacturer: Provide panelboards of one of the following:
 - a. Square D Company.
 - b. General Electric Company.
 - c. Cutler-Hammer.
 - d. Or Approved Equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Mounting: Install panelboards at locations shown on Drawings. Set cabinets so that top branch circuit breaker is not over six feet above the floor.
- B. Arrange circuits to balance the loads on the panelboards.

END OF SECTION

SECTION 26 98 00

START-UP, COMMISSIONING AND FIELD TESTING

PART 1 GENERAL

1.01 SYSTEM START-UP, COMMISSIONING AND FIELD TESTING RESPONSIBILITIES

- A. Contractor shall provide all labor, materials, equipment and incidentals as shown on the Drawings, specified and required to perform start-up, commissioning and field testing of all equipment. Field testing shall include an integrated system field test and operational availability demonstration.
- B. Contractor shall retain the services of the instrumentation supplier, packaged system supplier, PLC system supplier, and other vendors and contractors to supervise and/or perform start-up, commissioning and field testing of all system components. As part of these services, the Contractor shall include the equipment items not manufactured by the suppliers, the services of an authorized manufacturer's representative to check the equipment installation and place the equipment in operation. The manufacturer's representative shall be thoroughly knowledgeable about the installation, operation and maintenance of the equipment.
- C. Contractor shall submit to the Engineer a schedule with proposed start dates and test procedure guidelines for start-up, commissioning, and field testing at least four weeks in advance. Complete testing of each system through the PLC shall be documented by Contractor and submitted to the Engineer upon successful completion.

1.02 SYSTEM CHECK-OUT AND START-UP

- A. Contractor shall perform the following:
 - 1. Check and approve the installation of all computer control system components and all cable and wiring connections between the various system components prior to placing the various processes and equipment into operation. Check-out shall include the following items as a minimum:
 - a. All wiring shall be checked at each termination point for correct wire size, type, color, termination and wire number.
 - b. Analog wiring shall be checked for correct polarity and ground continuity at each termination point in the loop.
 - c. All control and monitoring loops shall be checked for signal continuity from source (such as field instrument/equipment, control panel, etc.) to end destination (Panels, PLC, etc.).
 - 2. Conduct a complete system checkout and adjustment, including calibration of all instruments, tuning of control loops, checking operation functions, and testing of final control actions. When there are future operational functions included in this Work, they should be included in the system checkout. All problems encountered shall be promptly corrected to prevent any delays in start-up of the various unit processes.

3. All instruments and devices shall be checked to verify compliance with the Specifications and approved Shop Drawings.
- B. Contractor shall provide all test equipment required to perform the testing during system checkout and start-up.
- C. Contractor shall furnish to the Engineer certified calibration reports for field instruments and devices as soon as calibration is completed.
 1. Receipt of any calibration certificate shall in no way imply acceptance of the work or instrument.
 2. The calibration certificate forms shall be prepared and furnished by Contractor and shall contain all relevant information.
 3. Each calibration certificate shall be signed and dated by an authorized representative of Contractor. Three copies of each completed certificate shall be submitted to Engineer.
- D. Contractor shall furnish Engineer two copies of an installation inspection report certifying that all equipment has been installed correctly and is operating properly. The report shall be signed by authorized representatives of both Contractor and the Instrumentation Supplier.
- E. Approved Operation and Maintenance manuals as specified in Division 1 and a schedule for training must be approved prior to commencing integrated system field tests.
- F. All spare parts must be on site and accepted prior to commencing integrated system field tests.

1.03 COMMISSIONING

- A. Following the Process Control System checkout and initial operation, Contractor, under the supervision of the Instrumentation Supplier, shall perform a complete system test in the presence of the Engineer to verify that all equipment is operating properly as a fully integrated system, and that the intended monitoring and control functions are fully implemented and operational.
 1. Commissioning can only begin when all instruments and control panels are installed and wired. Operation and Maintenance manuals and a schedule for training must be approved prior to Commissioning.
 2. All spare parts must be on site and accepted prior to Commissioning.
 3. Contractor shall submit to the Engineer a schedule for Commissioning, including a proposed start date and Commissioning test sheet examples at least three weeks in advance.
- B. Commissioning shall be divided into two parts. Part I will exercise field signals between field equipment or instrumentation and each Intermediate Termination Panel. Part II shall exercise input/output signals from each Intermediate Termination Panel through the PLC system's (systems') workstation graphic display. Contractor shall make the necessary arrangements in each ITP to isolate field wiring from the PLC and allow concurrent Part I and Part II testing. Contractor shall, as a minimum, perform the following checks for each test:

1. All wiring shall be checked at each termination point for correct wire size, type, color, termination and wire number.
 2. All instruments and devices shall be checked to verify compliance with the Specifications and approved Shop Drawings. The calibration of analog devices shall be verified including the zero and span.
 3. Analog wiring shall be checked for correct polarity and ground continuity at each termination point in the loop.
 4. All analog loops shall be verified at each termination point at 0%, 25%, 50%, 75%, and 100% signal levels.
- C. Contractor shall provide the following documentation for use during the Commissioning effort. This documentation is in addition to that required or included elsewhere.
1. Complete panel schematic and internal point-to-point wiring interconnect drawings.
 2. Complete electrical control schematics in accordance with NFPA 79 Standards.
 3. Complete panel layout drawings.
 4. Complete field wiring diagrams.
 5. Complete instrument loop diagrams.
 6. Completed Calibration Certificates for all field and panel devices which require adjustment or calibration.
 7. Contractor shall provide one set of Commissioning documentation for the Owner's personnel, one set for the Engineer's use, one set for field use, and the required number of sets for Contractor's use.
 8. The Drawings corrected and modified during Commissioning shall form the basis for the "As-Built" Record Drawing requirement.
- D. Any defects or problems found during the Commissioning effort shall be corrected by Contractor and then retested to demonstrate proper operation.

1.04 INTEGRATED SYSTEM FIELD TEST

- A. Following software testing and demonstration of all system functions, the Process Control System including field sensors/transducers and instruments shall be running and fully operational for a continuous 48 hour period. The Operational Availability Demonstration specified below shall not begin until the continuous 48 hour integrated system test has been successfully completed and Owner and Engineer agree that the Operation Availability Demonstration can begin.
- B. Contractor shall provide the following documentation for use during the integrated field test effort.
1. Complete panel schematic and internal point-to-point wiring interconnect drawings.
 2. Complete panel layout and electrical control schematics drawings.
 3. Complete field wiring diagrams.
 4. Complete instrument loop diagrams.
 5. Completed Calibration Certificates for all field and panel devices which require adjustment or calibration.
 6. Contractor shall provide one set of the documentation required for the integrated field test effort for the Owner's personnel, one set for the Engineer's use, one set for field use, and the required number of sets for the Contractor's use.

7. The drawings corrected and modified during Shop Drawing review and integrated field tests shall form the basis for the "As-Built" Drawing requirement.
- C. Any defects or problems found with the instrumentation, control system hardware, control panel components/wiring and field devices during the integrated field testing effort shall be corrected by Contractor and then retested to demonstrate proper operation.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 31 05 19.13
GEOTEXTILE FABRIC

PART 1 GENERAL

1.1 SUMMARY

- A. Contractor shall furnish all geotextile, labor, incidental materials, tools, supervision, transportation, and installation equipment necessary for the installation of geotextile, as specified herein, and as shown on the Drawings.
- B. Related Sections:
 - 1. Section 31 05 16 - Granular Materials.
 - 2. Section 31 10 00 - Site Clearing.
 - 3. Section 31 23 23 - Backfill.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM D4354 - Standard Practice for Sampling of Geosynthetics for Testing.
 - 2. ASTM D4491 - Standard Test Method for Water Permeability of Geotextiles by Permittivity.
 - 3. ASTM D4533 - Standard Test Method for Index Trapezoidal Tearing Strength of Geotextiles.
 - 4. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - 5. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 - 6. ASTM D4759 - Standard Practice for Determining the Specifications Conformance of Geosynthetics.
 - 7. ASTM D4833 - Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.
 - 8. ASTM D5261 - Standard Test Method for Measuring Mass per Unit Area of Geotextiles.
 - 9. ASTM D6241 - Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.

1.3 SUBMITTALS

- A. Prior to material delivery to project site, the Contractor shall provide the Engineer with a written certification or manufacturers quality control data which displays that the geotextile meets or exceeds minimum average roll values (MARV) specified herein.
- B. The Contractor shall submit, if required by the Engineer, manufacturer's quality control manual for the geotextile to be delivered to the site.

1.4 MATERIAL WARRANTY

- A. The geotextile manufacturer shall warrant the material against manufacturing defects and material degradation for a period of 1 year from the date of installation. The manufacturer shall replace any material which fails from the above causes within the warranty period. The manufacturer shall furnish a written warranty covering these requirements.

1.5 GUARANTEE

- A. The Contractor shall guarantee the geotextile against defects in installation and workmanship for the period of 1 year commencing with the date of Final Acceptance. The guarantee shall include the services of qualified service technicians and all materials and labor required for the repairs at no expense to the Owner.

PART 2 PRODUCTS

2.1 GEOTEXTILE

- A. The non-woven needle punched geotextile specified herein shall be made from polypropylene staple fiber.
- B. The geotextile shall be manufactured from prime quality virgin polymer.
- C. The geotextile shall be able to withstand direct exposure to ultraviolet radiation from Sun for up to 30 days without any noticeable effect on index or performance properties.
- D. Geotextile shall meet or exceed all material properties listed in Table 1.1.

Table 1.1: Minimum Average Roll Values (MARV) Required for Nonwoven Needlepunched Geotextiles:
(Refer to column with the heading 'NW12', Product Code GEO 1208002 for relevant required values)

TESTED PROPERTY	TEST METHOD	FREQUENCY	NW4	NW6	NW8	NW10	NW12	NW16
Product Code			GEO 0408002	GEO 0608002	GEO 0808002	GEO 1008002	GEO 1208002	GEO 1608002
AASHTO M288 Class			3	2	1	>1	>>1	>>>1
Mass per Unit Area, oz/yd ² (g/m ²)	ASTM D5261	90,000 ft ² (8,300 m ²)	4 (135)	6 (200)	8 (270)	10 (335)	12 (405)	16 (540)
Grab Tensile Strength, lb (N)	ASTM D4632	90,000 ft ² (8,300 m ²)	120 (530)	160 (710)	220 (975)	260 (1,155)	320 (1,420)	390 (1,735)
Grab Elongation, %	ASTM D4632	90,000 ft ² (8,300 m ²)	50	50	50	50	50	50
CBR Puncture Strength, lb (N)	ASTM D6241	540,000 ft ² (50,000 m ²)	303 (1,347)	435 (1,936)	575 (2,557)	725 (3,225)	925 (4,116)	1,125 (5,006)
Trapezoidal Tear Strength, lb (N)	ASTM D4533	90,000 ft ²	50 (220)	65 (290)	90 (395)	100 (445)	125 (555)	150 (665)
Apparent Opening Size, Sieve No. (mm)	ASTM D4751	540,000 ft ² (50,000 m ²)	70 (0.212)	70 (0.212)	80 (0.180)	100 (0.150)	100 (0.150)	100 (0.150)

Permittivity, sec ⁻¹	ASTM D4491	540,000 ft ² (50,000 m ²)	1.80	1.50	1.30	1.00	0.80	0.60
Water Flow Rate, gpm/ft ² (l/min/m ²)	ASTM D4491	540,000 ft ² (50,000 m ²)	135 (5,495)	110 (4,480)	95 (3,865)	75 (3,050)	60 (2,440)	45 (1,830)
UV Resistance (% retained after 500 hours)	ASTM D4355	Per formulation	70	70	70	70	70	70
Roll Length ⁽¹⁾ , ft (m)			850 (259)	850 (259)	600 (182)	500 (152)	400 (122)	300 (91)
Roll Width ⁽¹⁾ ,ft (m)			15 (4.5)	15 (4.5)	15 (4.5)	15 (4.5)	15 (4.5)	15 (4.5)
Roll Area, ft ² (m ²)			12,750 (1,185)	12,750 (1,185)	9,000 (836)	7,500 (698)	6,000 (557)	4,500 (418)

NOTES:

- The property values listed are in weaker principal direction. All values listed are Minimum Average Roll Values (MARV) except apparent opening size in mm and UV resistance. Apparent opening size (mm) is a Maximum Average Roll Value. UV is a typical value.
- ⁽¹⁾Roll lengths and widths have a tolerance of ±1%.

2.2 MANUFACTURER

- A. All rolls of the geotextile shall be identified with permanent marking on the roll or packaging, with the manufacturers name, product identification, roll number and roll dimensions.

2.3 TRANSPORT

- A. Transportation of the geotextile shall be the responsibility of the Contractor.
- B. During shipment, the geotextile shall be protected from ultraviolet light exposure, precipitation, mud, dirt, dust, puncture, or other damaging or deleterious conditions.
- C. Upon delivery at the job site, the Contractor shall ensure that the geotextile rolls are handled and stored in accordance with the manufacturer’s instructions as to prevent damage.
- D. Geotextile rolls are to be unloaded under the supervision of the liner installer using straps or other devices that will prevent damage to the liner material.
- E. Geotextile rolls should be stored in their original wrappers on smooth, well-drained subgrade, and shall be stacked not more than four rows high.
- F. If any material damage is noted during unloading or storage, the damaged areas are to be marked with a permanent marker, and a notation made as to the roll number, location of damage, and type of damage.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 00 00 - Quality Requirements: Examination of existing conditions before starting work.

3.2 QUALITY ASSURANCE

- A. The Engineer shall examine the geotextile rolls upon delivery to the site and report any deviations from project specifications to the Contractor.
- B. The Engineer may decide to arrange conformance testing of the rolls delivered to the job site. For this purpose, the Engineer shall take a sample three feet (along roll length) by roll width according to ASTM Practice D4354. The sample shall be properly marked, wrapped and sent to an independent laboratory for conformance testing.
- C. The pass or fail of the conformance test results shall be determined according to ASTM Practice D4759.

3.3 INSTALLATION

- A. The subgrade shall be inspected and approved by the Engineer prior to installation of the geotextile. The subgrade shall be maintained in a smooth, uniform and compacted condition during the installation of the fabric.
- B. The geotextile shall be handled in such a manner as to ensure that it is not damaged in any way. Should the Contractor damage the geotextile to the extent that it is no longer usable as determined by these specifications or by the Engineer, the Contractor shall replace the geotextile at his own cost.
- C. The geotextile shall be installed to the lines and grades as shown on the contract drawings and as described herein.
- D. The geotextile shall be rolled down the slope in such a manner as to continuously keep the geotextile in tension by self weight. The geotextile shall be securely anchored in an anchor trench where applicable, or by other approved or specified methods.
- E. Materials will not be deployed when moisture, high winds, or other adverse weather conditions are expected. Geotextiles shall be weighted by sandbags or approved equivalent to temporarily secure material in the event of light winds. Such anchors shall be installed during placement and shall remain in place until replaced with cover material.
- F. The Contractor shall take necessary precautions to prevent damage to adjacent or underlying materials during placement of the geotextile. Should damage to such material occur due to the fault of the Contractor, the latter shall repair the damaged materials at his own cost and to the satisfaction of the Engineer.

- G. During placement of the geotextile, care shall be taken not to entrap soil, stones or excessive moisture that could hamper subsequent seaming of the geotextile as judged by the Engineer.
- H. The geotextile shall not be exposed to precipitation prior to being installed and shall not be exposed to direct sunlight for more than 15 days after installation.
- I. The geotextile shall be seamed using heat seaming or stitching methods as recommended by the manufacturer and approved by the Engineer. Sewn seams shall be made using polymeric thread with chemical resistance equal to or exceeding that of the geotextile. All sewn seams shall be continuous. Seams shall be oriented down slopes perpendicular to grading contours unless otherwise specified. For heat seaming, fusion welding techniques recommended by the manufacturer shall be used. The sewing machine shall sew a two-thread double locked stitch. The thread used for sewing shall be a color that contrasts with the geotextile material.
- J. The Contractor shall not use heavy equipment to traffic above the geotextile without approved protection.
- K. The geotextile shall be covered as soon as possible after installation and approval. Installed geotextile shall not be left exposed for more than 15 days.
- L. Material overlying the geotextile shall be carefully placed to avoid wrinkling or damage to the geotextile.
- M. Geotextile panels are to be oriented at right angles to the toe of the berm (downslope) where possible. Transition seams between vertical slope panels and horizontal panels will be located at least 5 feet from the toe of the slope. Geotextile panels are to be deployed in a manner that minimizes field seams.
- N. Geotextile deployment shall start at the top of the slope and proceed downward. Adjacent rolls are to be overlapped a minimum of 6”.
- O. Damaged areas are to be patched with an additional layer of geotextile material. The patch is to overlap the damaged area by a minimum of 12 inches on each side, and is to be heat bonded to the main layer of geotextile. If the damaged area is in excess of 50% of the roll width, the damaged section is to be removed and replaced with undamaged geotextile material.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Removing surface debris.
 - 2. Removing designated paving, curbs, and other obstructions.
 - 3. Removing designated trees, shrubs, and other plant life.
 - 4. Removing abandoned utilities.
 - 5. Excavating topsoil.

- B. Related Sections:
 - 1. Section 31 22 13 - Rough Grading.

