Specifications

ALTO LAKES
WATER DISTRIBUTION IMPROVEMENTS B

VOLUME 1 OF 2

Alto Lakes Water & Sanitation District

ALTO LAKES WATER AND SANITATION DISTRICT

BOARD MEMBERS

DAN KNORR	**CHAIRMAN**
DAVID WINANS	**VICE-CHAIRMAN**
GARY PARKER	**SECRETARY**
PHILIP BISHOP	**TREASURER**
ROBERT DECKER	**MEMBER**

08/06/14

August 2014

PSC Project # 01525613

PARKHILLSMITH&COOPER
PSC

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PARKHILLSMITH&COOPER

SECTION 00020
ADVERTISEMENT FOR BIDS

ALTO LAKES WATER AND SANITATION DISTRICT
214 LAKESHORE DR.
ALTO, NM 88312

ALTO LAKES
WATER DISTRIBUTION IMPROVEMENTS B

Separate and sealed bids for construction of the **ALTO LAKES WATER DISTRIBUTION IMPROVEMENTS B** in Alto, NM, will be received by the Alto Lakes Water and Sanitation District (ALW&SD) located at the District office located at 214 Lakeshore Dr. Alto, NM 88312 until **February 10, 2015 at 10:00 a.m.** local time, and at that time and place, will be publicly opened and read aloud.

The work under this contract shall be for furnishing all labor, materials, transportation and services for the construction and installation of the following work:

The Project will consist of the following: The installation of approximately 4,000 linear feet of 6 inch waterline, 34 fire hydrants, 10 gate valves, 2 pressure reducing stations, 7,600 square yards of HMAC, 3-inch electrical conduits; pump station relocation, tie-ins, a Pre-Construction Video, Storm Water Erosion Control Plan, Trench Safety, Traffic Control and any other miscellaneous items to provide a complete project.

Contract documents may be examined and obtained over the internet through the office of PARKHILL, SMITH & COOPER, INC. (ENGINEER), 501 W. San Antonio, El Paso Texas, 79901 (915) 533-6811. Hardcopy plans may be printed but will not be offered by the Owner or Engineer.

A **MANDATORY PRE-BID MEETING** will be held on **January 27, 2015** at **10:00 a.m**. at the ALW&SD Office. A site tour will be held after the pre-bid meeting to allow bidders to familiarize themselves with on-site conditions. To qualify and be considered for Award of the Contract, bidders are required to attend the Mandatory Pre-Bid Meeting and Site Visit.

Each Bid shall be submitted in accordance with the Instructions to Bidders and be accompanied by a Bid Bond in the amount of five percent (5%) of the amount bid, by an acceptable bid surety. A certified check or bank draft payable to the Alto Lakes Water & Sanitation District, or negotiable U.S. Government Bonds (as par value) may be submitted in lieu of the Bid Bond.

The Successful Bidder must furnish a 100 percent Performance Bond and a 100 percent Payment Bond, in accordance with the Instructions to Bidders and the General Conditions.

By submission of the bid, Bidder fully understands the requirements of the Contract Documents and agrees to comply with all requirements thereof.

Attention is called to the fact that the Contractor on this project must comply with the provisions of the Labor Standards contained in the specifications and must pay not less than the prevailing wage rates, as issued by the NM Department of Workforce Solutions. The successful bidder must ensure that employees and applicants for employment are not discriminated against because of their race, color, religion, sex or national origin.

The ALW&SD reserves the right to reject any or all Bids or to waive any informality in the Bidding.

All contractors/subcontractors who are debarred, suspended or otherwise excluded from or ineligible for participation on federal assistance programs may not undertake any activity in part or in full under this project.

Bids may be held by the Engineer for a period not to exceed 30 days from the date of the Bid Opening for the purpose of reviewing the Bids and investigating the Bidder's qualifications, prior to awarding the Contract.

The ALW&SD is an Affirmative Action and Equal Opportunity Employer. Small, Minority and Female Owned firms are encouraged to submit Bids for this project.

ALTO LAKES WATER
DISTRIBUTION IMPROVEMENTS B

TABLE OF CONTENTS
VOLUME 1 OF 2
BIDDING REQUIREMENTS, CONTRACT FORMS,
AND CONDITIONS OF THE CONTRACT

TECHNICAL SPECIFICATIONS

DIVISION 1 – GENERAL REQUIREMENTS

DIVISION 2 – SITE WORK

DIVISON 3 – CONCRETE

SECTION 00100

BIDDER INFORMATION

PART 1 - GENERAL

1.1 SUBMITTING BIDS

A. Sealed bids will be received by the Alto Lakes Water and Sanitation District (ALW&SD) Alto, New Mexico, in accordance with the Bid Advertisement. Bidders shall use the bid form included with the specifications, and the specifications shall be returned with the bid. Bid form must bear the signature of the bidder to be considered.

B. Bids must be submitted in a sealed envelope with the outside clearly marked with the project being bid.

C. All bids are subject to all applicable taxes. Any contracts that include labor or services require that the full amount be subject to the Gross Receipts Tax. Do not include the taxes in the total bid price. Taxes will be added and paid at time of billing.

D. The use of brand name is for the purpose of describing the standard of quality performance and characteristics desired and is not intended to limit or restrict competition. Illustrative brochures and specifications shall be included with the bid submitted if the bid is for other than as specified. After examination and comparison of specifications, the Alto Lakes Water and Sanitation District reserves the right to make the selection.

E. Exceptions and/or alternatives to specifications and conditions of this bid shall be listed on a separate sheet of paper and attached to the bid. This sheet shall be labeled "Exceptions and/or Alternatives to Specifications and Conditions," and illustrative brochures and specifications shall be included. After examination and comparison of the specifications, the Alto Lakes Water & Sanitation District reserves the right to make the selection.

F. Resident preference - pursuant to section 13-1-21 NMSA 1978, bidders claiming 5% preference must be certified prior to bid opening. Bidders preference will be taken into consideration, only if the preference number is stated on the bid form on page 00300-2.

G. Per Article 4, Section 13-4-13.1 NMSA 1978, in order to submit a bid valued at more than $60,000 the contractor, whether serving as prime contractor or not, shall be registered with the Department of Workforce Solutions.

H. Per Article 4, Section 13-4-14 NMSA 1978, bid shall include a list of subcontractors exceeding the listing threshold of $5,000.

1.2 SERVICES

A. It is the bidder's responsibility to deliver his bid to the proper place and at the time designated. The fact that a bid was dispatched will not be considered.

B. The successful bidder must honor any guarantee or warranty normally offered with any product bid.

C. The successful bidder shall replace any defective equipment at no cost to the Owner, for as long as warranty is in effect.

D. Any proposed material or equipment to be furnished shall carry the usual new warranty and service that is provided by the manufacturer and dealer. The unit offered under this bid shall be new, standard production model of the latest design in current production. The successful bidder shall supply Alto Lakes Water and Sanitation District any books or manuals from the manufacturer that regularly accompany the item furnished.

1.3 AWARD OF CONTRACT

A. The Alto Lakes Water & Sanitation District reserves the right to waive irregularities in bids, and to reject any or all bids or portions thereof. They may accept any bid that in its opinion is in the best interest of the ALW&SD. Contract will be awarded on their decision as to the lowest responsible, responsive bidder.
B. Determining Lowest Responsible, Responsive Bidder – See Section 00110 – Item No. 8

1.4 DELIVERY

A. All bids shall be F.O.B., Job Site, 214 Lakeshore Drive Alto, New Mexico 88312.

1.5 MISCELLANEOUS

A. This construction contract specifically provides for a payment no later than forty-five days after submission of an undisputed request for payment.

END OF SECTION

SECTION 00110
INSTRUCTIONS TO BIDDERS

1. Interpretations or Addenda
   a) No oral interpretations will be made to any bidder. Each request for an interpretation shall be made in writing to the engineer no less than seven (7) days prior to the bid opening. Each interpretation made will be in the form of an Addendum to the contract documents and will be distributed to all parties holding contract documents no less than five (5) days prior to the bid opening. It is, however, the bidder's responsibility to make inquiry as to any addenda issued. All such addenda shall become part of the contract documents and all bidders shall be bound by such addenda.
   b) The use of the brand names in the specifications or plan sheets on this project is for the purpose of describing a standard of quality, performance and characteristics desired and not intended to limit or restrict competition.
   c) Engineer to issue all Addendums to NMED-CPB.

2. Contingent Award of Contract
   a) Any contract or contracts awarded as a result of the Advertisement for Bids are expected to be funded in part by money from the New Mexico Water Trust Board. Neither the State of New Mexico nor any of its departments, agencies, or employees is or will be a party to this Advertisement for Bids or any resulting contract.

3. Equal Employment Opportunity and Affirmative Action
   a) Equal Opportunity in Employment - All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin. Bidders on this work will be required to comply with the President's Executive Order No. 11246, as amended by Executive Order 11375, and as supplemented in Department of Labor regulations 41 CFR Part 60.