1.2 QUALITY ASSURANCE

- A. Perform Work in accordance with the most recent edition of the New Mexico Standard Specifications for Public Works Construction, with latest revisions.

- B. Perform Work in accordance with the most recent edition of the NMDOT Standard Specifications for Road and Bridge Construction, with latest revisions.

- C. Conform to applicable State of New Mexico code for environmental requirements, disposal of debris, burning debris on site, use of herbicides.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 00 00 - Quality Requirements: Examination of existing conditions before starting work.

- B. Verify existing plant life designated to remain is tagged or identified.

- C. Identify waste area and/or salvage area for placing removed materials.

3.2 PREPARATION

- A. Call New Mexico “One Call” at 811 and local utility companies at least three (3) days before performing Work.
 - 1. Request that underground utilities be located and marked within and surrounding construction areas.

3.3 PROTECTION

- A. Locate, identify, and protect utilities indicated to remain, from damage.
- B. Protect trees, plant growth, and features designated to remain, as final landscaping.
- C. Protect benchmarks, survey control points, and existing structures from damage or displacement.

3.4 CLEARING

- A. Clear areas required for access to site and execution of Work.
- B. Remove trees and shrubs within indicated areas. Remove stumps and surface rock.
- C. Clear undergrowth and deadwood, without disturbing subsoil.
- D. Apply herbicide to remaining stumps to inhibit growth.

3.5 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- B. Partially remove paving, curbs, and other obstructions as indicated on Drawings. Neatly saw cut edges at right angle to surface.
- C. Remove abandoned utilities as directed by Owner and/or Engineer. Indicate removal termination point for underground utilities on Record Documents.
- D. Continuously clean up and remove waste materials from site. Do not allow materials to accumulate on site.
- E. The Engineer will indicate to the Contractor which obstructions are to be removed, disposed of, or salvaged, and will require special documentation.
- F. All existing fences crossed by the Work, or are within the construction area, are to be removed and rebuilt to original condition or better. Fence materials resulting from such removal are to be stored or disposed of as directed by the Engineer. Fence materials suitable for reuse or salvage that are damaged, lost or destroyed due to the Contractor's negligence or carelessness are to be replaced at the Contractor's expense.
- G. Do not burn or bury materials on site. Leave site in clean condition.

3.6 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, relandscaped, or regraded, without mixing with foreign materials for use in finish grading.
- B. Do not excavate wet topsoil.
- C. Stockpile in area designated on site to depth not exceeding 8 feet and protect from erosion. Stockpile material on impervious material and cover over with same material, until disposal.
- D. Remove excess topsoil not intended for reuse, from site.
- E. All equipment shall be properly maintained and with proper safety devices.
- F. Contractor must maintain control of dust and minimize blowing debris.

END OF SECTION

SECTION 31 22 13

ROUGH GRADING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavating subsoil.
 - 2. Cutting, grading, filling, rough contouring, and compacting site for site structures and building pads.
- B. Related Sections:
 - 1. Section 31 10 00 - Site Clearing: Excavating topsoil.
 - 2. Section 31 23 23 - Backfill: General building area backfilling.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. The following payment concepts only apply when a corresponding item is included in the Bid Schedule. If no specific item is provided, then this work shall be considered incidental to those items which require grading.
- B. Topsoil Fill:
 - 1. Basis of Payment: Includes excavating existing soil, supplying soil materials, stockpiling, scarifying substrate surface, placing where required, and compacting.
- C. Subsoil Fill:
 - 1. Basis of Payment: Includes excavating existing subsoil, supplying subsoil materials, stockpiling, scarifying substrate surface, placing where required, and compacting.
- D. Structural Fill:
 - 1. Basis of Payment: Includes excavating existing subsoil, supplying structural fill materials, stockpiling, scarifying substrate surface, placing where required, and compacting.

1.3 REFERENCES

- A. Geotechnical Report
 - 1. Geo-Test, Inc., "Geotechnical Engineering Services, Job. No. 1-15411, Hospital Tank Replacement, Santa Fe, NM," September 18, 2015.
- B. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.

- C. American Society for Testing and Materials International (ASTM):
1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 2. ASTM D422 - Particle -Size Analysis of Soils.
 3. ASTM D653 - Terminology Relating to Soil, Rock, and Contained Fluids.
 4. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort 12,400 ft-lbf/ft³.
 5. ASTM D1140 - Amount of Material in Soils Finer than the No. 200 Sieve.
 6. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
 7. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort 56,000 ft-lbf/ft³.
 8. ASTM D1633 - Test Method for Compressive Strength of Molded Soil - Cement Cylinders.
 9. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 10. ASTM D2216 - Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
 11. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
 12. ASTM D2434 - Standard Test Method for Permeability of Granular Soils Constant Head.
 13. ASTM D2487 - Classifications of Soils for Engineering Purposes (Unified Soil Classification System).
 14. ASTM D2488 - Description and Identification of Soils (Visual-Manual Procedure).
 15. ASTM D2774 - Standard Practice for Underground Installation of Thermoplastic Pressure Piping.
 16. ASTM D2901 - Test Method for Cement Content of Freshly Mixed Soil Cement.
 17. ASTM D4253 - Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 18. ASTM D4254 - Minimum Index Density and Unit Weight of Sols and Calculation of Relative Density.
 19. ASTM D4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 20. ASTM D4564 - Density of Soil in Place by the Sleeve Method.
 21. ASTM D4643 - Determination of Water (Moisture) Content of Soil by the Microwave Oven Heating.
 22. ASTM D4718 - Correction of Unit Weight and Water Content for Soils Containing Oversize Particles.
 23. ASTM D4832 - Compressive Strength of Controlled Low Strength Material.
 24. ASTM D4914 - Density of Soil and Rock in Place by the Sand Replacement Method in a Test Pit.
 25. ASTM D4959 - Determination of Water (Moisture) Content of Soil by Direct Heating.
 26. ASTM D5030 - Density of Soil and Rock in Place by the Water Replacement Method in a Test Pit.
 27. ASTM D5080 - Rapid Determination of Percent Compaction.

28. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.4 SUBMITTALS

- A. Section 01 00 00 - Submittal Procedures.
- B. Samples: Submit, in airtight containers, 10 lb sample of each type of fill to testing laboratory.
- C. Materials Source: Submit name of imported materials suppliers.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C136, ASTM D2419, and ASTM D2434.
- B. Perform Work in accordance with applicable New Mexico State Standards.

PART 2 PRODUCTS

2.1 MATERIALS

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 00 00 - Quality Requirements: Examination of existing conditions before starting work.
- B. Verify survey benchmark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

- A. Call New Mexico "One Call" at 811 and local utility companies at least three (3) days before performing Work.
 1. Request underground utilities to be located and marked within and surrounding construction areas.

- B. Identify required lines, levels, contours, and datum.
- C. Notify utility company to remove and relocate utilities.
- D. Protect remaining utilities from damage.
- E. Protect plant life, lawns, and other features remaining as portion of final landscaping.
- F. Protect benchmarks, survey control point, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be further excavated, relandscaped, or regraded.
- B. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.
- C. When excavating through roots, perform Work by hand and cut roots with sharp axe.
- D. Remove excess subsoil not intended for reuse, from site.
- E. Benching Slopes: Horizontally bench existing slopes greater than 1: 4 to key placed fill material to slope to provide firm bearing.
- F. Stability: Replace damaged or displaced subsoil as specified for fill.
- G. Notify Owner of any utility damage at once so emergency measures can be taken. The Contractor will pay for any required repairs.
- H. Intercept and divert surface drainage and precipitation away from excavation through use of dikes, curb walls, ditches, pipes, or other means.
- I. Remove and exclude water, including storm water, groundwater, irrigation water, and/or other waters, from all excavations. Dewatering wells, well-points, sump pumps, or other means shall be used to remove water and continuously maintain groundwater at a level below the bottom of excavations. Water shall be removed and excluded until backfilling is complete and all field soils testing have been completed.
- J. Comply with New Mexico state standards and requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.
- K. Excavation below Fills and Embankments: The subgrade areas beneath embankments shall be excavated to remove not less than the top 1 foot of native material and, where such subgrade is sloped, the native material shall be benched. After the required excavation or over-excavation has been completed, the top 12 inches of material shall be scarified and moisture added or material dried to optimum moisture and the exposed surface shall be proof rolled.

- L. Excavation under areas to be paved shall extend to the bottom of the sub-base. After the required excavation has been completed, the area shall be scarified a minimum of 12 inches below the subgrade surface and recompact prior to the placement of the sub-base aggregate and/or base course aggregate. The finished sub-grade shall be even, self-draining, and in conformance with the slope of the finished pavement. Areas that could accumulate standing water shall be regraded to provide a self-draining subgrade.
- M. Material beyond prescribed lines which is loosened by the Contractor's operations shall be removed, replaced and/or compacted, as directed by the Engineer, at no additional cost to the Owner.

3.4 FILLING

- A. See Section 31 23 23 - Backfill.

3.5 DISPOSAL OF EXCAVATED MATERIALS

- A. Excess excavated material or excavated material not suitable for backfill may be disposed of on-site, provided that:
 - 1. The finished grade substantially conforms with the Drawings, or any deviation therefrom is approved by the Engineer.
 - a. Blend with natural terrain.
 - b. Minimum slope: 2%.
 - c. Maximum slope: 4:1.
 - 2. All excess excavated material spread on the right-of-way is compacted to the same specifications as final backfill, as set for in Section 31 23 23 - Backfill and the Drawings, and
 - 3. All on-site disposal of material is approved by the Engineer.
- B. Do not dispose of waste material by dumping from tops of slopes.
- C. Do not dispose of excess material within 15 feet of any wash, drainage or waterway.

3.6 TOLERANCES

- A. Section 01 00 00 - Quality Requirements: Tolerances.
- B. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

3.7 FIELD QUALITY CONTROL

- A. Section 01 00 00 - Execution Requirements: Testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557, ASTM D698, AASHTO T180.
- C. Perform in place compaction tests in accordance with the following:
 - 1. Density Tests: ASTM D6938.
 - 2. Moisture Tests: ASTM D6938.

- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- E. Compaction testing shall be done to the extent such that the Owner and Engineer can be reasonably assured that the backfill has been placed in accordance with the requirements of the Contract Documents or in accordance with the NMDOT Standard Specifications for Road and Bridge Construction, whichever is the more stringent. When a testing allowance is established on the Bid Form, the Owner and Engineer will determine the testing frequency to be used throughout the project.

END OF SECTION

SECTION 31 23 23

BACKFILL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Backfilling building perimeter to subgrade elevations.
 - 2. Backfilling site structures to subgrade elevations.
 - 3. Fill under slabs-on-grade.
 - 4. Fill under paving.
 - 5. Fill for over-excavation.
 - 6. Pipe bedding material.

- B. Related Sections:
 - 1. Section 03 30 00 - Cast-in-Place Concrete: Concrete materials.
 - 2. Section 31 22 13 - Rough Grading: Site filling.
 - 3. Section 33 11 00 - Water Utility Distribution Piping.

1.2 REFERENCES

- A. Geotechnical Report
 - 1. Geo-Test, Inc., "Geotechnical Engineering Services, Job. No. 1-15411, Hospital Tank Replacement, Santa Fe, NM," September 18, 2015.
 - 2. Refer to geotechnical data regarding any issues not specifically addressed in these technical specifications. In the event of any discrepancies or differences in requirements between the geotechnical report and the technical specifications, the more stringent requirement shall apply.

- B. New Mexico Standard Specifications for Public Works Construction (NMSSPWC):
 - 1. NMSSPWC Sections 701, 801 & 802 "Trenching, Excavation and Backfill".

- C. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. AASHTO T99 - Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 3050mm (12-in.) Drop.
 - 2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

- D. American Society for Testing and Materials International (ASTM):
 - 1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 2. ASTM D422 - Particle -Size Analysis of Soils.
 - 3. ASTM D653 - Terminology Relating to Soil, Rock, and Contained Fluids.
 - 4. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m^{3 - 5. ASTM D1140 - Amount of Material in Soils Finer than the No. 200 Sieve.}

6. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
7. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³, 2,700 kN-m/m³).
8. ASTM D1633 - Test Method for Compressive Strength of Molded Soil - Cement Cylinders.
9. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
10. ASTM D2216 - Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
11. ASTM D2487 - Classifications of Soils for Engineering Purposes (Unified Soil Classification System).
12. ASTM D2488 - Description and Identification of Soils (Visual-Manual Procedure).
13. ASTM D2774 - Standard Practice for Underground Installation of Thermoplastic Pressure Piping.
14. ASTM D2901 - Test Method for Cement Content of Freshly Mixed Soil Cement.
15. ASTM D4253 - Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
16. ASTM D4254 - Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
17. ASTM D4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
18. ASTM D4564 - Density of Soil in Place by the Sleeve Method.
19. ASTM D4643 - Determination of Water (Moisture) Content of Soil by the Microwave Oven Heating.
20. ASTM D4718 - Correction of Unit Weight and Water Content for Soils Containing Oversize Particles.
21. ASTM D4832 - Compressive Strength of Controlled Low Strength Material.
22. ASTM D4914 - Density of Soil and Rock in Place by the Sand Replacement Method in a Test Pit.
23. ASTM D4959 - Determination of Water (Moisture) Content of Soil by Direct Heating.
24. ASTM D5030 - Density of Soil and Rock in Place by the Water Replacement Method in a Test Pit.
25. ASTM D5080 - Rapid Determination of Percent Compaction.
26. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 DEFINITIONS

- A. Percentage Compaction: Ratio, expressed as percentage, of actual density of material compared with maximum dry density based on Modified Proctor (ASTM D1557).
- B. Optimum Moisture Content: Based on Modified Proctor (ASTM D1557).
- C. Unified Soil Classification System: Based on ASTM D2487.

1.4 SUBMITTALS

- A. Section 01 00 00 - Submittal Procedures.
- B. Submit samples and certified test documentation of all materials to be used.
- C. Materials Source: Submit name of imported fill materials suppliers.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.
- E. Submit field soil test on material in place as backfill and pipe bedding material.
- F. Submit construction drawings with compaction test locations marked and labeled with station, date, test number, depth of test below ground surface, and test result.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Suitable materials may be processed on-site, or may be imported. If imported materials are required to meet the quantity requirements of the project, it will be provided at no additional expense to the Owner, unless a unit price item is included for imported materials on the Bid Form. The following types of materials are defined as suitable where scheduled:

- 1. Type A (three-quarter inch minus aggregate backfill): Crushed rock or gravel, and sand with the gradation requirements below.

<u>Sieve Size</u>	<u>Percentage Passing</u>
3/4-inch	100
No. 4	30 – 50
No.200	0 – 12

- 2. Type B (Class I crushed stone): Manufactured angular, crushed stone, crushed rock, or crushed slag with the following gradation requirements. The material shall have a minimum sand equivalent value of 75.

<u>Sieve Size</u>	<u>Percentage Passing</u>
3/4-inch	100
No. 4	30 – 50
No. 200	0 - 5

- 3. Type C (sand backfill): Sand with 100 percent passing a 3/8-inch sieve, at least 90 percent passing a No. 4 sieve, and a sand equivalent value not less than 30.

- a. This material to be used only when approved by Engineer.

- 4. Type D: (pipe bedding material): Crushed rock or gravel with 100 percent passing a 1/2-inch sieve and not more than 3 to 5 percent passing a No. 10 sieve and 1 to 2 percent passing a No. 200 sieve.

- 5. Type E (pea gravel backfill): Crushed rock or gravel with 100 percent passing a 1/2-inch sieve and not more than 10 percent passing a No. 4 sieve.

6. Type F (coarse drain rock): Crushed rock or gravel meeting the following gradation requirements:

<u>Sieve Size</u>	<u>Percentage Passing</u>
2-inch	100
1-1/2-inch	90 - 100
1-inch	20 - 55
3/4-inch	0 - 15
No. 200	0 - 3

7. Type G (aggregate base, base course) as follows:

<u>Sieve Size</u>	<u>Percentage Passing</u>
1-inch	100
3/4 inch	80-100
No.4	30-60
No.10	20-45
No. 200	3-10

8. Type H (graded drain rock): Drain rock shall be crushed rock or gravel, durable and free from slaking or decomposition under the action of alternate wetting or drying. The material shall be uniformly graded and shall meet the following gradation requirements:

<u>Sieve Size</u>	<u>Percentage Passing</u>
1-inch	100
3/4-inch	90 - 100
3/8-inch	40 - 100
No. 4	25 - 40
No. 8	18 - 33
No. 30	5 - 15
No. 50	0 - 7
No. 200	0 - 3

9. Type I Not Used

10. Type J (cement-treated backfill): Material which consists of Type H material, or any mixture of Types B, C, G, and H materials which has been cement-treated so that the cement content of the material is not less than 5 percent by weight when tested in accordance with ASTM D2901 - Test Method for Cement Content of Freshly Mixed Soil Cement. The ultimate compressive strength at 28 days shall be not less than 400 psi when tested in accordance with ASTM D1633 - Test Method for Compressive Strength of Molded Soil - Cement Cylinders.

11. Type K (topsoil): Stockpiled topsoil material which has been obtained at the site by removing soil to a depth not exceeding 2 feet. Removal of the topsoil shall be done after the area has been stripped of vegetation and debris.