4. Bid Guarantee
   a) Each bidder shall furnish a bid guarantee equivalent to five (5%) percent of the bid price. If a bid bond is provided, the contractor shall utilize a surety company which is authorized to do business in New Mexico in accordance with Art. 7.19-1. Bond of Surety Company; Chapter 7 of the Insurance code.
   b) A certified check or bank draft payable to the Locality or negotiable U.S. Government Bonds (as par value) may be submitted in lieu of the Bid Bond.

5. Award of Contract to Nonresident Bidder
   a) Refer to Section 00100 Bidder Information Section 1.1 F.

6. Copies of Bidding Documents
   a) Complete electronic files in PDF format of the Bidding Documents are available, as stated in the Advertisement or Invitation to Bid may be obtained through the **office of PARKHILL, SMITH & COOPER, INC. (ENGINEER), 501 W. San Antonio, El Paso Texas 79901 (915) 533-6811**.

b) Complete sets of Bidding Documents must be used in preparing Bids; neither the Owner nor the Engineer shall assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
c) Owner and Engineer, in making Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

7. Bid Form
   a) All bids must be submitted on the forms provided and are subject to all requirements of the Contract Documents, including the Drawings.
   b) All blanks on the Bid Form must be completed in Ink. Bids which do not have all blanks filled in or completed may be rejected at the Owner's option.
   c) Bids by corporations must be executed in the corporate name by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.
   d) Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of partnership must be shown below the signature.
   e) All bids must be regular in every respect and no inter-lineation, excisions or special conditions may be made or included by the bidder.
   f) The Locality may consider as irregular any bid on which there is an alteration of or departure from the bid form and, at its option, may reject any irregular bid.
   g) In order to submit a bid valued at more than fifty thousand dollars ($50,000), or in order to respond to a request for proposals, or to be considered for award of any portion of a public works project greater than fifty thousand dollars ($50,000) for a public works project that is subject to the Public Works Minimum Wage Act, the contractor, serving as prime contractor or not, shall be registered with the New Mexico Department of Workforce Solutions.
   h) A subcontractor shall provide a performance and payment bond on a public works project if the subcontractor's contact for work to be performed on a project is fifty thousand dollars ($50,000) or more.
   i) The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).
   j) The address and telephone number for communications regarding the Bid must be shown.
   k) The Prompt Payment Act – Forty-five (45) days after presentation of the Application for payment to the Owner with Engineer's Recommendation. The amount recommended will become due and when due will be paid by Owner to Contractor.
   l) Contractor shall not include New Mexico Gross Receipts Tax in his Bid. Gross Receipt Tax will be applied at time of billing of current applicable rate.

8. Determining Lowest Responsible, Responsive Bidder
   a) To demonstrate that the Bidder is responsible and able to perform the Work, each Bidder must be prepared to submit written evidence, such as financial data, previous experience, present commitments and other data as may be called for below. Each Bid must contain evidence of Bidder's qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to Award of the Contract.

      In determining the lowest responsible, responsive Bidder, in addition to price, the following elements will be considered:

b) the number and scope of conditions attached to the bid;
c) whether the bidder can perform the contract and provide the service promptly, or within the time required, without delay or interference;
d) the previous and existing compliance by the bidder with laws relating to the contract or service;
e) any previous or existing noncompliance by the bidder with specifications, or requirements relating to time of submission of specified data such as samples, models, drawings, certificates, or other information;
f) the sufficiency of the financial resources and ability of the bidder to perform the contract or to provide the service;
g) the experience of the bidder in performing work similar in type, size and complexity to this project, as demonstrated by a listing of projects, with verifiable references (names, addresses, phone numbers, etc.), successfully completed.

9. The Locality shall have the right to take such steps as it deems necessary to determine the ability of the bidder to perform his obligations under the contract, and the bidder shall furnish the locality of all such information and data for this purpose as it may request. The right is reserved to reject any bid where an investigation of the available data does not satisfy the Locality that the bidder is qualified to carry out properly the terms of the contract.

Bidder must meet the following minimum criteria to qualify for Award of the Project.

a) The Bidder, or at least three Key Personnel, directly assigned to this project and employed by the Bidder, must demonstrate Successful Completion of a project similar in nature and scope to this project within the past five (5) years.
b) Bidder is expected to perform all installation of the 6 inch pipe and fire hydrants as the Prime Contractor. The Bidder shall submit documentation demonstrating two (2) Projects successfully completed as the Prime Contractor with the Project Manager and Project Superintendent listed for this project in the past five (5) years. The projects listed must be 6 inch or larger water systems. The projects shall be at least 75% of the bid value for this project using similar pipe materials as bid for this project. At least one project must show installation of not less than 10,000 linear feet of 6 inch or larger within paved streets, by Project Manager and Project Superintendent proposed for this project.
c) Project information submitted by the Bidder shall demonstrate employing Traffic Control on a project in a congested area. Bidder experience as a subcontractor is **not** acceptable.
d) Bidder shall submit documentation for two (2) projects requiring installation of pipe with confined limits of excavation.
e) The Bidder shall submit documentation for two (2) projects demonstrating successful placement of HMAC within City Streets. Projects must show placement of HMAC of not less than 20,000 square yards. If Bidder elects to use a subcontractor, subcontractor shall meet the same qualifications as the Bidder.
f) KEY PERSONNEL: Defined as individuals who will be directly assigned to this project which includes, but is not limited to, the Bidder's Project Manager, the Project Superintendent, and Supervisory personnel such as the Foremen who will be directly assigned to this project as well as similar Subcontractor Key Persons. Resumes of Key Personnel must be submitted and accepted by the Owner in order for Bidder to receive the Award.

10. Successful Completion

Defined as completion of a project on time; which generally means no more than thirty (30) days later than the original contract time allocated. It also means within budget, which generally means within 5% of the original contract price. If there is any project submitted by the Bidder as qualifying, but which does not meet these requirements, in order to be fully responsive the Bidder is required to submit names and phone numbers of the Design Engineer and the Client are to be provided for evaluation as to whether the project may be considered "successful". For any project where liquidated damages were assessed, the Bidder will not be considered to have been on time.

11. Contract Time

The numbers of Calendar Days within which, or the dates by which, the Work is to be substantially completed and also completed and ready for final payment (the Contract Time) are set forth in the Agreement. Completion within this time is of the essence in the performance of this contract.

12. Liquidated Damages

Provisions for liquidated damages, if any, are set forth in the Agreement.

13. Pre-Bid Conference

a) A mandatory pre-bid conference will be held at **10:00 a.m. on January 27, 2015** at the ALW&SD office, located at 214 Lakeshore Dr., Alto, NM 88312. Representatives of Owner and Engineer will be present to discuss the Project. To qualify, and be considered for Award of the Contract Bidders are required to attend the Mandatory Pre-Bid Meeting and Site Visit. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference.

b) A Site Tour will be held after the pre-bid conference to allow bidders to familiarize themselves with on-site conditions.

14. Submission of Bids

a) Separate and sealed bids for construction of the **ALTO LAKES WATER DISTRIBUTION IMPROVEMENTS B** in Alto, NM, will be received by the ALW&SD at the District office located at 214 Lakeshore Dr., Alto, NM 88312 **until 10:00 a.m.**, local time, **February 10, 2015**, and at that time and place, will be publicly opened and read aloud.

b) Bids shall be enclosed in a sealed envelope, marked with the Project title and name and address of the Bidder and accompanied by the Bid security and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it.

c) Bid received prior to the advertised hour of opening shall be kept securely sealed. The officer appointed to open the bids shall decide when the specified time has arrived and no bid received thereafter will be considered.

15. Sales and Use Taxes

Contractor shall not include New Mexico Gross Receipts Tax in his Bid. Gross Receipt Tax will be applied at time of billing of current applicable rate.

16. Bid Modifications Prior to Bid Opening
    a) Any Bidder may modify his bid by telegraphic communication at any time prior to the scheduled closing time for receipt of bids, provided such telegraphic communication is received by the Locality prior to the closing time, and provided further, the Locality is satisfied that a written confirmation of the telegraphic modification over the signature of the Bidder was mailed prior to the closing time. The telegraphic communication should not reveal the bid price but should provide the addition, subtractions or other modifications so that the final prices or terms will not be known by the Locality until the sealed bid is open. If written confirmation is not received within two (2) days from the closing time, no consideration will be given to the telegraphic modification.
    b) Likewise, any Bidder may modify a bid by submitting a supplemental bid in person prior to the scheduled closing time for receipt of bids. Such supplemental bid should mention only additions or subtractions to the original bid so as to not reveal the final prices or terms to the Locality until the sealed bid is open.
    c) Erasures or other corrections in the bid must be noted over the signature of the bidder.