12. Type L (controlled low strength material): Controlled low strength material, also referred to as ‘soil cement slurry’ or ‘flowable fill’ shall meet the following requirements:
- a. Slurry shall have a 7-day compressive strength of not less than 50 psi and not more than 150 psi. The compressive strength shall be determined in accordance with ASTM D4832.
 - b. Typical cement content: 3 to 10 percent by dry weight of soil to obtain specified compressive strength.
 - c. The water-cement ratio of the mix shall not exceed 3.5:1. The water content shall not exceed that required to provide a mix that will flow and can be pumped.
 - d. The consistency of the slurry shall be such that the slurry flows easily into all openings between the pipe and the lower portion of the trench.

13. Type M (aggregate sub-base, structural fill). Well-graded crushed rock or natural gravel meeting the following gradation requirements:

<u>Sieve Size</u>	<u>Percentage Passing</u>
4-inch	100
3-inch	95 100
No. 200	3 - 15

- B. Where these Specifications conflict with the requirements of any local agency having jurisdiction or with the requirements of a pipe material manufacturer, the Engineer shall be immediately notified. In case of conflict between types of pipe embedment backfills, the Contractor is to use the agency-specified backfill material if that material provides a greater degree of structural support to the pipe, as determined by the Engineer. In case of conflict between types of trench or final backfill types, the Contractor shall use the agency-specified backfill material if that material provides the greater in-place density after compaction.
- C. Fill and backfill types, including use of native soil, shall be used in accordance with the following provisions. Native soil used for fill and backfill must meet the requirements of the type of material specified below and as shown for the corresponding type of material shown in 2.1.A above.
1. Embankment fills shall be constructed of Type M material, as defined herein, or other material approved by the Project Engineer. Drainage structures embankments shall be backfilled with materials used in original construction.
 2. Pipe zone backfill shall consist of the following materials for each pipe material listed below. All pipe bedding material shall receive prior approval by the Engineer before use.
 - a. Concrete pipe, shall be provided Type A or B pipe bedding and embedment backfill material, or native material that meets the criteria described below, and is acceptable to the Engineer.
 - b. Plastic pipe shall be provided Type D bedding and embedment zone material, or native material that meets the criteria described below, and is acceptable to the Engineer.

- 1) In trenches where dewatering is required, the pipe bedding material and embankment backfill shall be Type A or B as directed by the Engineer.
- c. Excavated native material will be allowed, provided that it is free draining and contains no organic materials, no rocks larger than 1/2-inch, clods or frozen lumps. A proctor of this material shall be submitted to the Engineer for review and approval before use. If native backfill material is approved, on-site screening may be required by Engineer to remove any rock material larger than 1/2-inch at no additional expense to the Owner. The location of such sites must be coordinated with the Owner.
3. Trench zone backfill for pipelines shall be any of Types A through H backfill materials or any mixture thereof.
4. Final backfill material for pipelines under paved areas shall be Type G backfill material.
5. Final backfill under areas not paved shall be the same material as that used for trench backfill, unless otherwise indicated.
6. Trench backfill and final backfill for pipelines under structures shall be the same material as used in the pipe zone, except where concrete encasement is required by the Contract Documents.
7. Aggregate base materials under pavements, curb and gutter, and sidewalk shall be Type G material constructed to the thickness indicated.
8. Aggregate sub-base shall be Type M material.
9. Backfill around structures shall be Types A through Type H materials, or any mixture thereof.
10. Under structures where groundwater must be removed to allow placement of concrete, Type F material shall be used. Before the Type F material is placed, filter fabric shall be placed over the exposed foundation. Filter fabric shall be Mirafi 140 N, Mirafi 700X, or equal.
11. Under all other structures, Type G or H material shall be used.
12. Backfill used to replace pipeline trench over-excavation shall be a layer of Type F material with a 6-inch top filter layer of Type E material or filter fabric to prevent migration of fines for wet trench conditions or the same material as used for the pipe zone backfill if the trench conditions are not wet.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 00 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- C. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.
- D. Verify structural ability of unsupported walls to support loads imposed by fill.

3.2 PREPARATION

- A. Compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with structural fill and compact to density equal to or greater than requirements for subsequent fill material.
- C. Scarify subgrade surface to depth of 8 inches.
- D. Proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.3 BACKFILLING FOR STRUCTURES, SITE WORK AND APPURTENANCES

- A. Backfill areas to contours and elevations with unfrozen materials as indicated on the Drawings or as directed by the Engineer.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Each layer shall be thoroughly mixed as necessary to promote uniformity of material in each layer.
- D. Place material in continuous layers as follows:
 - 1. Subsoil Fill: Maximum 8 inches compacted depth.
 - 2. Structural Fill: Maximum 6 inches compacted depth.
 - 3. Granular Fill: Maximum 6 inches compacted depth.
- E. Employ placement method that does not disturb or damage other work.
- F. Maintain optimum moisture content of backfill materials to attain required compaction density.
- G. Slope grade away from building minimum 6 inches in 10 ft, unless noted otherwise.
- H. Make gradual grade changes. Blend slope into level areas.
- I. Shape and drain embankments and excavations, maintain ditches and drains to provide drainage at all times. Protect graded areas against action of elements prior to acceptance of work, and reestablish grade where settlement or erosion occurs.
- J. Bench hillside slopes or fills to key the embankment. Remove and re-compact a minimum of 12 inches normal to the slope of the hillside or fill as the embankment or fill is brought up in layers.
- K. Under surfaced or paved roads, driveways or parking areas, apply base course at uppermost layer of backfill to same thickness as existing driving surface, or 6 inches, whichever is

greater. If paved, apply pavement patch to thickness equal to or greater than existing pavement.

- L. Remove surplus backfill materials from site.
- M. Leave fill material stockpile areas free of excess fill materials.
- N. Repair or replace remaining items damaged by excavation or filling.

3.4 BACKFILLING OF TRENCHES

- A. Place a minimum of 4 inches of bedding material in pipe trenches to lines and grades indicated on Drawings or as directed by Engineer and compact before pipe is laid. Grade bedding material parallel to bottom of pipe.
- B. Do not place material when either the material or the surface upon which it is to be placed is frozen.
- C. Pipe zone backfill materials shall be manually spread around the pipe so that, when compacted, the pipe zone backfill will provide uniform bearing and side support.
 - 1. Exercise care not to damage pipe or appurtenances when placing embedment material.
 - 2. Maintain optimum moisture content of fill materials to attain required compaction density.
 - 3. Ensure material is placed to equal height on both sides of pipe to avoid unequal loading and possible lateral displacement of the pipe. Elevation difference of embedment between each side of pipe shall not exceed 6 inches.
 - 4. Place material in uniform layers.
 - 5. Work material into pipe haunches to prevent voids and achieve specified compaction under the haunches.
 - 6. No backfilling by machine methods permitted until a minimum of one foot of material has been placed by hand over the top of the pipe.
 - 7. Place material to a compacted depth of 12 inches over the top of the pipe, 15 inches of compacted depth over the top of the pipe in paved or traffic areas, and compacted by hand held compacting tools before other backfilling is done.
- D. If pipe laying operations are interrupted for more than 24 hours, cover pipe laid in the trench with backfill.
- E. When the bottom of the trench is unstable, an additional 4 inches shall be over-excavated and filled with bedding material before pipe is laid.
- F. Where rock is present and where there is concern that settling rocks in the surrounding material may rupture the pipeline, the amount of bedding material below and above the pipe shall be increased. In these cases there will be 8 inches of bedding material below the pipe and 15 inches above, as directed by the Engineer.

- G. When using free-draining crushed rock or gravel for embedment on stretches longer than 300 feet, install trench plugs composed of silty, non-plastic material at 300 foot intervals to impede flow of trench water through the embedment.
- H. Under surfaced or paved roads, driveways or parking areas, apply base course at uppermost layer of backfill to same thickness as existing driving surface, or 6 inches, whichever is greater. If paved, apply pavement patch to thickness equal to or greater than existing pavement.

3.5 COMPACTION

- A. Do not place and compact soil under the following conditions:
 - 1. Ambient air temperature below freezing.
 - 2. Rain that creates puddles in clayey or silty materials.
 - 3. Ice or snow pockets visible in material being placed.
- B. Surface Preparation:
 - 1. Prepare surface so that first compacted lift will be placed on firm, stable base. Compact surface to specified percent compaction, if necessary.
 - 2. For water-retaining compacted fill, scarify and moisten surface to provide satisfactory bonding surface before placing first layer of material to be compacted.
 - 3. Do not place material to be compacted on frozen surface.
- C. Compact material in trenches in layers having approximately the same top elevation on both sides of the pipeline to avoid unequal loading and displacement of the pipe.
- D. Placement:
 - 1. Place soil to be compacted in horizontal layers.
 - 2. Blend materials as needed to ensure compacted fill is homogenous and free from lenses, pockets, streaks, voids, laminations and other imperfections.
- E. Compaction Procedures:
 - 1. Silty or Clayey Material:
 - a. Compact with mechanical impact tampers, tamping rollers, vibrating pad foot rollers, rubber tire rollers or other suitable compaction equipment.
 - b. Uniformly distribute equipment passes.
 - c. Compact in horizontal layers to compacted thickness of 6 inches or less.
 - 2. Cohesionless Free-Draining Material: Compact in horizontal layers to maximum compacted thickness of:
 - a. Tampers and rollers: 6 inches
 - b. Crawler-type tractors, vibrating drum rollers, surface vibrators or similar equipment: 12 inches
 - c. Saturation and internal vibration: Penetrating depth of vibrator.
 - 3. When compacting pipe embedment material, exercise care not to damage the pipe or appurtenances with compaction equipment. Do not apply compaction equipment directly above the pipe.
 - 4. Demonstration: Lift thicknesses may vary depending on equipment and methods. Field adjustments to the specified lift thicknesses may be allowed or required.

Contractor shall demonstrate that proposed equipment and methods will meet required compaction for the proposed lift thickness.

5. Flooding and jetting is not allowed unless specifically approved by the Engineer.
- F. Moisture Content:
1. Optimum moisture content for each soil type, whether native soil or imported material, shall be determined by the Modified Proctor method, ASTM D1557.
 2. Moisture content during compaction shall be no more than 2 percentage points wet or dry of optimum moisture content.
 3. Moisten or aerate material, as necessary, to provide specified moisture content. Add water to soil in increments that will permit moisture content to be uniform and homogenous through each layer after mixing.
 4. Add no more than 2 percent water to fill by sprinkling just prior to compaction when fill is clayey and contains dry clods of clay.
 - a. If clayey soil is more than 2 percent below optimum moisture, pre-conditioning and curing may be required to obtain uniform and homogenous distribution of moisture in clods.
 - b. Use of disks, harrows or rakes may be required to blend moisture prior to placement and compaction.
 5. For cohesionless soils, add water as necessary during compaction, as these soils are free-draining.
- G. Minimum Percent Compaction:
1. Over-excavation: Backfill of over-excavation to specified or directed lines shall be compacted to same percent compaction as embedment material or undisturbed foundation material, whichever is greater. If the in-place compaction of the undisturbed foundation material is greater than 95%, the over-excavation backfill may be compacted to 95%.
 2. Pipe Bedding Material: Place and compact pipe bedding material as indicated on Drawings for given soil classification, pipe wall thickness, and depth of cover. If native material meets grading requirements and is used, compact to 95%.
 3. Initial and Final Backfill: For trenches outside of roads, driveways, parking areas or wash crossings, compact to 90%, or to a density equal to that of the adjacent undisturbed soil, as directed by the Engineer. For trenches within the driving surfaces of roads, driveways or parking areas (both paved and unpaved) or within wash crossings, compact to 95%.
 4. Embankments: Compact to same requirements as Final Backfill.
 5. Under buildings, tanks, slabs and other structures: Compact in accordance with Geotechnical reports provided in Exhibit A, where not clarified, assume 95%.
 6. Note that all Percent Compaction values in these Technical Specifications and Drawings are based on Modified Proctor, ASTM D1557, unless otherwise noted.

3.6 TOLERANCES

- A. Section 01 00 00 - Quality Requirements: Tolerances.
- B. Top Surface of Backfilling within Building Areas: Plus or minus 1 inch from required elevations.

- C. Top Surface of Backfilling under Paved Areas: Plus or minus 1 inch from required elevations.
- D. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.
- E. Percent Compaction: Shall meet minimum required compaction as set forth in these specifications
- F. Moisture Content: As set forth in these specifications.

3.7 FIELD QUALITY CONTROL

- A. Section 01 00 00 - Execution Requirements: Testing, Adjusting, and Balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557.
- C. Perform in place compaction tests in accordance with the following:
 - 1. Density Tests: ASTM D1556, ASTM D2167, or ASTM D6938.
 - 2. Moisture Tests: ASTM D6938.
- D. When tests indicate Work does not meet specified requirements, remove material, replace, compact, and retest.
- E. Provide test trenches and excavations including excavation, trench support, and groundwater removal for the soils testing operations, at the locations and depths required. The cost of all work associated with accessing, preparing, or time delays for testing to be included in the unit price of the applicable pay item being tested.
- F. Compaction testing shall be done to the extent such that the Owner and Engineer can be reasonably assured that the backfill has been placed in accordance with the requirements of the Contract Documents, or as required by the utility for which the trenching is being provided, whichever is the more stringent. When a testing allowance is established on the Bid Form, the Owner and Engineer will determine the testing frequency to be used throughout the project.
- G. Correction of Substandard Work: All fill and backfill represented by tests that fail to meet compaction, moisture content, soil classification or other specifications shall be uncovered as needed, replaced as needed, re-compacted and re-tested until all specifications are met, at no additional expense to the Owner.
 - 1. Elevations, lines and grades of replaced material, as well as of pipe and other structures resting against such material, shall be re-surveyed at the direction of the Engineer. Contractor shall correct elevations, lines and grades as needed, at no additional expense to the Owner.

3.8 PROTECTION OF FINISHED WORK

- A. Section 01 00 00 - Execution Requirements: Protecting Installed Construction.
- B. Reshape and re-compact fills subjected to vehicular traffic.

3.9 SCHEDULE

A. Interior Slab-On-Grade:

1. Per the geotechnical report in Exhibit V. Allows for use of densified native soil or structural fill meeting the following grading requirements:

Sieve Size	Percent Passing
1 Inch	100
¾ Inch	85-100
No. 4	45-95
No. 200	0-10

2. The Granular base should be compacted to a minimum of 95% of maximum dry density as determined in accordance with ASTM D-1557.

B. Exterior Side of Foundation Walls, Tank Walls and Over Granular Filter Material and over top of tank:

1. Use native material per the geotechnical report in Exhibit V.
2. Compaction per the geotechnical recommendations in Exhibit V.

C. Fill for Foundation Perimeter Drainage and Retaining Wall fill and leveling pad:

1. Fill Type B (Class I crushed stone), to 6 inches below retaining walls, 24" behind retaining walls as measured from the front face and below 6" below the retaining wall for leveling pad. compact uniformly to 90 percent of maximum density.

D. Fill Under Asphalt, side walk, Curb and gutter and Concrete Paving:

1. Per the New Mexico State Department of Transportation Standard Specifications for Highway and Bridge Construction for 4" base course.

END OF SECTION

SECTION 33 11 00

WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings for public line including potable water line.
 - 2. Tapping Sleeves, Tees and Valves.
 - 3. Underground Pipe Markers.
 - 4. Bedding and Cover Materials.

- B. Related Sections:
 - 1. Section 03 30 00 - Cast-in-Place Concrete: Concrete materials.
 - 2. Section 31 23 23 - Backfill: Requirements for backfill to be placed.
 - 3. Section 33 12 16 - Water Utility Distribution Valves.
 - 4. Section 33 13 00 - Disinfection of Water Utility Distribution.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Pipe and Fittings:
 - 1. Basis of Measurement: By the linear foot.
 - 2. Basis of Payment: Includes trenching, hand trimming excavation, piping and fittings, all valves and appurtenances not listed separately on the Bid Form, bedding, backfill, compaction, tracer wire, detectable warning tape, concrete thrust restraints (where applicable), concrete wall anchors (if not separately listed on Bid Form), mechanical joint restraints, connection to public utility water source (if not separately listed on Bid Form). Special excavation methods for trenching in rock or hard soils, rock removal and disposal, and/or imported bedding material, if required to meet the project specifications, shall be considered incidental to the cost of the pipe installation. Soil cement, if used, shall be considered incidental to the cost of the pipe installation.
 - 3. The cost of laboratory testing for water quality and the cost of compaction testing shall be reimbursed to the Contractor, upon submittal of invoices. Work performed by Contractor related to such testing shall be considered incidental and shall not be reimbursable from testing allowance. Work shall be coordinated and directed by Engineer. Contractor shall pay for all failed tests.
 - 4. The cost of work associated with hydrostatic pressure testing and testing of material welds, etc. shall be considered incidental to related work and not be reimbursed. Work shall be coordinated and directed by Engineer.

- B. Fittings:
 - 1. Basis of Measurement: Each.
 - 2. Basis of Payment: Includes fittings, all appurtenances not listed separately on the Bid Form, bedding, pipe joint restraints, and connection of fittings to pipe.