17. Subcontractors, Suppliers, and Others
    a) The Bidder is required to identify all Subcontractors and Suppliers who will perform work in the amount of five thousand dollars ($5000.00) or more of the Bid; and to provide their own and their subcontractor's business classification (Small Locally-Owned Business Enterprise, Minority Business Enterprise, Woman Owned Business Enterprise, or Other). The Bidder shall submit with his Bid a list of all proposed Subcontractors and Suppliers.
    b) If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, other person or organization, either Owner or Engineer may, before the Notice of Award is given, request the apparent Successful Bidder to submit an acceptable substitute, in which case the apparent Successful Bidder shall submit an acceptable substitute, that Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution and Owner may consider such price adjustment in evaluating Bids and making the Contract Award.
    c) After Award, Bidder shall provide a copy of the proposed subcontracts (unexecuted copies are acceptable at this time) to Purchasing indicating the scope and the value of work to be subcontracted or to be obtained through a purchase order to a Supplier. After execution of this Agreement by Owner and Bidder, contractor shall provide copies of the executed subcontracts and purchase orders to Suppliers to the Owner's Contracts Department prior to submittal of the first Application for Payment.

18. Opening of Bids
    The Locality shall, at the time and place fixed for the opening of bids, cause each bid to be publicly opened and read aloud, irrespective of any irregularities therein.

19. Withdrawal of Bids
    Bidder may withdraw the Bid before the time fixed for the opening of Bids by communicating his purpose in writing to the Locality. Upon receipt of such notice, the unopened Bid will be returned to the Bidder. The bid guaranty of any bidder withdrawing his bid in accordance with the above will be returned promptly.

20. Execution of Agreement

The failure of the successful bidder to execute the agreement and supply the required bonds within fifteen (15) days after the prescribed forms are presented for signature, or within such extended period as the Locality may grant shall constitute a default and the Locality may, at its option either award the contract to the next lowest responsible bidder, or re-advertise for bids. In either case, the Locality may charge against the bidder the difference between the amount of the bid, and the amount for which a contract is subsequently executed irrespective of whether this difference exceeds the amount of the bid bond. If a more favorable bid is received through re-advertisement, the defaulting bidder shall have no claim against the Locality for a refund.

21. Award of Contract

a) Owner reserves the right to reject any and all Bids, to waive any and all informalities not involving price, time or changes in the Work and the right to disregard all immaterial, nonconforming, nonresponsive, unbalanced or conditional Bids. Also, Owner reserves the right to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to the Bidder, whether because the Bid is not responsive or the Bidder is not responsible because the Bidder is deemed to be unqualified or of doubtful financial ability or fails to meet any other pertinent criteria established by Owner.

b) Discrepancies in the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

c) Any bids submitted in which there is a material failure to comply with the Bid requirements or specifications will be rejected and the contract will be awarded to the lowest responsible Bidder conforming to the specifications unless the Owner decides to reject all Bids.

d) In evaluating Bids, Owner will consider the responsiveness of the Bid, responsibility of the Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

e) Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work as to which the identity of Subcontractors, Suppliers, and other persons and organizations must be submitted as provided in the Supplementary General Conditions or other sections of this bid document. Owner also may consider the operating costs, maintenance requirements, performance data and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award or as a substitute.

f) Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

g) If the contract is to be awarded, it will be awarded to the lowest Bidder whose responsibility has been evaluated in accordance with these Instructions to Bidders.

h) If the contract is to be awarded, Owner will give the Successful Bidder a Notice of Award within 60 days after the day of the Bid opening, or such reasonable time as the funding agency may require.

22. Signing of Agreement

a) When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached.

b) Within fifteen days hereafter, Contractor shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner with the required Bonds and a copy of the Certificate of Insurance along with a copy or copies of the actual Insurance policy or policies. Within ten days thereafter, Owner shall deliver two fully signed counterparts to Contractor.

BID PROPOSAL CHECKLIST

Section 00110/00300	1.	MANDATORY: Signed Bid Form with all blanks filled in, including names of all Subcontractors and Suppliers.
Section 00430/00615	2.	MANDATORY: Bid Security and Payment Bond.
Section 00110/00800	3.	MANDATORY: Certificate of Insurance Availability.
Section 00150	4.	MANDATORY: Non-Collusion Affidavit of Prime Bidder
	5.	MANDATORY: Resident Veterans Preference Certification, if applicable
	6.	MANDATORY: Bidders Certification WRD-255
	7.	MANDATORY: Bidder's Contractor Certificate

POST-BID/PRE-AWARD CHECKLIST

Section 00110/00800	1.	MANDATORY: Evidence of Worker's Compensation Insurance Coverage: a Certificate of Insurance or Form DWC-81, DWC-82, DWC-83, DWC-84, DWC-85 or if self insured, a coverage agreement filed with the New Mexico Department of Workforce Solutions.
Section 00110/00010	2.	MANDATORY: If employees provided by leasing company, evidence of Worker's Compensation policy. If no leased employees will be used, provide a letter on Contractor's letterhead stating so.
Section 00120	3.	MANDATORY: Qualification and Financial Disclosure Statement
Section 00110/00300	4.	MANDATORY: Evidence that Bidder meets Project Minimum Qualification criteria