1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO):
1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. American Society of Mechanical Engineers (ASME):
1. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
- C. American Society for Testing and Materials International (ASTM):
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 3. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 4. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 5. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
 6. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
 7. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
 8. ASTM D2487 - Classifications of Soils for Engineering Purposes (Unified Soil Classification System).
 9. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
 10. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
 11. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
 12. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
 13. ASTM F714 - Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
 14. ASTM F2164 - Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure.
 15. ASTM F2620 - Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.
 16. ASTM F2634 - Standard Test Method for Laboratory Testing of Polyethylene (PE) Butt Fusion Joints using Tensile-Impact Method.
- D. American Water Works Association (AWWA):
1. AWWA C104 - ANSI Standard for Cement Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
 2. AWWA C105 - ANSI Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
 3. AWWA C110 - ANSI Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. through 48 In. (76 mm through 1,219 mm), for Water.

4. AWWA C111 - ANSI Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 5. AWWA C115 - ANSI Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
 6. AWWA C116 - ANSI Standard for Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service.
 7. AWWA C151 - ANSI Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
 8. AWWA C153 - ANSI Standard for Ductile-Iron Compact Fittings for Water Service.
 9. AWWA C200 - Steel Water Pipe 6 In. (150 mm) and Larger.
 10. AWWA C205 - Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 In. and Larger - Shop Applied.
 11. AWWA C206 - Field Welding of Steel Water Pipe.
 12. AWWA C207 - Steel Pipe Flanges for Waterworks Service - Sizes 4 In. through 144 In. (100 mm through 3,600 mm).
 13. AWWA C208 - Dimensions for Fabricated Steel Water Pipe Fittings.
 14. AWWA C209 - Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.
 15. AWWA C213 - Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
 16. AWWA C600 - Installation of Ductile-Iron Water Mains and their Appurtenances.
 17. AWWA C605 - Underground Installation of Polyvinyl Chloride PVC Pressure Pipe and Fittings for Water.
 18. AWWA C606 - Grooved and Shouldered Joints.
 19. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In. through 12 In. (100 mm through 300 mm), for Water Distribution.
 20. AWWA C901 - Polyethylene Pressure Pipe and Tubing, 1/2 In. through 3 In. (13 mm through 76 mm), for Water Service.
 21. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. through 48 In. (350 mm through 1,200 mm), for Water Transmission and Distribution.
 22. AWWA C906 - Polyethylene Pressure Pipe and Fittings, 4 In. through 63 In. (100 mm through 1,575 mm), for Water Distribution and Transmission).
- E. Manufacturer's Standardization Society of the Valve and Fittings Industry:
1. MSS SP-60 - Connecting Flange Joint between Tapping Sleeves and Tapping Valves.
- F. National Fire Protection Agency
1. NFPA 24 - Standard for the Installation of Private Fire Service Mains and Their Appurtenances.
- G. National Sanitation Foundation (NSF):
1. NSF-14 - Plastics Piping System Components and Related Materials
 2. NSF-61 - Drinking Water System Components-Health Effects
- H. New Mexico Standard Specifications for Public Works Construction (NMSSPWC):

1. NMSSPWC Sections 701, 801 & 802 “Trenching, Excavation and Backfill”.
 - I. Plastic Pipe Institute (PPI):
 1. TR-33 - Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe.
 - J. American Welding Society (AWS):
 1. AWS D1.1 - Structural Welding Code
- 1.4 SUBMITTALS
- A. Section 01 00 00 - Submittal Procedures: Requirements for submittals.
 - B. Product Data: Submit data on pipe materials, pipe fittings and accessories.
 - C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.
 - D. Testing Plan: Contractor must submit proposed testing procedure and equipment to be employed for hydrostatic testing of lines, as well as continuity testing for tracer wire, for approval by Engineer.
 - E. Contractor shall submit a joint restraint table for all types of restrained joints to be used for the project based on the manufacturer’s specifications and calculations.
- 1.5 CLOSEOUT SUBMITTALS
- A. Section 01 00 00 - Execution Requirements: Requirements for submittals.
 - B. Project Record Documents: Record actual locations of piping mains, connections, thrust restraints, and invert elevations. Refer to paragraph 1.51 of Section 01 00 00.
 - C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
- 1.6 QUALITY ASSURANCE
- A. Perform Work in accordance with these specifications, as well as the most recent edition of New Mexico Standard Specifications for Public Works Construction, with latest revisions. The most stringent requirement shall apply.
 - B. All piping, fittings, valves, hydrants and any other potable water system appurtenances shall comply with the “Reduction of Lead in Drinking Water Act”, in effect as of 2014, or any subsequent revision thereof.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Section 01 00 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
 - B. Block individual and stockpiled pipe lengths to prevent moving.

- C. Do not place pipe or pipe materials on private property without prior authorization, or in areas obstructing pedestrian or vehicular traffic.
- D. Store polyethylene materials out of sunlight.
- E. Flexible pipe shall be braced as required to maintain roundness of +/- 1% during shipping and handling.
- F. Coated pipe shall be shipped on bunks and secured with nylon belt tie down straps or padded banding over braces, and shall be stored on padded skids or other suitable means to prevent damage to coating.
- G. Coated pipe shall be handled with wide belt slings, padded forks or other means to prevent damage to coating. Chains, cables or other equipment likely to damage coating or pipe shall not be used.
- H. Prior to shipment and again prior to installation, all materials shall be visually inspected for damage, including coatings and surfaces. Any damaged materials shall be repaired to original standards or replaced.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 WATER PIPING AND FITTINGS

- A. Ductile Iron Pipe: Bituminous outside coating: AWWA C151, Pipe Cement-Mortar Lining: AWWA C104, Polyethylene Encasement: AWWA C105.
 - 1. Pipe Class: AWWA C151, for nominal thickness, rated water working pressure and maximum depth of cover.
 - 2. Fittings: Ductile iron, Compact MJ fittings AWWA C153.
 - a. Interior/Exterior Lining: AWWA C116, epoxy coating, minimum 8 mil thickness.
 - b. Pressure rating of at least 250 psi.
 - c. Marked with pressure rating, nominal diameter of opening, manufacturers' identification, country where cast, and degree of bend.
 - 3. Joints:
 - a. Mechanical and Push-On Joints: AWWA C111.
 - b. All gaskets and joints shall be rated to the maximum rated pressure of the pipe.
 - c. Flanged Joints: AWWA C115; ASME B16.1.
 - d. Restrained Joints: Boltless, push-on type, joint restraint independent of joint seal, for fittings of 3" diameter and greater, thrust blocking for fittings less than 3" diameter. Installation and spacing for joint restraints as per manufacturer's specifications.
 - 4. Jackets: AWWA C105 polyethylene jacket.

- a. Installation Method "A".
 - b. Two separate, independently applied polyethylene jackets shall be applied to all buried ductile iron pipe. At least 12" separation, measured longitudinally along the axis of the pipe, shall be maintained between the seams of the two layers.
5. Bolts:
- a. All buried bolts, other than stainless steel bolts, shall be coated with field-applied coal tar epoxy.
- B. Polyvinyl Chloride (PVC): AWWA C900 and AWWA C905, with Dimension Ratio (DR) of DR18 for C900 pipe and DR21 for C905 pipe, unless otherwise identified on the Drawings or on the Bid Form, for all PVC pipe of 4" diameter and greater; ASTM D2241, IPS Gasketed Pipe, NSF approved, SDR21 with Pressure Rating of 200 psi, or as scheduled, for all PVC pipe with a diameter of 2" and greater but less than 4" diameter; ASTM D1785, PVC 1120 or 1220, NSF approved, Schedule 40, or as scheduled, for all PVC pipe less than 2" diameter:
1. Fittings: Ductile iron, Compact MJ fittings AWWA C153, on all PVC pipe 4" diameter and greater.
 - a. Interior/Exterior Lining: AWWA C116, epoxy coating, minimum 8 mil thickness.
 - b. Pressure rating of at least 250 psi.
 - c. Marked with pressure rating, nominal diameter of opening, manufacturers' identification, country where cast, and degree of bend.
 - d. ASTM D1785, Schedule 40, for all PVC pipe less than 4" diameter.
 2. Joints: Mechanical conforming to ANSI/AWWA C111/A21.11. Solvent-cement couplings are not permitted on pipe 1-1/2" diameter and greater.
 3. Joint Restraints: "EBAA Iron, Megalug®", or approved equal, for all pipe 4" diameter and greater, "EBAA Iron, Series 6500 and 7500", or approved equal, for all pipe from 2" to 3-1/2" diameter, installation and spacing as per manufacturer's specifications; or concrete thrust blocking.
 4. All buried metallic components shall be wrapped in 8-mil polyethylene. All buried bolts, other than stainless steel bolts, shall be coated with field-applied coal tar epoxy.
- C. Steel Pipe: AWWA C200 Fabricated Pipe, minimum wall thickness 0.375 inches for pipe diameters up to 8 inches, and 0.50 inches for pipe diameters greater than 8 inches.
1. Fittings and Special Sections: AWWA C208.
 2. Flanges: AWWA C207 Class D slip-on.
 3. Field Welding Materials:
 - a. Pipe: AWWA C206.
 - b. Joints: AWWA C205.
 4. Interior Cement Mortar Lining: AWWA C205.
 5. Buried Steel Pipe Exterior Lining:
 - a. AWWA C213, fusion-bonded epoxy coating.

2.2 TAPPING SLEEVES, TEES AND VALVES

- A. Tapping Sleeves:
1. Manufacturers:

- a. Mueller Co.
 - b. Romac
 - c. Or approved equal
 - d. Substitutions: Section 01 00 00 - Product Requirements.
2. Ductile iron or stainless steel, conforming to AWWA C223, dual compression type capable of sustaining pressures up to 250 psi.
 3. Outlet Flange Dimensions and Drilling: ASME B16.1, Class 125 and MSS SP-60.
 4. Refer to Section 31 12 16 for specification on gate valve to install as tapping valve on sleeve.

2.3 UNDERGROUND PIPE MARKERS

- A. Furnish materials in accordance with the following, as well as the New Mexico Standard Specifications for Public Works Construction, with latest revisions. The most stringent requirement shall apply.
- B. Tracer Wire: 12 AWG, Solid Copper, Single Conductor, 30 volts, Blue Jacket, UF-XHHW wire or equal, for underground installation.
- C. Detectable Underground Utility Marking Tape: Bright colored, continuously printed, minimum 6 inches wide by 4-mil thick, manufactured for direct burial service, imprinted with "BURIED WATER SERVICE" (or similar wording) in large letters, on blue tape in conformance with APWA color code specifications for underground tape systems. The tape shall be constructed of material that is impervious to alkalis, acids, chemical reagents, and solvents found in the soils.
- D. Splice Connectors: Model LV 9500 Blazing Snap-locking waterproof connectors pre-filled with silicone or engineer approved equal.

2.4 PIPE SUPPORTS AND ANCHORING

- A. Metal for pipe support brackets: ASTM A123/A123M, galvanized structural steel thoroughly coated with bituminous paint.
- B. Metal tie rods and clamps or lugs: Galvanized steel sized in accordance with NFPA 24 thoroughly coated with bituminous paint.

2.5 BEDDING AND BACKFILL MATERIALS

- A. Bedding: Fill Type as specified in Section 31 23 23.
- B. Soil Backfill from Above Pipe to Finish Grade: Soil Type as specified in Section 31 23 23. Subsoil with no rocks over 6 inches in diameter, frozen earth or foreign matter.

2.6 BOLTS AND NUTS

- A. Zinc-plated or fluoropolymer coated bolts and nuts shall be used for the installation of pipelines up to 500 mm (20") diameter and shall be carbon steel conforming to ASTM

A307, Grade A, unless otherwise indicated on the approved drawings. Bolts and nuts shall have standard ANSI B1.1, Class 2A coarse threads.

- B. Stainless steel bolts and nuts shall be used for the installation of pipelines 600 mm (24") diameter and larger and for submerged flanges. Bolts and nuts shall be Type 316 stainless steel conforming to ASTM A193, Grade B8M for bolts, and Grade 8M for nuts.
- C. All bolt heads and nuts shall be hexagonal, except where special shapes are required. Bolts shall be of such length that not less than 6.4 mm (¼") or more than 12.7 mm (½") shall project past the nut in tightened position.

2.7 ACCESSORIES

- A. Joint Restraints: "EBAA Iron, Megalug®", or approved equal, for all pipe 4" diameter and greater, "EBAA Iron, Series 6500 and 7500", or approved equal, for all pipe from 2" to 3-1/2" diameter, installation and spacing as per manufacturer's specifications.
- B. Concrete for Thrust Restraints: Conform to Section 03 30 00, with minimum compressive strength of 3,000 psi.
- C. Steel rods, bolt, lugs and brackets: ASTM A36/A36M or ASTM A307 carbon steel.
- D. Field-applied Roskote coal tar epoxy coating on all buried steel bolts on all fittings and valves.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 00 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify existing utility water main size, location, and invert, are as indicated on Drawings.

3.2 PREPARATION

- A. Pre-Construction Site Photos:
 - 1. If required in the Contract Documents, take photographs or videotape along centerline of proposed pipe trench; minimum one photograph for each 50 feet of pipe trench.
 - 2. Show mailboxes, curbing, lawns, driveways, signs, culverts, and other existing site features that may potentially be impacted by the construction work.
 - 3. Include project description, date taken and sequential number on back of each photograph.
- B. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs. Use only equipment specifically designed for pipe cutting. The use of chisels or hand saws will not be permitted. Grind edges smooth with beveled end for push-on connections.

- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare pipe connections to equipment with flanges or unions.
- E. Excavate pipe trench in accordance with Section 31 23 17 for Work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated on Drawings.

3.3 TRENCHING AND BACKFILL

- A. Excavate trenches in accordance with Section 31 23 17, including dewatering of excavations as required, to maintain dry conditions and preserve final grades at bottom of excavation.
- B. Place bedding and trench backfill material in accordance with Section 31 23 23.

3.4 INSTALLATION - PIPE

- A. Install PVC pipe in accordance with AWWA C605. Use only lubricants supplied by the pipe manufacturer and apply in accordance with manufacturer's recommendations. Clean the gasket, bell, groove and spigot immediately prior to connecting pipe joints.
- B. Handle and assemble pipe in accordance with manufacturer's instructions and as indicated on Drawings. Inspect each pipe and fitting prior to lowering into trench to ensure there is no damage to the pipe, fitting or coatings. Repair any damage prior to installation. Clean ends of pipe and remove foreign material from inside of pipe and fittings.
- C. Steel Rods, Bolt, Lugs, and Brackets: Coat buried steel with one coat of coal tar coating before backfilling.
- D. Maintain 10 ft horizontal separation of water main from sewer piping in accordance with local code.
- E. Install pipe to indicated elevation to within tolerance of 3 inches.
- F. Route pipe in straight line. Relay pipe that is out of alignment or grade.
- G. Twenty-foot lengths (20') of PVC pipe shall not be deflected more than 2% of their length (5") either horizontally or vertically. Any sections of pipe less than twenty feet (20') in length shall not be deflected.
- H. PVC pipe deflections may be made either at joints or by pipe bending.
 - 1. Deflection both at joints and by pipe bending shall not exceed maximum deflection recommendations by the pipe manufacturer or AWWA C605. In the case of a discrepancy between these recommendations, the smaller maximum deflection value shall apply.
- I. Install ductile iron piping and fittings to AWWA C600. Encase all ductile iron pipe and fittings in two separate, independently wrapped layers of polyethylene, per AWWA C105, Method "A". No tears, cuts, rips or other breaks in the polyethylene encasement shall be

acceptable. No dirt, water or debris inside the encasement shall be acceptable. Bond all joints with two bonds per joint.

- J. Weld pipe in accordance with AWWA C206. Weld joints in accordance with AWWA C205.
- K. Flanged Joints: Not to be used in underground installations except within approved underground structures.
- L. Ductile iron and steel pipe deflections may be made at joints, provided pipe manufacturer's allowable deflection limits are not exceeded.
- M. Install pipe with no high points. If unforeseen field conditions arise which necessitate high points, increase pipe bury depth or install air release valves as directed by Engineer.
- N. Install pipe to have bearing along entire length of pipe. Excavate bell holes to permit proper joint installation. Do not lay pipe in wet or frozen trench.
- O. Prevent foreign material from entering pipe during placement.
- P. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- Q. Close pipe openings with watertight plugs during work stoppages.
- R. Install access fittings to permit disinfection of water system performed under Section 33 13 00.
- S. Establish elevations of buried piping with not less than 4 foot of cover. Measure depth of cover from final surface grade to top of pipe barrel.
- T. Install tracer wire continuous, taped to top of pipeline at regular intervals not exceeding 24"; coordinate with Sections 31 23 17 and 31 23 23. Continuity of tracer wire shall be tested periodically as indicated by Engineer, and prior to final acceptance of work. Any segment of tracer wire that fails the continuity test shall be repaired or replaced by Contractor at no additional cost to Owner.
- U. Expose tracer wire at every surface penetration (i.e. valves, hydrants, vaults, etc.). Protect wire ends with wire caps and protect from corrosion. Provide extra length of tracer wire at each structure, so tracer wire can be pulled 3 feet out top of structure for connection to detection equipment.
- V. Install underground utility marking tape continuous, buried 18 inches directly above pipe.

3.5 THRUST RESTRAINTS

- A. Install tie rods, clamps, setscrew retainer glands, or restrained joints. Protect metal restrained joint components against corrosion by applying a bituminous coating, or by concrete mortar encasement of metal area. Do not encase pipe and fitting joints to flanges.

- B. Install thrust blocks or restrained fittings in accordance with Drawings and in accordance with manufacturer's instruction.
- C. Install thrust blocks, tie rods, and joint restraint at dead ends of water main.

3.6 BACKFILLING

- A. Backfill trenches for piping in accordance with Section 31 23 23.

3.7 DISINFECTION OF POTABLE WATER PIPING SYSTEM

- A. Flush and disinfect system in accordance with Section 33 13 00.

3.8 FIELD QUALITY CONTROL

- A. Section 01 00 00 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform pressure test on potable water distribution system in accordance with applicable standards:
 - 1. PVC Pipe: AWWA C605.
 - 2. Ductile Iron Pipe: AWWA C600.
 - 3. Steel Pipe: AWWA C200.
- C. Hydrostatic pressure for testing shall be 1.5 times the designed working pressure at the lowest point in the line section being tested, or 150 psi minimum pressure, whichever is greater. In the event it is not possible to measure the pressure at the lowest point directly, this pressure may be calculated by measuring the pressure elsewhere within the section and calculating the pressure based on elevation difference.
 - 1. Warning: Safety is of paramount importance when conducting hydrostatic pressure leak test due to possibility of sudden violent rupture or failure.
 - 2. In no case shall the test pressure exceed the manufacturers' recommended maximum safe test pressure for the pipe or fittings.
 - 3. No observable leakage is allowed. Measurable leakage must be within the maximum allowable limits set forth by applicable AWWA and ASTM standards.
 - 4. Any leaks detected during testing shall be repaired. After repairs are completed, another full duration test shall be performed on the section of the pipeline to which the repairs were made.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest at no additional cost to the Owner.
- E. Tolerances: Lay pipe to lines and grades shown on Drawings or as indicated by the Engineer, to the following tolerances:
 - 1. Total departure from vertical grade not to exceed 3 inches.
 - 2. Departure from vertical slope not to exceed 1/16 inch per foot.

- F. Contractor shall not connect to existing system until all testing and disinfection is complete and shall obtain written permission from the Engineer to proceed with connection to the existing system.

END OF SECTION

SECTION 33 13 00

DISINFECTION OF WATER UTILITY DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes disinfection of potable water distribution and transmission system; and testing and reporting results.
- B. Related Sections:
 - 1. Section 33 11 00 - Water Utility Distribution Piping: Product and Execution requirements for installation, testing, of site domestic water distribution piping.

1.2 REFERENCES

- A. American Water Works Association (AWWA):
 - 1. AWWA B300 - Hypochlorites.
 - 2. AWWA B301 - Liquid Chlorine.
 - 3. AWWA B302 - Ammonium Sulfate.
 - 4. AWWA B303 - Sodium Chlorite.
 - 5. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
 - 6. AWWA C651 - Disinfecting Water Mains.
- B. New Mexico Administrative Code (NMAC) - Title 20, Chapter 7, Part 10:
 - 1. Section 201: Application for Public Water System Project Approval.
 - 2. Section 400: General Operating Requirements.

1.3 SUBMITTALS

- A. Section 01 00 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit procedures, proposed chemicals, and treatment levels for review.
- C. Test Reports: Indicate results comparative to specified requirements.
- D. Certificate: Certify cleanliness of water distribution system meets or exceeds specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 00 00 - Execution Requirements: Requirements for submittals.
- B. Disinfection Report:
 - 1. Type and form of disinfectant used.
 - 2. Date and time of disinfectant injection start and time of completion.
 - 3. Test locations.
 - 4. Name of person collecting samples.

5. Initial and 24 hour disinfectant residuals in treated water in ppm for each outlet tested.
 6. Date and time of flushing start and completion.
 7. Disinfectant residual after flushing in ppm for each outlet tested.
- C. Bacteriological Report:
1. Date issued, project name, and testing laboratory name, address, and telephone number.
 2. Time and date of water sample collection.
 3. Name of person collecting samples.
 4. Test locations.
 5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
 6. Coliform bacteria test results for each outlet tested.
 7. Certify water conforms, or fails to conform, to bacterial standards of authority having jurisdiction.
- D. Water Quality Certificate: Certify water conforms to quality standards of authority having jurisdiction, suitable for human consumption.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with AWWA C651 and the standards and specifications of the utility provider, whichever is more stringent.

1.6 QUALIFICATIONS

- A. Testing Firm: Company specializing in testing potable water systems, certified by State of New Mexico.
- B. Submit bacteriologist's signature and authority associated with testing.

PART 2 PRODUCTS

2.1 DISINFECTION CHEMICALS

- A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 00 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify piping system has been cleaned, inspected, and pressure tested.

- C. Perform scheduling and disinfecting activity with start-up, water pressure testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

3.2 INSTALLATION

- A. Provide and attach required equipment to perform the Work of this section.
- B. Prior to disinfection, thoroughly flush the system with potable, disinfected water. Flushing may be accomplished either by gravity or by pumping, provided the pump is not damaged due to insufficient head. Any damage to the pump during flushing shall be the responsibility of the Contractor and shall be repaired or replaced at no additional expense to the Owner. A minimum flow velocity of 3 feet per second (fps) is required.
- C. Perform disinfection of water distribution system and installation of system and pressure testing. Refer to Section 33 11 00.
- D. Introduce treatment into piping system and perform disinfection in accordance with AWWA C651.
- E. Maintain disinfectant in system for 24 hours, or 48 hours if the temperature is less than 41 degrees Fahrenheit.”
- F. Flush, circulate, and clean until required cleanliness is achieved; use domestic water.
- G. Replace permanent system devices removed for disinfection.

3.3 FIELD QUALITY CONTROL

- A. Section 01 00 00 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Disinfection, Flushing, and Sampling:
 - 1. Disinfect and test pipeline installation in accordance with AWWA C651.
 - 2. Upon completion of retention period required for disinfection, flush pipeline until chlorine concentration in water leaving pipeline is no higher than that generally prevailing in existing system or is acceptable for domestic use.
 - 3. Legally dispose of chlorinated water. When chlorinated discharge may cause damage to environment, apply neutralizing chemical to chlorinated water to neutralize chlorine residual remaining in water.
 - 4. After final flushing and before pipeline is connected to existing system, or placed in service, employ an approved independent testing laboratory, approved by the Engineer, to sample, test and certify water quality suitable for human consumption.
 - 5. Contractor shall be reimbursed for the cost of laboratory tests upon submittal of invoice(s). The laboratory results of all tests shall be submitted directly to the Engineer. Contractor shall pay for all failed tests.
 - 6. Contractor shall not connect to existing system until all testing and disinfection is complete and shall obtain written permission from the Engineer to proceed with connection to the existing system.

- C. Re-Disinfection:
1. In the event the performed water quality testing fails, the Contractor will disinfect the affected portions of the system again, and the approved testing laboratory shall sample, test and certify water quality as described in these specifications. Re-disinfection shall be performed at no additional cost to the Owner.

END OF SECTION

SECTION 33 13 13

WATER STORAGE TANK DISINFECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Water tank disinfection.
 - 2. Bacteriological testing.
- B. Related Sections:
 - 1. Section 03 30 00 Cast-in-place Concrete
 - 2. Section 03 35 00 Post-Tensioned Concrete Tanks
 - 3. Section 03 90 00 Watertightness Testing

1.2 REFERENCES

- A. American Water Works Association:
 - 1. AWWA C652 - Disinfection of Water Storage Facilities.

1.3 SUBMITTALS

- A. Section 01 00 00 - Submittal procedures.
- B. Disinfection Procedure: Submit procedure description including type of disinfectant to and calculations indicating quantities of disinfectants required to produce specified chlorine concentration in accordance with Section 3 and 4 of AWWA C652.
- C. Test Reports: Indicate results of bacteriological and residual chlorine laboratory test reports.
- D. Manufacturer's Certificate:
 - 1. Certify products meet or exceed specified requirements.
 - 2. Certify disinfectants meet or exceed AWWA Standards requirements.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with AWWA C652.
- B. Perform Work in accordance with State of New Mexico Environment Department standards.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store disinfectants in cool, dry place away from combustibles such as wood, rags, oils and grease.

- B. Handle disinfectants with caution; protect skin and eyes from contact; avoid breathing vapors; wear gloves, aprons, goggles, and vapor masks.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Furnish personnel working inside tank during disinfection with equipment to comply with Federal and State regulations for work conducted in hazardous atmosphere.
- B. Neutralize disinfectant solution before disposal.
- C. Legally dispose of disinfection solution off Project site.
- D. Repair damage caused by disinfectant solution and disinfection procedures.

PART 2 PRODUCTS

2.1 DISINFECTANTS

- A. Chlorine Forms: In accordance with AWWA C652, Section 4.2.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Conduct inspection of tank interior before beginning disinfection.
 - 1. Verify tank is clean and free of polluting materials.
 - 2. Verify tank pipe and vent connections are properly made and clear of obstructions.
 - 3. Verify paint is thoroughly cured in accordance with paint manufacturer's instructions.

3.2 PREPARATION

- A. Protect aquatic life and vegetation from damage from disinfectant solution purged from tank.

3.3 APPLICATION

- A. Use Chlorination Method 2 for disinfecting tank as specified in Section 4.3 of AWWA C652.

3.4 FIELD QUALITY CONTROL

- A. Section 01 00 00 - Testing, adjusting and balancing requirements.
- B. Collect samples of water from filled tank for bacteriological analysis in accordance with Section 5.1 of AWWA C652; take inlet and outlet water samples.

- C. Test water samples for bacterial contamination, residual chlorine, in accordance with State Health Standards for potable water.
- D. When water samples fail to meet State Health Standards for potable water perform the following corrective measures until water quality conforms to State Health Standards:
 - 1. Inlet and Outlet Water Sample Failure: Eliminate source of contamination in water supply, repeat disinfection, and retest water quality.
 - 2. Outlet Water Sample Failure: Repeat disinfection, and retest water quality.

END OF SECTION



**GEOTECHNICAL
ENGINEERING SERVICES
JOB NO. 1-50411
HOSPITAL TANK REPLACEMENT
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**PREPARED FOR
SOUDER MILLER & ASSOCIATES**



September 18, 2015
File No. 1-50411

Souder Miller & Associates
401 West Broadway
Farmington, New Mexico 87401

Attn: Mr. Douglas W. Mise, P.E., Vice President

RE: Geotechnical Engineering Services
Hospital Tank Replacement
Santa Fe, New Mexico

Dear Mr. Mise:

Submitted herein is the Geotechnical Engineering Services Report for the above referenced project. The report contains the results of our field investigation and laboratory testing, and recommendations for foundation design, shoring, as well as criteria for site grading.

It has been a pleasure to serve you on this project. If you should have any questions, please contact this office.

Respectfully submitted:
GEO-TEST, INC.

Reviewed by:

Timothy J. Matson, Geologist

Robert D Booth, P.E.

cc: Addressee (4)

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INTRODUCTION

This report presents the results of the geotechnical engineering services investigation performed by this firm at the site for the hospital tank replacement located in Santa Fe, New Mexico.

The objectives of this investigation were to:

- 1) Evaluate the nature and engineering properties of the subsurface soils underlying the proposed tank site.
- 2) Provide recommendations for the design and construction of foundations, shoring, as well as the required site grading.

The investigation includes subsurface exploration, selected soil sampling, laboratory testing of the samples, performing an engineering analysis and preparation of this report.

PROPOSED CONSTRUCTION

It is understood that the project consists of the demolition of an existing rectangular concrete tank and replacing the tank with a new 4 million gallon divided, pre-stressed, post tension concrete oval shaped water tank. The newly designed tank will be mostly buried and will be constructed within the footprint of the existing tank. The new tank will have vertical concrete walls around the perimeter of the tank with an interior concrete wall dividing the tank and a concrete roof supported by interior columns and walls. The concrete floor of the new tank will be at the same elevation as the floor of the existing tank, or at 7002 feet. During the demolition of the existing tank, shoring may be required around a portion of the site, particularly along the northeast side of the site, to construct the new subterranean tanks. Unit loading at the base of the tank will be on the order of 2,000 pounds per square foot. Structural loads are unknown at this time, however, are anticipated to be light to moderate with interior column loads on the order of 100 kips and continuous wall loads on the order of 4 kips per linear foot.

Should project details vary significantly from those outlined above, this firm should be notified for review and revision of recommendations contained herein.

FIELD EXPLORATION

Four exploratory borings were drilled to auger refusal at depths ranging from

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approximately 23½ to 46 feet below existing site grade. The locations of the borings are shown on the attached Boring Location Maps, Figure 1. The soils and/or rock encountered in the borings were continuously examined, visually classified and logged during the drilling operations. The boring logs are presented in a following section of this report. Drilling was accomplished using a truck mounted drill rig equipped with 5.5-inch diameter continuous flight hollow stem auger. Subsurface materials were sampled at 2.5 feet, 5.0 feet and 5-foot intervals below 5 feet, utilizing an open tube split barrel sampler driven by a standard penetration test hammer.

LABORATORY TESTING

Selected soils/rock samples were tested in the laboratory to determine certain engineering properties of the soils. Moisture contents were determined to evaluate the various soil deposits with depth. The results of these tests are shown on the boring logs.

Sieve analysis and Atterberg limits tests were performed to aid in soil/rock classification. Results of these tests are presented in the Summary of Laboratory Results and on the individual test reports presented in a following section of this report.

SITE CONDITIONS

The existing concrete water tank is located directly southwest of 4 and 5 Calle Medico and was built in 1979. The tank is partially buried and cut into a gently sloping hillside. It is our understanding that the exterior concrete walls of the existing tank are vertical and extend from the top of the tank (elevation about 7035 feet) to a depth of about 19 feet (elevation 7016 feet), at which depth are founded on a spread-type footing. These upper vertical walls are designed as retaining walls. Below that depth, the perimeter walls slope inward toward the center of the tank at a 1.5 to 1 (horizontal to vertical) slope to the bottom of the tank (elevation 7002 feet). It is unknown how these sloping walls were constructed or whether they are constructed with cast-in-place concrete or shotcrete. The floor of the tank is concrete. The floor of the tank is approximately 24 to 31 feet below existing grades and the concrete roof of the tank, which is partially supported by interior columns, serves as a tennis court. The site is bordered by vacant land to the northwest and southwest, commercial buildings to the northeast, and a paved parking area on the southeast. A fiber optics line and sewer line are also present along the northeast side of the site.

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SUBSURFACE SOIL CONDITIONS

As indicated by the exploratory borings, the soils/rock underlying the site consist primarily of interbedded clayey sands with various amount of gravel, and clayey gravels with various amounts of sand which extend to the full depth explored. These soils are generally of low to medium plasticity and dense to very dense. Although these subsurface materials were logged as very dense soils, most of these materials, particularly below the base of the tank, are believed to consist of weathered bedrock of the Santa Fe Formation. The Santa Fe Formation in this area is a sedimentary rock deposited approximately 1 to 5 million years ago, and has the engineering properties of a very dense soil or weak rock. Although not encountered in the borings, it is assumed that the soils immediately adjacent to the perimeter of the tank consist of fill soils placed during the construction of the existing tank. These soils in all probability consist of native soils from the overexcavation of the original tank site but the relative density of these backfill soils is not known.

Soil and rock moisture contents were relatively low throughout the full depth of the borings and no groundwater was encountered.

CONCLUSIONS AND RECOMMENDATIONS

The native soils/weathered bedrock encountered in the borings are dense to very dense and considered suitable to provide reliable support of the proposed tank. Accordingly, it is recommended that the proposed water tank be supported on shallow spread-type footings bearing directly on densified native soils/rock. Detailed recommendations concerning the required site preparation and for foundation design are presented in the following sections of this report.

TANK FOUNDATION

Shallow spread-type footings bearing directly on densified native soils/rock are recommended for the support of the water tank. An allowable soil bearing pressure of 5,000 pounds per square foot is recommended for footing design. This bearing pressure applies to full dead load plus realistic live loads, and can be safely increased by one-third for totals loads including wind and seismic forces.

Exterior footings should be established a minimum of 2.0 feet below the lowest adjacent grade, while interior footings should be at least 12 inches below finished floor grade. The minimum recommended width of square and continuous footings is 2.0 feet and 1.33 feet, respectively.

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All bearing surfaces should be cleaned of all loose, disturbed material and densified prior to placement of structural fill or concrete. All foundation systems should be adequately reinforced to aid in redistributing loads and to minimize the effects of differential settlement.

Maximum settlements of foundations designed and constructed as recommended herein are estimated not to exceed $\frac{3}{4}$ inch for the soil moisture contents encountered during this investigation or moisture contents introduced during construction. Differential movements should be less than 75 percent of total movements. Significant moisture increases in the supporting soils after construction could cause additional movements.

Since our soils borings were necessarily located around the perimeter of the tank, it is recommended that additional borings be drilled directly beneath the footprint of the proposed tank during construction once the existing tank has been demolished. This is considered necessary to verify the soil bearing pressure recommended above. It is possible that leakage of water from the bottom of the tank has occurred which could weaken the soils and lower the allowable bearing pressure and/or increase estimated settlements.

SLABS ON GRADE

Adequate support for lightly loaded slab-on-grade floors will be provided by the densified native soils or structural fill when placed as recommended in a following section of this report. Thus, the use of granular base for structural support of lightly loaded slabs is not considered necessary. However, should it be desired as a working surface, a course of granular base can be placed beneath concrete floor slabs.