QUALIFICATION AND FINANCIAL DISCLOSURE STATEMENT

BIDDER: **PROJECT NAME:**

_____ _____

1. ORGANIZATION

1.1 How many years has your organization been in business as a Contractor?

1.2 How many years has your organization been in business under its present business name?

1.3 If your organization is a corporation, answer the following:

1.3.1 Date of incorporation: _____

1.3.2 State of incorporation: _____

1.3.3 President's name: _____

1.3.4 Vice-president's name(s): _____

_____

1.3.5 Secretary's name: _____

1.3.6 Treasurer's name: _____

1.4 If your organization is a partnership, answer the following:

1.4.1 Date of organization: _____

1.4.2 Type of partnership (if applicable): _____

1.4.3 Name(s) of general partner(s): _____

1.5 If your organization is individually owned, answer the following:

1.5.1 Date of organization: _____

1.5.2 Name of owner: _____

1.6 If the form of your organization is other than those listed above, describe it and name the principals:

2. LICENSING

2.1 List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable. Indicate name, license

number and expiration date for Master Electrician or other trade required under the Instructions to Bidders section of this Bid.

2.2 List jurisdictions in which your organization's partnership or trade name is filed.

3. EXPERIENCE

3.1 List the categories of work that your organization normally performs with its own forces.

3.2 Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)

3.2.1 Has your organization ever failed to complete any work awarded to it?

3.2.2 Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

3.2.3 Has your organization filed any law suits or requested arbitration with regard to construction contracts within the last five years?

3.2.4 Has any construction contracts to which you have been a part been terminated by the Owner; have you ever terminated work on a project prior to completion for any reason; has any surety which issued a performance bond on your behalf ever completed the work in its own name or financed such completion on your behalf; has any surety expended any monies in connection with the contract for which they furnished a bond on your behalf?

3.2.5 At any time in the last five years has your firm been assessed liquidated damages after completion of a project under a construction contract with either a public or private owner?

3.3 Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.)

3.4 State total worth of work in progress and under contract:

3.5 State annual amount of construction work performed each year during the past five years:

3.6 List the construction experience and present commitments of the key individuals of your organization. Bidder hereby certifies that the Resident Superintendent has the authority to act on behalf of the Contractor at all times. No substitution shall be made without the written authorization of the Owner and the Engineer based upon acceptance of the qualifications of the proposed substitute.

3.7 Provide evidence that the Bidder meets the minimum criteria called out in Section 00110 Instructions to Bidders.

4. REFERENCES

4.1 Trade References:

4.2 Bank References:

4.3 Surety:

Name and telephone number of Bonding Company: _____

Name, telephone and address of Agent: _____

_____

_____

5. FINANCING

5.1 Financial Statement – Attach a financial statement, preferably audited, including your organization's latest balance sheet and income statement.

5.2 Will the organization whose financial statement is attached act as guarantor of the contract for construction?

6. SIGNATURE

6.1 To be executed by a Principal of the firm authorized to certify the foregoing information:

_____, being duly sworn, deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

6.2 Dated at _____ this _____ day of _____, 200___.

Name of Organization: _____

By: _____

_____
(Printed Name)

Title: _____

SECTION 00130
ATTORNEY'S REVIEW CERTIFICATION

I, the undersigned, _____, the duly authorized and acting legal representative of the _____, do hereby certify as follows:

I have examined the attached contract(s) and surety bonds and am of the opinion that each of the agreements may be duly executed by the proper parties, acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties; and that the agreements shall constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

Attorney's signature: _____ Date: _____

Print Attorney's name: _____

END OF SECTION

SECTION 00150
NONCOLLUSION AFFIDAVIT OF PRIME BIDDER

State of _____)
County of _____)
_____, being first duly sworn, deposes and says that:

(1) He is _____ of _____, the Bidder that has submitted the 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 another 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 communication 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 an 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 Alto Lakes Water & Sanitation District 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.

(Signed) _____

_____
Title

Subscribed and sworn to me this _____ day of _____.

By: _____
Notary Public

My commission expires _____

END OF SECTION

BID FORM

PROJECT IDENTIFICATION: ALTO LAKES
WATER DISTRIBUTION IMPROVEMENTS B

Name and Address of OWNER: Alto Lakes Water & Sanitation District
214 Lakeshore Drive
Alto, NM 88312

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

2. BIDDER accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for sixty days after the day of Bid opening. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within fifteen days after the date of OWNER's Notice of Award.