Where granular base is used beneath the slabs, it should have a plasticity index of no greater than 3 and meet the following grading requirements:

Sieve Size (Square Openings)	Percent Passing by Dry Weight
1 Inch	100
$\frac{3}{4}$ Inch	85-100
No. 4	45-95
No. 200	0-10

The granular base should be compacted to a minimum of 95 percent of maximum dry density as determined in accordance with ASTM D1557.

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LATERAL LOADS

Resistance to lateral forces will be provided by soil friction between the base of floor slabs and footings and the soil and by passive earth resistance against the sides of the footings and stem walls. A coefficient of friction of 0.40 should be used for computing the lateral resistance between bases of footings and slabs and the soil. With backfill placed as recommended in the site grading section of this report, a passive soil resistance equivalent to a fluid weighing 325 pounds per cubic foot should be used for analysis.

RETAINING WALLS

Lateral pressure against the perimeter walls of the tank will depend upon their degree of restraint. Walls which are restrained so as to limit movement at the top to less than 0.001 times the height of the wall should be designed for an "at rest" earth pressure of 55 pounds per square foot per foot of depth. Walls free to move at the top should be designed of an "active" earth pressure equal to 35 pounds per square foot per foot of depth.

The recommended equivalent fluid pressures do not include hydrostatic forces and are applicable to a condition of horizontal backfill without surcharge loads. Analysis of earth pressures produced by sloping backfill or surcharge loads can be provided by this firm upon request. To minimize the potential for saturation of the backfill by infiltration of surface water, the ground surface behind the walls should be sloped to drain as discussed in the Moisture Protection section of this report.

During backfilling, the contractor should be limited to the use of hand operated compaction equipment within a zone of about 5 feet horizontally from the back of the wall. The use of heavier equipment could apply lateral pressures well in excess of the earth pressure, particularly over the upper portions of the wall. Backfill should be compacted in accordance with the criteria outlined in the Site Grading section of this report.

The foundation recommendations presented above for the proposed structure should be used for the design of the retaining wall footings.

SITE SEISMISITY

Based on the standard penetration testing encountered in the borings to a depth of 45 feet and our experience in the area, Site Class C should be used for structural design in accordance with IBC 2009.

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SITE-GRADING

The following general guidelines should be included in the project construction specifications to provide a basis for quality control during site preparation. It is recommended that all structural fill and backfill be placed and compacted under engineering supervision and in accordance with the following:

- 1) After demolition of the existing tank structure, all existing man-made fill, or soils loosened or disturbed by the demolition, should be removed from throughout the area of the new tank. The exposed surface within footprint of the water tank should be densified as discussed below. Densification of the exposed cut surface should extend laterally beyond the edge of the foundation a minimum of 2.0 feet.
- 2) Densification of the exposed soil/rock should consist of scarifying to a depth of 8 inches, moisture conditioning to optimum moisture content to 2 percent above, and compacting the subgrade to a minimum of 95 percent of maximum dry density as determined in accordance with ASTM D-1557. If scarifying the bottom of the excavation is not possible, the surface should be cleaned of any loose material from the excavation prior to construction or placement of concrete.
- 3) The results of this investigation indicate that most of the on-site soils/rock will be suitable for reuse as structural fill or backfill; however, blending of materials may be required to meet the specifications for fill. All structural fill and backfill material should be free of vegetation and debris and contain no rocks larger than 3 inches. The gradation of the material, as determined in accordance with ASTM D-422, should be as follows:

Size	Percent Passing
3 inch	100
No. 4	60 – 100
No. 200	15 – 35

- 4) The plasticity index of the material should be no greater than 15 when tested in accordance with ASTM D-4318.
- 5) Fill or backfill, should be placed in 8-inch loose lifts and compacted with approved compaction equipment. Lifts should be reduced to 4-inches if hand held compaction equipment is used. Each lift should be firm and

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non-yielding.

- 6) All compaction of structural fill should be accomplished to a minimum of 95 percent of the maximum dry density determined in accordance with ASTM D-1557. The moisture content of the structural fill during compaction should be within 2 percent of the optimum moisture content.
- 7) Tests for the degree of compaction should be determined in accordance with ASTM D-1556 or ASTM D-6938. Observation and field tests should be carried on during fill placement by the geotechnical engineer to assist the contractor to obtain the required degree of compaction. If less than 95 percent compaction is indicated, additional compaction effort should be made with adjustment of the moisture content as necessary until 95 percent compaction is obtained.

CONSTRUCTION EXCAVATIONS

Once the existing tank has been demolished, the soils around its entire perimeter should be sloped back to allow for the safe construction of the new tank. Wherever possible, the resulting excavation should be sloped back to form a temporary cut slope no steeper than 1 horizontal to 1 vertical. In areas where sloping of the excavation is not possible, particularly along the northeast side of the tank where underground utilities are present, shoring or stabilizing the walls of the excavation by other means, will be required. We recommend that the shoring system be designed by engineers or contractors experienced in shoring design and who are familiar with the area.

In areas where space restrictions do not allow for open cut excavations, it may be possible to leave the existing retaining wall in place which is founded reportedly on a spread-type footing at an elevation of 7016 feet. Excavating below that elevation, a shoring system, or stabilizing the walls of the excavation by other means such as soil nails, will be required. If a conventional shoring system is used, the presence of very dense soils will preclude the use a sheet pile shoring and may make driving H-section soldier piling difficult. Accordingly, it is recommended that an excavation bracing system consisting of straight drilled cast-in-place concrete piers to form soldier piles be designed.

Several options exist for the design of a shoring system around the drilled pier soldier piles. The design of the shoring system would best be performed by the contractor, with review and approval by the structural and geotechnical engineers. This allows the contractor to utilize equipment and materials he has

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available as well as work the shoring system into his construction scheduling and site logistics constraints. Shoring should be designed using the following criteria:

Depth (ft)	Internal Friction Angle Φ	Cohesion C	Unit Weight Y
0-25	40°	300 psf	130 pcf
25+	43°	500 psf	135 pcf

In lieu of a conventional shoring system, soil nails could be used to support the walls of the excavation, particularly along the northeast side. This involves drilling small diameter holes into the side wall of the excavation as the excavation proceeds downward, generally in 3 to 6 foot increments. High strength reinforcement bars (soil nails) are then grouted into the holes. Reinforced shotcrete facing is then applied on the excavated sidewall and bearing plates installed on the end of the nails. The excavation then proceeds downward to the next row of soil nails. The advantage of stabilizing the slope using soil nails is that they can be placed with relatively small equipment, are generally more cost effective than soldier piles walls, and have no space restrictions. Soil nails could also be used to stabilize the existing vertical retaining wall prior to excavation below the wall should the stability of the wall be in question. The soil nailed excavation should be designed and constructed by a contractor who specializes in soil nail walls.

MOISTURE PROTECTION

Precautions should be taken during and after construction to minimize moisture increases of foundation soils. Positive drainage should be established away from the exterior walls of the tank. Backfill around the perimeter of the tank should be well compacted and should meet the specifications outlined in the site grading section of this report. Irrigation within 10 feet of foundations should be carefully controlled. All utility trenches leading into the tank should be backfilled with compacted fill.

Proper landscaping and drainage maintenance is required to preclude accumulation of excessive moisture in the soils below the tank. Accumulations of excessive moisture can weaken or cause other changes in the soils supporting the foundations. This can cause differential movement of foundations and can result in structural or cosmetic damage to the tank.

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If any water lines or tank leaks are detected, they should be promptly repaired. In addition, if any depressions develop from settlement of soils in utility trenches or other areas, they should be backfilled to maintain the grade so that surface water drains rapidly away from the tank.

The foregoing recommendations should only be considered minimum requirements for overall site development. It is recommended that a civil/drainage engineer be consulted to provide more detailed grading and drainage recommendations.

FOUNDATION REVIEW AND INSPECTION

This report has been prepared to aid in the evaluation of this site and to assist in the design of this project. It is recommended that the geotechnical engineer be provided the opportunity to review the final design drawings and specifications in order to determine whether the recommendations in this report are applicable to the final design. Review of the final design drawings and specifications should be noted in writing by the geotechnical engineer.

Variations from soil conditions presented herein may be encountered during construction of this project. In order to permit correlation between the conditions encountered during construction and to confirm recommendations presented herein, it is recommended that the geotechnical engineer be retained to perform sufficient review during construction of this project. Observation and testing should be performed during construction to confirm that suitable fill soils are placed upon competent materials and properly compacted and foundation elements penetrate the recommended soils.

CLOSURE

Our conclusions, recommendations and opinions presented herein are:

- (1) Based upon our evaluation and interpretation of the findings of the field and laboratory program.
- (2) Based upon an interpolation of soil conditions between and beyond the explorations.
- (3) Subject to confirmation of the conditions encountered during construction.

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- (4) Based upon the assumption that sufficient observation will be provided during construction.
- (5) Prepared in accordance with generally accepted professional geotechnical engineering principles and practice.

This report has been prepared for the sole use of Souder Miller & Associates, specifically for the design of the hospital tank replacement to be located in Santa Fe, New Mexico and not for the use by any third parties

We make no other warranty, either expressed or implied. Any person using this report for bidding or construction purposes should perform such independent investigation as he deems necessary to satisfy himself as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of work on this project. If conditions encountered during construction appear to be different than indicated by this report, this office should be notified.

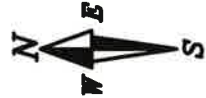
Variations from soil and/or rock conditions presented herein may be encountered during construction of this project. In order to permit correlation between the conditions encountered during construction and to confirm recommendations presented herein, it is recommended that the geotechnical engineer be retained to perform sufficient review during construction of this project.

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BORING LOCATION MAP



Hospital Tank Replacement
Santa Fe, New Mexico
Job No. 1-50411

GEO-TEST
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AND MATERIAL TESTING
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Figure 1



Project: Hospital Tank Replacement
 Date: 07/22/2015 Project No: 1-50411
 Elevation: Type: 5.5" OD HSA

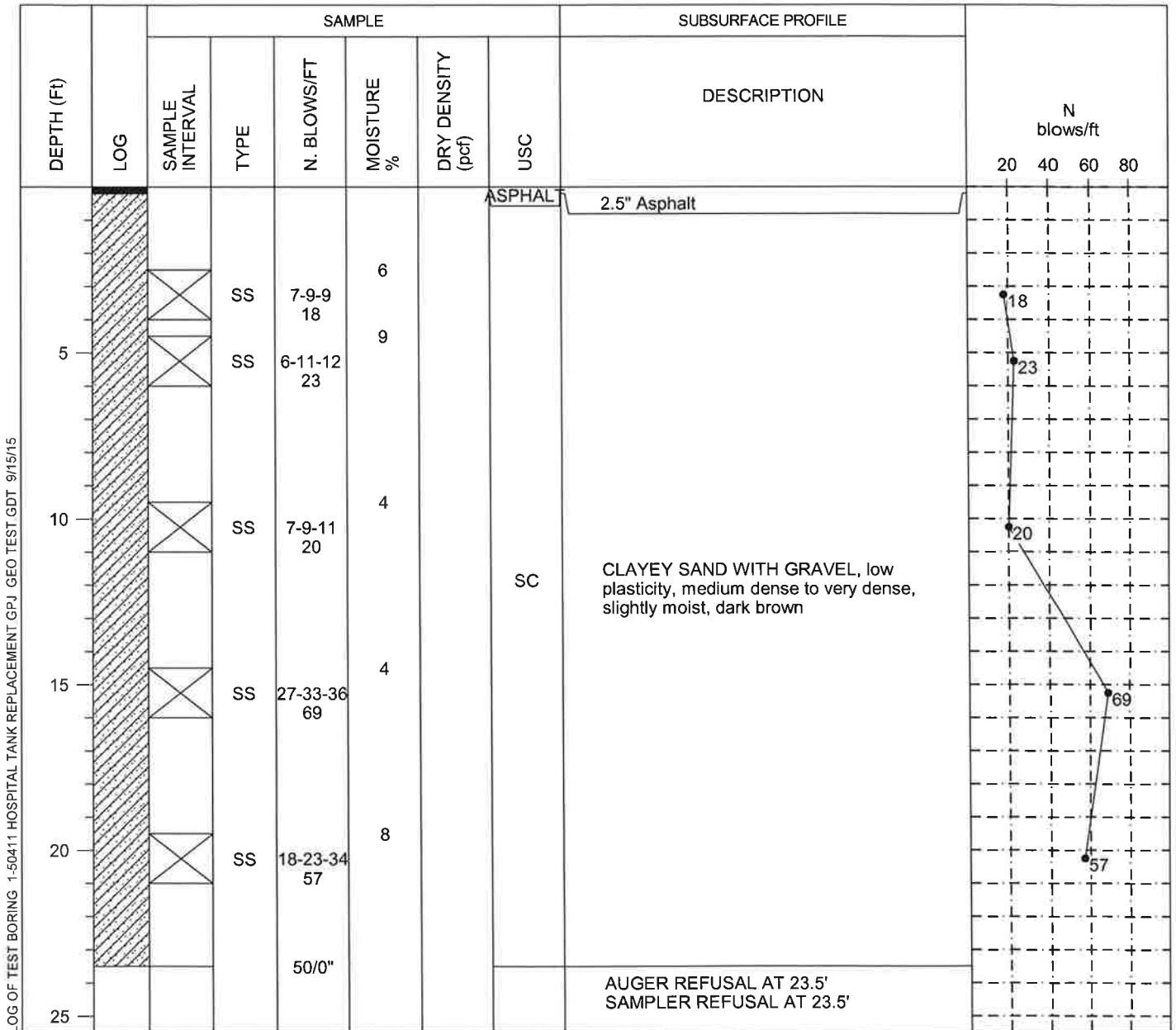
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 1

During Drilling: None

After 24 Hours:



LOG OF TEST BORING 1-50411 HOSPITAL TANK REPLACEMENT GPJ GEO TEST GDT 9/15/15

LEGEND

- SS - Split Spoon
- AC - Auger Cuttings
- UD/SL - Undisturbed Sleeve
- AMSL - Above Mean Sea Level
- CS - Continuous Sampler
- UD - Undisturbed
- ST - Shelby Tube

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.



Project: Hospital Tank Replacement
 Date: 07/22/2015 Project No: 1-50411
 Elevation: Type: 5.5" OD HSA

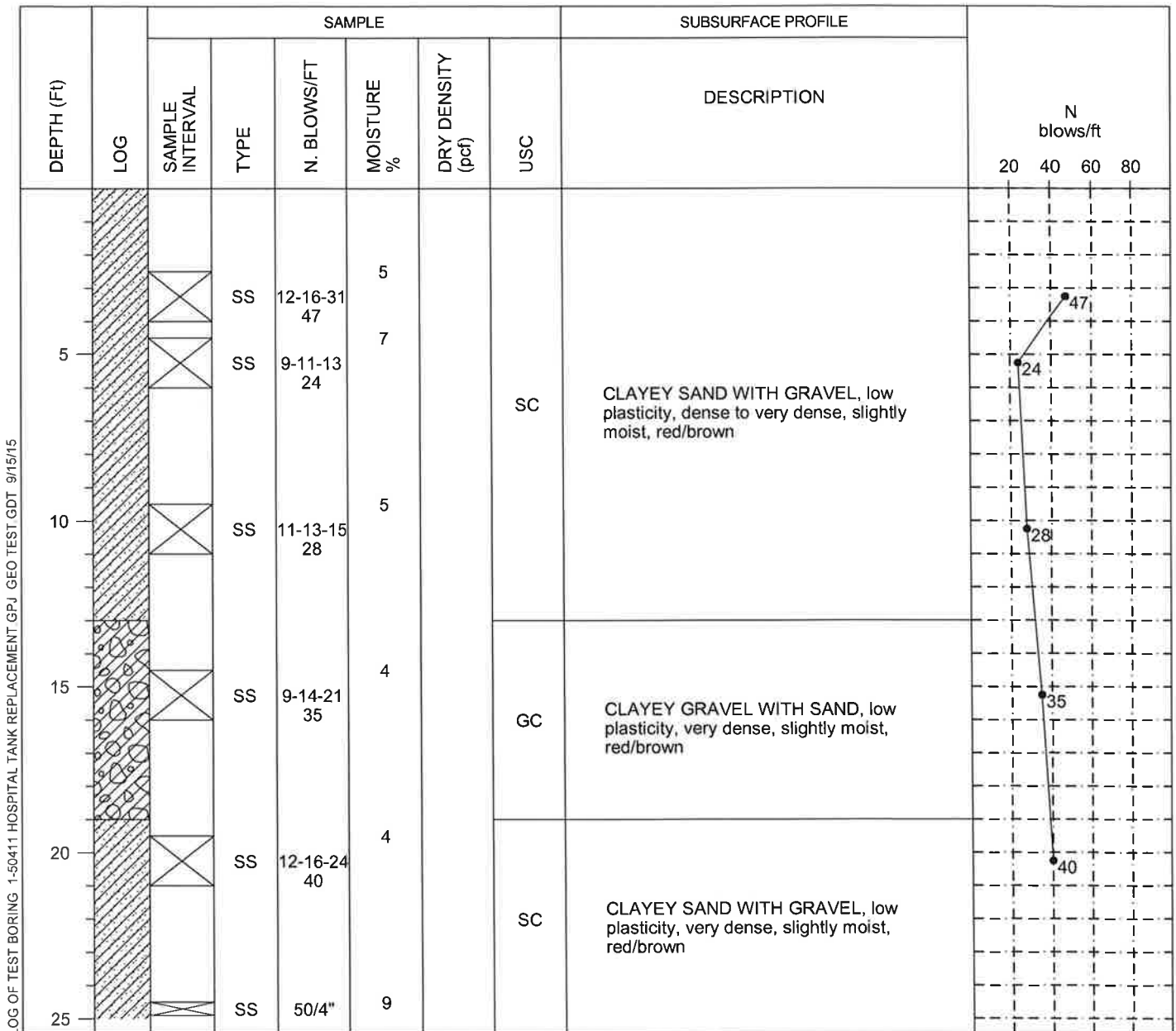
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 2

During Drilling: None

After 24 Hours:



LOG OF TEST BORING 1-50411 HOSPITAL TANK REPLACEMENT GPJ GEO TEST GDT 9/15/15

LEGEND

- SS - Split Spoon
- AMSL - Above Mean Sea Level
- AC - Auger Cuttings
- CS - Continuous Sampler
- UD/SL - Undisturbed Sleeve
- UD - Undisturbed
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Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.



Project: Hospital Tank Replacement

Date: 07/22/2015

Project No: 1-50411

Elevation:

Type: 5.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 2

During Drilling: None

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE						SUBSURFACE PROFILE					
		SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft				
									20	40	60	80	
30			SS	50/3"	7		SC	CLAYEY SAND WITH GRAVEL, low plasticity, very dense, slightly moist, red/brown					
35			SS	50/2"	6								
			SS	50/0"									
40								AUGER REFUSAL AT 37.5' SAMPLER REFUSAL AT 37.5'					
45													
50													

LOG OF TEST BORING 1-50411 HOSPITAL TANK REPLACEMENT.GPJ GEO TEST.GDT 9/15/15

LEGEND

SS - Split Spoon
 AC - Auger Cuttings
 UD/SL - Undisturbed Sleeve

AMSL - Above Mean Sea Level
 CS - Continuous Sampler
 UD - Undisturbed
 ST - Shelby Tube

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.



Project: Hospital Tank Replacement
 Date: 07/21/2015 Project No: 1-50411
 Elevation: Type: 5.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 3

During Drilling: None

After 24 Hours:

DEPTH (FT)	LOG	SAMPLE						SUBSURFACE PROFILE	
		SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft
5	[Pattern]	[X]	SS	15-32-36 68	6		SM	SILTY SAND WITH GRAVEL, non-plastic to low plasticity, very dense, slightly moist, brown	68
		[X]	SS	50/6"	5				
10	[Pattern]	[X]	SS	12-14-14 28	14		SC	CLAYEY SAND WITH GRAVEL, low plasticity, dense, moist, brown	28
15	[Pattern]	[X]	SS	45-50/4" 50/4"	5		GM	SILTY GRAVEL WITH SAND, non-plastic, very dense, slightly moist, brown	57
		[X]	SS	11-25-27 52	12		GM	SILTY GRAVEL WITH SAND, non-plastic, very dense, slightly moist, brown	
20	[Pattern]	[X]	SS	11-25-27 52	12		SC	CLAYEY SAND WITH GRAVEL, low plasticity, very dense, slightly moist to moist, brown	52
		[X]	SS	17-27-30	9				
25	[Pattern]	[X]	SS	17-27-30	9				57

LOG OF TEST BORING 1-50411 HOSPITAL TANK REPLACEMENT GPJ GEO TEST GDT 9/15/15

LEGEND

SS - Split Spoon
 AC - Auger Cuttings
 UD/SL - Undisturbed Sleeve

AMSL - Above Mean Sea Level
 CS - Continuous Sampler
 UD - Undisturbed
 ST - Shelby Tube

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.



Project: Hospital Tank Replacement

Date: 07/21/2015

Project No: 1-50411

Elevation:

Type: 5.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 3

During Drilling: None

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	SAMPLE			USC	SUBSURFACE PROFILE	DESCRIPTION	N blows/ft
				N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)				
27				57			SC	CLAYEY SAND WITH GRAVEL, low plasticity, very dense, slightly moist to moist, brown		
30			SS	22-44-50 94	7		SM	SILTY SAND WITH GRAVEL, non-plastic, to low plasticity, very dense, slightly moist, red/brown	94	
35			SS	31-50 81	6		SM	SILTY SAND WITH GRAVEL, non-plastic, to low plasticity, very dense, slightly moist, red/brown	81	
40			SS	28-50 78	8		SC	CLAYEY SAND WITH GRAVEL, low plasticity, very dense, slightly moist, red/brown	78	
45			SS	30-50 80	8		SC	CLAYEY SAND WITH GRAVEL, low plasticity, very dense, slightly moist, red/brown	80	
46								AUGER REFUSAL AT 46' STOPPED SAMPLER AT 45'		
50										

LOG OF TEST BORING 1-50411 HOSPITAL TANK REPLACEMENT GPJ GEO TEST GDT 9/15/15

LEGEND

SS - Split Spoon
 AC - Auger Cuttings
 UD/SL - Undisturbed Sleeve

AMSL - Above Mean Sea Level
 CS - Continuous Sampler
 UD - Undisturbed
 ST - Shelby Tube

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.



Project: Hospital Tank Replacement

Date: 07/23/2015

Project No: 1-50411

Elevation:

Type: 5.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 4

During Drilling: None

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE						SUBSURFACE PROFILE	N blows/ft
		SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC		
5			SS	13-25-31 56	4		GC-GM	SILTY, CLAYEY GRAVEL WITH SAND, low plasticity, very dense, slightly moist to dry, brown	56
			SS	25-30-36 66	2				66
10			SS	16-23-27 50	1				50
15			SS	23-50/4" 50/4"	2				
20			SS	24-33-50/3" 50/3"	2				
25					3				

LOG OF TEST BORING 1-50411 HOSPITAL TANK REPLACEMENT GPJ GEO TEST GDT 9/15/15

LEGEND

SS - Split Spoon
AC - Auger Cuttings
UD/SL - Undisturbed Sleeve

AMSL - Above Mean Sea Level
CS - Continuous Sampler
UD - Undisturbed
ST - Shelby Tube

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.



Project: Hospital Tank Replacement

Date: 07/23/2015

Project No: 1-50411

Elevation:

Type: 5.5" OD HSA

LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 4

During Drilling: None

After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE					SUBSURFACE PROFILE		
		SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION	
30			SS	16-23-28 51					
			SS	31-28-32 60	2		GC-GM	SILTY, CLAYEY GRAVEL WITH SAND, low plasticity, very dense, slightly moist to dry, brown	
35			SS	18-26-35 61	3				
40								AUGER REFUSAL AT 37.5' SAMPLER REFUSAL AT 37.5'	
45									
50									

LOG OF TEST BORING 1-50411 HOSPITAL TANK REPLACEMENT GPJ GEO TEST GDT 9/15/15

LEGEND

SS - Split Spoon
 AC - Auger Cuttings
 UD/SL - Undisturbed Sleeve

AMSL - Above Mean Sea Level
 CS - Continuous Sampler
 UD - Undisturbed
 ST - Shelby Tube

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

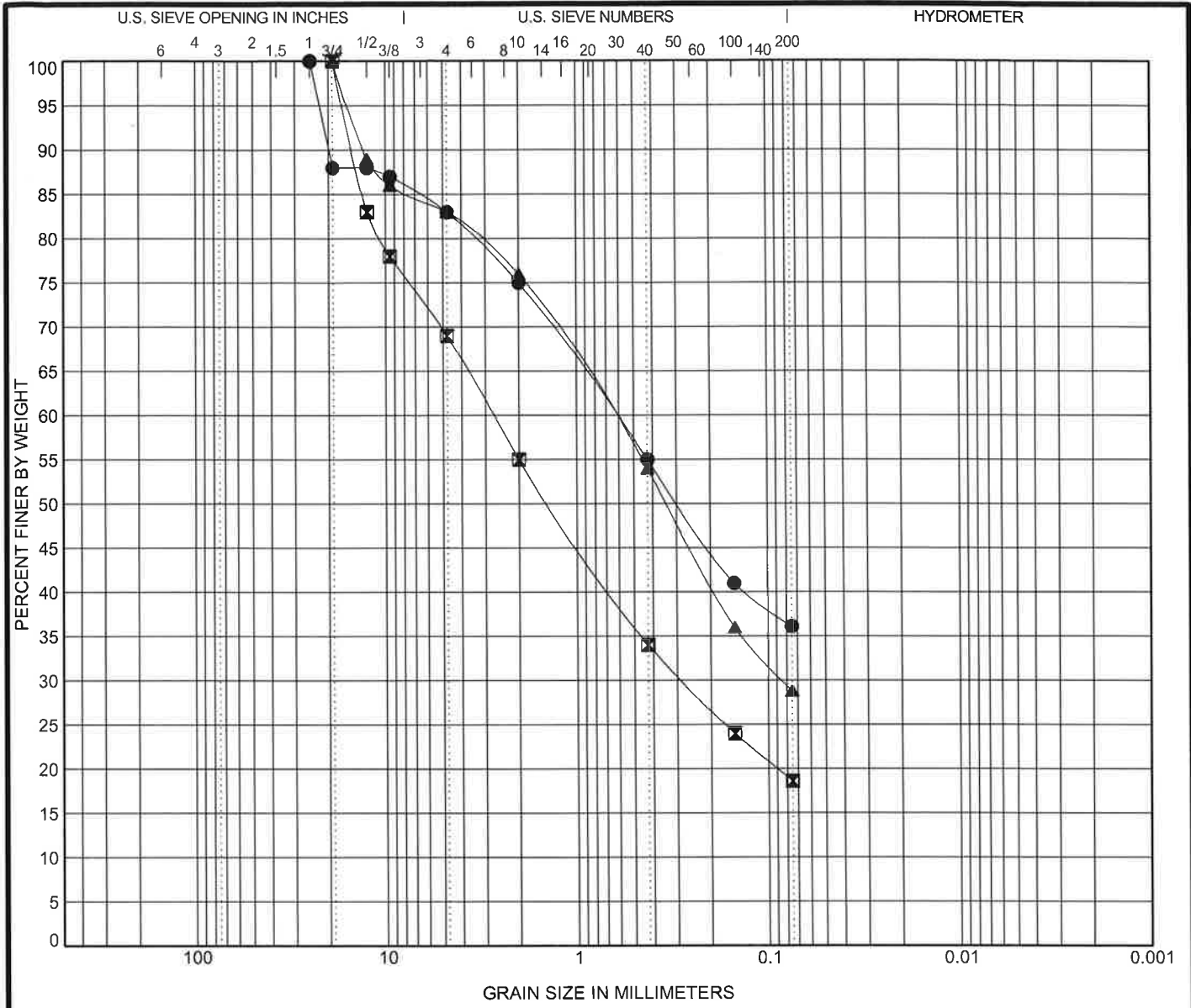
SUMMARY OF LABORATORY RESULTS

TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	(% MOIST	LL	PI	SIEVE ANALYSIS PERCENT PASSING														
						NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"	2"	4"			
1	2.5		5.6																	
1	4.5	SC	9.4	31	12	36	41	55	75	83	87	88	88	100						
1	9.5		4.0																	
1	14.5	SC	4.2	29	12	19	24	34	55	69	78	83	100							
1	19.5	SC	7.8	27	8	29	36	54	76	83	86	89	100							
2	2.5		4.8																	
2	4.5	SC	7.3	30	11	24	27	41	65	77	88	91	91	100						
2	9.5		4.8																	
2	14.5	GC	4.1	27	10	20	22	31	49	59	68	73	80	100						
2	19.5		4.3																	
2	24.5	SC	9.1	30	11	29	34	48	71	80	87	89	100							
2	29.5		6.5																	
2	34.5		6.0			13	17	28	49	62	70	75	89	100						
3	2.5		5.8																	
3	4.5	SM	5.4	23	2	19	23	35	53	63	75	92	100							
3	9.5		14.1																	
3	14.5	GM	4.6	NP	NP	16	21	31	41	50	61	67	86	100						
3	19.5		12.3																	
3	24.5	SC	9.4	35	14	22	27	41	71	83	92	93	93	100						



LL = LIQUID LIMIT
PI = PLASTICITY INDEX
NP = NON PLASTIC or NO VALUE

Project: Hospital Tank Replacement
Location: Santa Fe, New Mexico
Number: 1-50411



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● 1 4.5	CLAYEY SAND with GRAVEL(SC)	31	19	12		
☒ 1 14.5	CLAYEY SAND with GRAVEL(SC)	29	17	12		
▲ 1 19.5	CLAYEY SAND with GRAVEL(SC)	27	19	8		

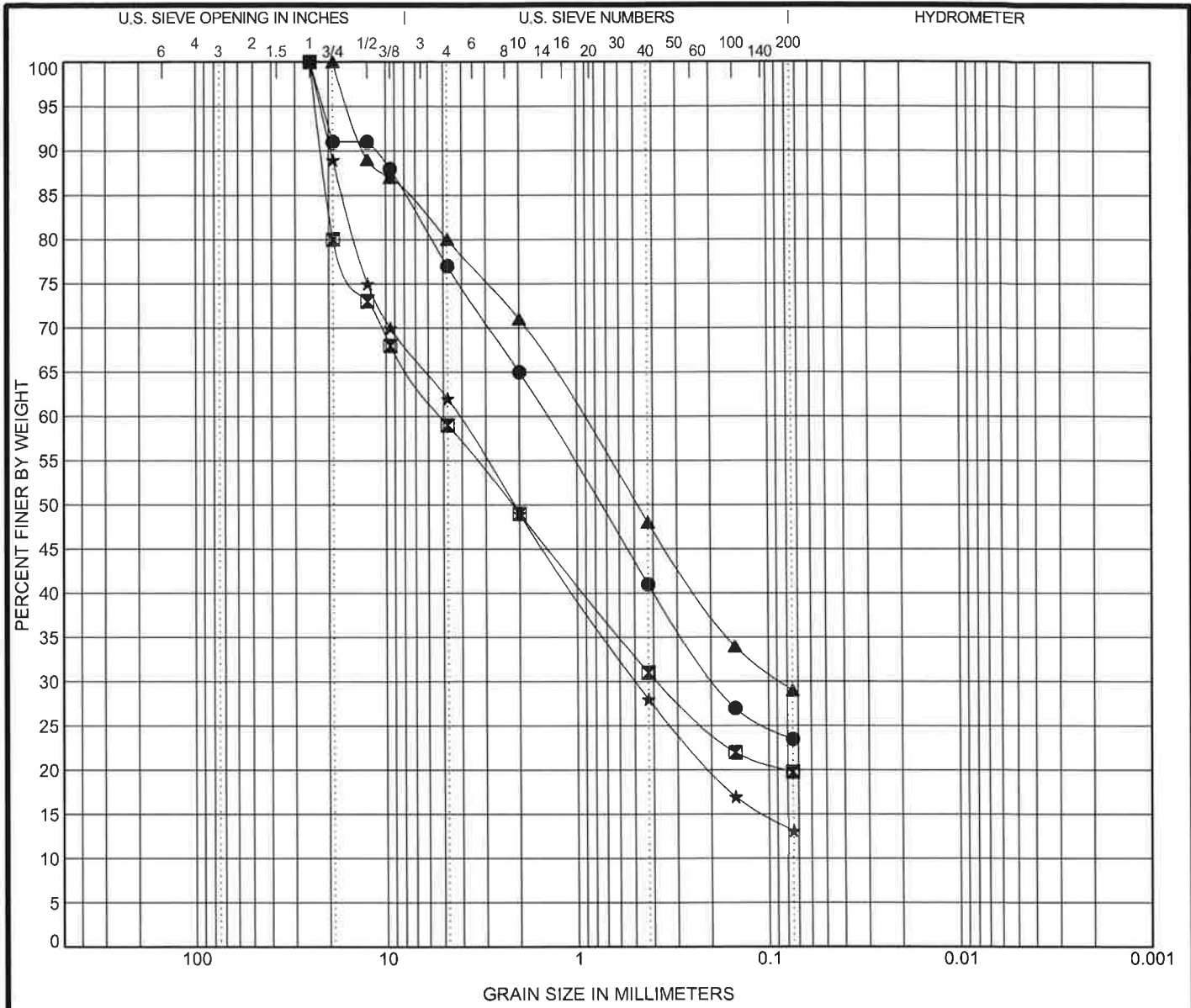
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● 1 4.5	25	0.626			17.0	46.9	36.1	
☒ 1 14.5	19	2.724	0.28		31.0	50.4	18.6	
▲ 1 19.5	19	0.648	0.084		17.0	54.2	28.8	

GRAIN SIZE DISTRIBUTION



Project: Hospital Tank Replacement
 Location: Santa Fe, New Mexico
 Number: 1-50411

U.S. GRAIN SIZE 1-50411 HOSPITAL TANK REPLACEMENT.GPJ GEO TEST.GDT 8/11/15



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● 2 4.5	CLAYEY SAND with GRAVEL(SC)	30	19	11		
■ 2 14.5	CLAYEY GRAVEL with SAND(GC)	27	17	10		
▲ 2 24.5	CLAYEY SAND with GRAVEL(SC)	30	19	11		
★ 2 34.5						

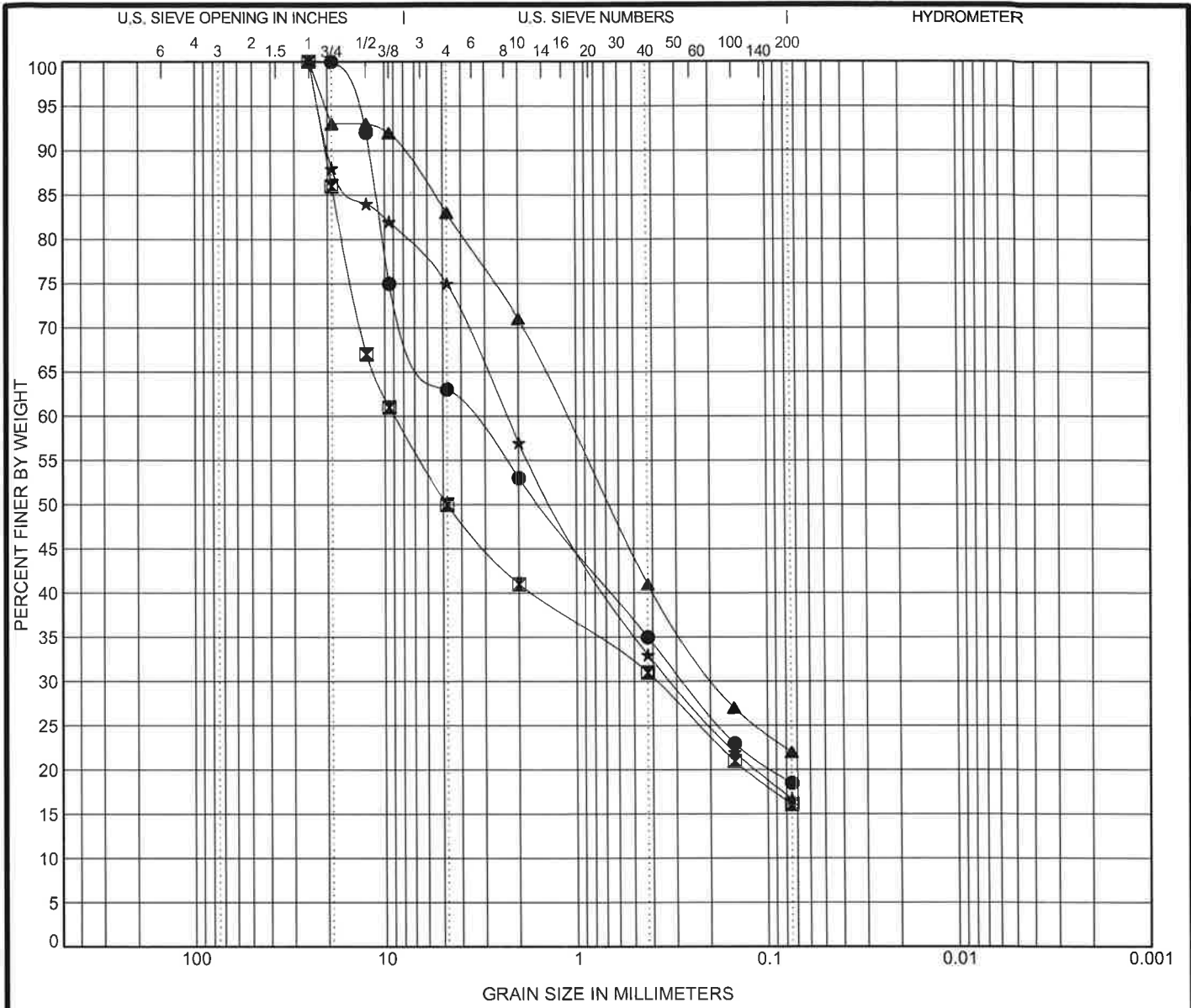
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● 2 4.5	25	1.448	0.188		23.0	53.5	23.5	
■ 2 14.5	25	5.13	0.379		41.0	39.2	19.8	
▲ 2 24.5	19	0.954	0.086		20.0	51.0	29.0	
★ 2 34.5	25	4.158	0.493		38.0	48.9	13.1	

GRAIN SIZE DISTRIBUTION



Project: Hospital Tank Replacement
 Location: Santa Fe, New Mexico
 Number: 1-50411

U.S. GRAIN SIZE 1-50411 HOSPITAL TANK REPLACEMENT.GPJ GEO TEST.GDT 8/11/15



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● 3 4.5	SILTY SAND with GRAVEL(SM)	23	21	2		
☒ 3 14.5	SILTY GRAVEL with SAND(GM)	NP	NP	NP		
▲ 3 24.5	CLAYEY SAND with GRAVEL(SC)	35	21	14		
★ 3 34.5	SILTY SAND with GRAVEL(SM)	26	23	3		

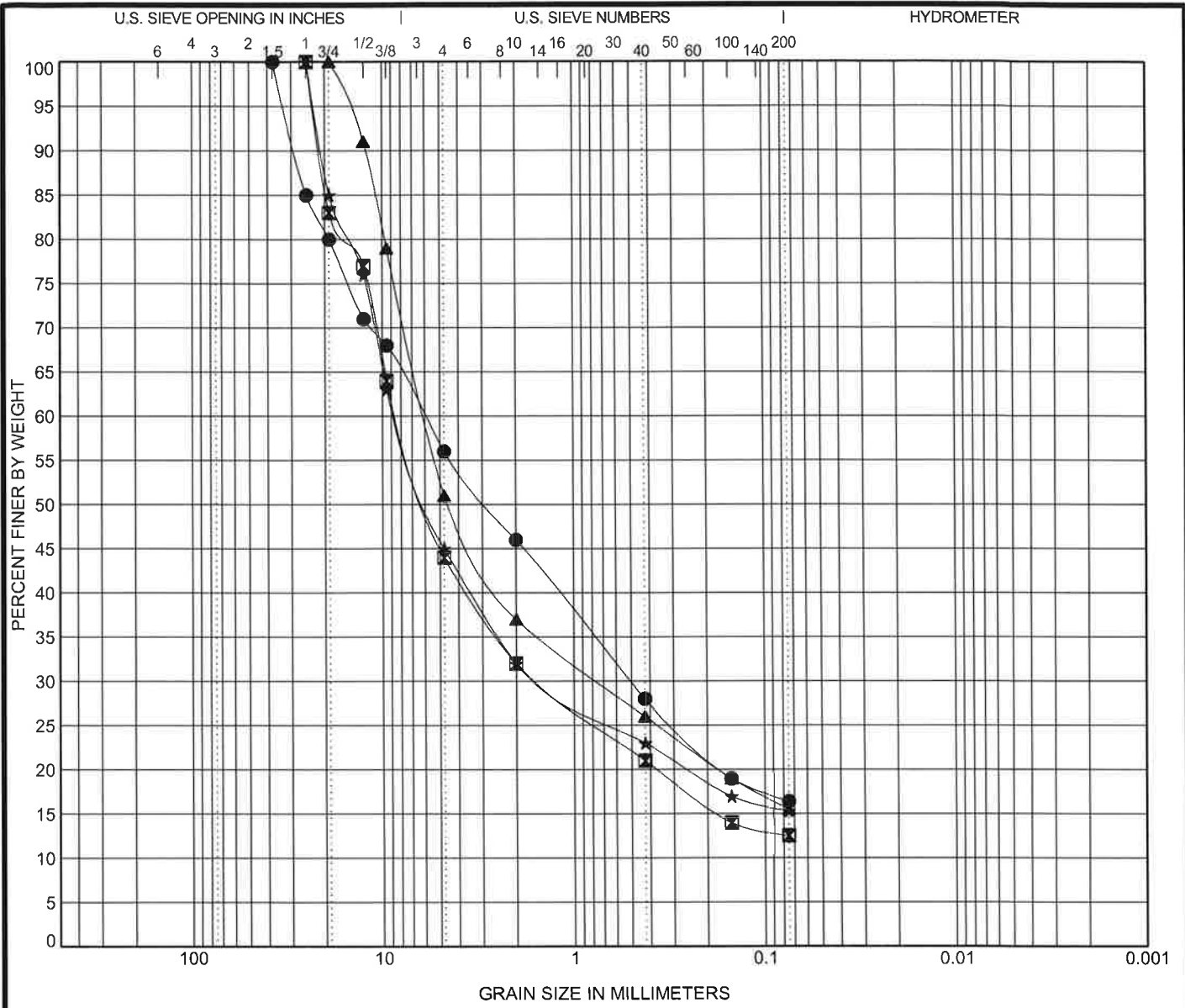
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● 3 4.5	19	3.664	0.275		37.0	44.5	18.5	
☒ 3 14.5	25	8.92	0.383		50.0	33.9	16.1	
▲ 3 24.5	25	1.133	0.188		17.0	61.0	22.0	
★ 3 34.5	25	2.31	0.32		25.0	58.3	16.7	

GRAIN SIZE DISTRIBUTION



Project: Hospital Tank Replacement
 Location: Santa Fe, New Mexico
 Number: 1-50411

U.S. GRAIN SIZE: 1-50411 HOSPITAL TANK REPLACEMENT.GPJ GEO TEST.GDT 8/11/15



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● 4 4.5	CLAYEY GRAVEL with SAND(GC)	28	17	11		
☒ 4 14.5	SILTY, CLAYEY GRAVEL with SAND(GC-GM)	24	17	7		
▲ 4 24.5	SILTY, CLAYEY GRAVEL with SAND(GC-GM)	22	18	4		
★ 4 34.5	SILTY, CLAYEY GRAVEL with SAND(GC-GM)	23	16	7		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● 4 4.5	37.5	5.985	0.505		44.0	39.6	16.4	
☒ 4 14.5	25	8.27	1.509		56.0	31.5	12.5	
▲ 4 24.5	19	5.935	0.746		49.0	35.5	15.5	
★ 4 34.5	25	8.464	1.418		55.0	29.7	15.3	

GRAIN SIZE DISTRIBUTION



Project: Hospital Tank Replacement
 Location: Santa Fe, New Mexico
 Number: 1-50411

US GRAIN SIZE 1-50411 HOSPITAL TANK REPLACEMENT.GPJ GEO TEST.GDT 8/11/15



pH of SOIL (ASTM G-51 & D-4972)

PROJECT: Hospital Tank Replacement

CLIENT: Souder Miller & Associates

JOB NO: 1-50411

DATE SAMPLED: 7/21/15

DATE TESTED: 8/12/15

LAB NO: _____

SAMPLE LOCATION: BORING #3 COMPOSITE, UPPER

PH OF SOIL AS RECEIVED (ASTM G-51)

PH READING 1: _____
PH READING 2: _____
PH READING 3: _____
PH READING 4: _____
STABILIZED PH READING: _____

MOISTURE CONTENT (AS RECEIVED)

CAN #: _____
WET WT.: _____
DRY WT.: _____
% MOISTURE: _____

PH OF SOIL (ASTM D-4972)

PH READING: 5.5
(DISTILLED WATER SOLUTION)

PH READING: 5.3
(CALCIUM CHLORIDE SOLUTION)

LAB NO: _____

SAMPLE LOCATION: BORING #3 COMPOSITE, LOWER

PH OF SOIL AS RECEIVED (ASTM G-51)

PH READING 1: _____
PH READING 2: _____
PH READING 3: _____
PH READING 4: _____
STABILIZED PH READING: _____

MOISTURE CONTENT (AS RECEIVED)

CAN #: _____
WET WT.: _____
DRY WT.: _____
% MOISTURE: _____

PH OF SOIL (ASTM D-4972)

PH READING: 5.3
(DISTILLED WATER SOLUTION)

PH READING: 5.0
(CALCIUM CHLORIDE SOLUTION)



SOIL RESISTIVITY (ASTM G-57)

PROJECT: Hospital Tank Replacement CLIENT: Souder Miller & Associates
JOB NO: 1-50411 DATE SAMPLED: 7/21/15
DATE TESTED: 8/4/12

LAB NO: _____

SAMPLE LOCATION: BORING #3 COMPOSITE, UPPER

MOISTURE CONTENT

SOIL WET WEIGHT: _____

SOIL DRY WEIGHT: _____

AS RECEIVED MOISTURE CONTENT: _____

RESISTIVITY AS RECEIVED

CHANGE IN POTENTIAL (Volts): 16

CURRENT (Amps): .004

RESISTIVITY (Volts/Amps): _____ Ohm-cm

RESISTIVITY SATURATED CONDITION

CHANGE IN POTENTIAL (Volts): 17

CURRENT (Amps): .005

RESISTIVITY (Volts/Amps): _____ Ohm-cm

LAB NO: _____

SAMPLE LOCATION: BORING #3 COMPOSITE, LOWER

MOISTURE CONTENT

SOIL WET WEIGHT: _____

SOIL DRY WEIGHT: _____

AS RECEIVED MOISTURE CONTENT: _____

RESISTIVITY AS RECEIVED

CHANGE IN POTENTIAL (Volts): 16

CURRENT (Amps): .006

RESISTIVITY (Volts/Amps): _____ Ohm-cm

RESISTIVITY SATURATED CONDITION

CHANGE IN POTENTIAL (Volts): 16

CURRENT (Amps): .006

RESISTIVITY (Volts/Amps): _____ Ohm-cm



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

August 10, 2015

Charlie Miller

Geo-Test

8528 Calle Alameda NE

Albuquerque, NM 87113

TEL: (505) 857-0933

FAX (505) 857-0803

RE: Hospital Tank Replacement Santa Fe

OrderNo.: 1508118

Dear Charlie Miller:

Hall Environmental Analysis Laboratory received 2 sample(s) on 8/3/2015 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a light blue horizontal line.

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Analytical Report

Lab Order: 1508118

Date Reported: 8/10/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Geo-Test
Project: Hospital Tank Replacement Santa Fe

Lab Order: 1508118

Lab ID: 1508118-001 **Collection Date:** 8/3/2015
Client Sample ID: Composite Boring #3 Upper **Matrix:** SOIL
Analyses **Result** **RL** **Qual** **Units** **DF** **Date Analyzed** **Batch ID**

EPA METHOD 300.0: ANIONS

Analyst: LGT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
Sulfate	21	1.5		mg/Kg	1	8/6/2015 12:29:40 PM	20649

Lab ID: 1508118-002 **Collection Date:** 8/3/2015
Client Sample ID: Composite Boring #3 Lower **Matrix:** SOIL
Analyses **Result** **RL** **Qual** **Units** **DF** **Date Analyzed** **Batch ID**

EPA METHOD 300.0: ANIONS

Analyst: LGT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
Sulfate	8.2	1.5		mg/Kg	1	8/6/2015 1:19:19 PM	20649

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	E Value above quantitation range
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	ND Not Detected at the Reporting Limit	P Sample pH Not In Range
	R RPD outside accepted recovery limits	RL Reporting Detection Limit
	S % Recovery outside of range due to dilution or matrix	

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1508118

10-Aug-15

Client: Geo-Test
Project: Hospital Tank Replacement Santa Fe

Sample ID	MB-20649	SampType:	MBLK	TestCode:	EPA Method 300.0: Anions					
Client ID:	PBS	Batch ID:	20649	RunNo:	28030					
Prep Date:	8/6/2015	Analysis Date:	8/6/2015	SeqNo:	843926	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	1.5								

Sample ID	LCS-20649	SampType:	LCS	TestCode:	EPA Method 300.0: Anions					
Client ID:	LCSS	Batch ID:	20649	RunNo:	28030					
Prep Date:	8/6/2015	Analysis Date:	8/6/2015	SeqNo:	843927	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	30	1.5	30.00	0	101	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit



Hall Environmental Analysis Laboratory
 4901 Hawkins NE
 Albuquerque, NM 87109
 TEL: 505-345-3975 FAX: 505-345-4107
 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **GEO TEST**

Work Order Number: **1508118**

RcptNo: 1

Received by/date:

AG

08/03/15

Logged By:

Lindsay Mangin

8/3/2015 2:35:00 PM

Lindsay Mangin

Completed By:

Lindsay Mangin

8/5/2015 8:06:49 AM

Lindsay Mangin

Reviewed By:

CS

08/05/15

Chain of Custody

1. Custody seals intact on sample bottles?
2. Is Chain of Custody complete?
3. How was the sample delivered?

Yes No Not Present
 Yes No Not Present
Client

Log In

4. Was an attempt made to cool the samples?
5. Were all samples received at a temperature of >0° C to 6.0°C
6. Sample(s) in proper container(s)?
7. Sufficient sample volume for indicated test(s)?
8. Are samples (except VOA and ONG) properly preserved?
9. Was preservative added to bottles?
10. VOA vials have zero headspace?
11. Were any sample containers received broken?
12. Does paperwork match bottle labels?
(Note discrepancies on chain of custody)
13. Are matrices correctly identified on Chain of Custody?
14. Is it clear what analyses were requested?
15. Were all holding times able to be met?
(If no, notify customer for authorization.)

Yes No NA
Approved by client
 Yes No NA
Approved by client
 Yes No
 Yes No
 Yes No NA
 Yes No No VOA Vials
 Yes No
 Yes No
 Yes No
 Yes No
 Yes No
 Yes No

of preserved bottles checked for pH:
 (<2 or >12 unless noted)
 Adjusted?
 Checked by:

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order?

Yes No NA

Person Notified:

Date:

By Whom:

Via:

eMail Phone Fax In Person

Regarding:

Client Instructions:

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	21.4	Good	Not Present			