3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

   A. BIDDER has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

Date	Number
_____	
_____	
_____	
_____	
_____	

   B. BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

   C. BIDDER has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in Section 02010 – Subsurface Investigation and accepts the extent of the technical data contained in such reports and drawings.

   D. BIDDER has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests and studies (in addition to or to supplement those referred to in "C." above) which pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work as BIDDER considers necessary for the performance or furnishing of the

Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 4.2 of the General Conditions.

E. BIDDER has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities.

F. BIDDER has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

G. BIDDER has given ENGINEER written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER.

H. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

4. Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

Bidder's Preference Number_____.

UNIT PRICE SCHEDULE

Base Bid

Item No.	UOM	Brief Description of Item With Unit Bid Price in Words	Est. Qty	Unit Bid Price In Figures	Amount In Figures
1.	LS	Mobilization, insurance, bonds, moving-in and moving out related expenses, complete, for the sum of (NOT TO EXCEED 5% OF TOTAL BID):	1	$ _____	$ _____
2.	LS	Pre & Post construction video	1	$ _____	$ _____
3.	LS	Pump station modifications	1	$ _____	$ _____
4.	LF	Furnish and install 6 inch PVC water pipeline	3,930	$ _____	$ _____

Item No.	UOM	Brief Description of Item With Unit Bid Price In Words	Est. Qty	Unit Bid Price In Figures	Amount in Figures
5.	EA	Furnish and install 4 inch pressure reducing station	2	$ _____	$ _____
6.	EA	Furnish and install fire hydrant on new waterline	3	$ _____	$ _____
7.	EA	Furnish and install fire hydrant on existing waterline	31	$ _____	$ _____
8.	SY	Furnish and install HMAC 1-1/2 inch overlay	7,600	$ _____	$ _____
9.	EA	Furnish and install ¾ inch service connection to existing meter can	2	$ _____	$ _____
10.	EA	Furnish and install ¾ inch service connection and meter can	2	$ _____	$ _____
11.	EA	Furnish and install a 1 inch CAV	1	$ _____	$ _____
12.	EA	Furnish and install cut and plug	4	$ _____	$ _____
13.	LF	Install three, 3–inch electrical conduits in common waterline trench with conduit provided by Otero County Electric	1,200	$ _____	$ _____
14.	EA	Install electrical conduit sweeps from common waterline trench to 18 inches beyond edge of pavement with conduit provided by Otero County Electric.	3	$ _____	$ _____
15.	EA	Furnish and install tie-in with 6 inch gate valve	4	$ _____	$ _____
16.	LS	Furnish, install and maintain storm water erosion control	1	$ _____	$ _____
17.	LS	Furnish and maintain traffic control	1	$ _____	$ _____
18.	EA	Furnish and install 6 inch gate valve on existing waterline	10	$ _____	$ _____
19.	LF	Furnish and install single yellow 4 inch wide solid striping	2,200	$ _____	$ _____

NEW MEXICO GROSS RECEIPTS TAX (GRT) WILL BE ADDED TO THE TOTAL BID PRICE. **DO NOT ADD** NM GRT TO TOTAL BID PRICE BELOW.

TOTAL PRICE (Items 1 through 19 constitutes the Base Bid Price):

Price in Words_____

_____**($**_____**)**

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

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

5. Liquidated Damages – OWNER AND CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss and public inconvenience if the Work is not completed and the submittals are not submitted within the times specified in Paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER the sum per day as noted below per milestone for each and every milestone date as defined in Section 01010 of these Specifications and which the Contractor fails to meet. For each milestone date, liquidated damages shall be computed from the milestone date until the date the milestone task is completed.

	Liquidated Damages Per Day	
Description of Work	Milestone 1	Milestone 2
Milestone 1 Substantial Completion	$1500	
Milestone 2 Final Completion		$700

Milestone 1 (120 days after the day the Contract Time commences.)

Milestone 2 (150 days after the day the Contract Time commences.)

Liquidated Damages - The Contractor agrees to pay to Owner as Liquidated Damages, Dollars ($1500.00) per calendar day that expires after the time specified for Substantial Completion. After Substantial Completion, if the Contractor neglects, refuses or fails to complete the remaining work within the contract time or any proper extension thereof granted by the Engineer, Contractor shall pay Owner Dollars ($700.00) for each calendar day that expires after the time specified for Final Completion.

6. Prompt Payment Act-Forty-five (45) days after presentation of the Application for Payment to the Owner with Engineer's Recommendation, the amount recommended will become due, and when due, will be paid by the Owner to the Contractor.

   Bidder agrees that the Work will be substantially complete within number of calendar days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and will be completed and ready for final payment in accordance with Paragraph 14.07.B of the General Conditions within number of calendar days after the date when the Contract Times commence to run.

   Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the Contract Times.

7. A tabulation of all Subcontractors who will provide labor at the site of the work or render services to the CONTRACTOR in or about the construction of the work and Suppliers and other persons and organizations is required to be identified in this Bid. Include the work item and value of work to be provided by the Prime Contractor, as well as its category.

SUBCONTRACTOR AND OR SUPPLIER	WORK ITEM	SUBCONTRACT OR PURCHASE ORDER VALUE (If value is unknown, please list *Pending*)	SMLB	MBE	WBE	HUB		OTHER
Prime Contractor								

The Bid is hereby respectfully submitted by:

Name of Bidder

By (Signature) Date

(SEAL) if Bid is by Corp.

Printed Name & Title

New Mexico Contractor's License Number

Address

New Mexico Contractor's Resident Bidder's Preference Number

City & State Zip

Telephone Number

Resident Veterans Preference Certification

_____(NAME OF CONTRACTOR) hereby certifies the following in regard to application of the resident veterans' preference to this procurement:

Please check one box only

☐ I declare under penalty of perjury that my business prior year revenue starting January lending December 31 is less than $1M allowing me the 10% preference discount on this solicitation. I understand that knowingly giving false or misleading information about this fact constitutes a crime.

☐ I declare under penalty of perjury that my business prior year revenue starting January 1 ending December 31 is more than $1M but less than $5M allowing me the 8% preference discount on this bid or proposal. I understand that knowingly giving false or misleading information about this fact constitutes a crime.

☐ I declare under penalty of perjury that my business prior year revenue starting January lending December 31 is more than $5M allowing me the 7% preference discount on this bid or proposal. I understand that knowingly giving false or misleading information about this fact constitutes a crime.

"I agree to submit a report, or reports, to the State Purchasing Division of the General Services Department declaring under penalty of perjury that during the last calendar year starting January 1 and ending on December 31, the following to be true and accurate:

"In conjunction with this procurement and the requirements of this business' application for a Resident Veteran Business Preference/Resident Veteran Contractor Preference under Sections 13-1-21 or 13-1-22 NMSA 1978, when awarded a contract which was on the basis of having such veterans preference, I agree to report to the State Purchasing Division of the General Services Department the awarded amount involved. I will indicate in the report the award amount as a purchase from a public body or as a public works contract from a public body as the case may be.

"I understand that knowingly giving false or misleading information on this report constitutes a crime."

I declare under penalty of perjury that this statement is true to the best of my knowledge. I understand that giving false or misleading statements about material fact regarding this matter constitutes a crime.

_____ _____

(Signature of Business Representative)* (Date)

*Must be an authorized signatory for the Business.

The representations made in checking the boxes constitutes a material representation by the business that is subject to protest and may result in denial of an award or un-award of the procurement involved if the statements are proven to be incorrect.

BIDDER'S CERTIFICATIONS

Project Name _____

Project Number _____

Contract For _____

The following certifications must be completed by the bidder for each contract.

A. EQUAL EMPLOYMENT OPPORTUNITY:

( ) I have developed and have on file at my establishment affirmative action programs pursuant to 41 CFR Part 60-2.

( ) I have participated in previous contract(s) or subcontract(s) subject to the equal opportunity clause under **Executive Orders 11246 and 11375**. I have filed all reports due under the requirements contained in 41 CFR 60-1.7.

( ) I have not participated in previous contracts(s) subject to the equal opportunity clause under **Executive Orders 11246 and 11375**.

( ) I will obtain a similar certification from any proposed subcontractor(s), when appropriate.

B. NONSEGREGATED FACILITIES

( ) I certify that I do not and will not maintain any facilities provided for my employees in a segregated manner, or permit my employees to perform their services at any location under my control where segregated facilities are maintained; and that I will obtain a similar certification prior to the award of any federally assisted subcontract exceeding $10,000 which is not exempt from the equal opportunity clause as required by 41 CFR 60-1.8.

I understand that a false statement on this certification may be grounds for rejection of this bid proposal or termination of the contract award.

_____

Typed Name & Title of Bidder's Authorized Representative

_____

Signature of Bidder's Authorized Representative Date

_____

_____

Name & Address of Bidder

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:
Project (Brief Description Including Location):

BOND
Bond Number:
Date (Not later than Bid due date):
Penal sum _____ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER	SURETY
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature and Title	Signature and Title (Attach Power of Attorney)
Attest: _____	Attest: _____
Signature and Title	Signature and Title

Note: Above addresses are to be used for giving required notice.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2. All Bids are rejected by Owner, or

3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

SECTION 00500
STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR ON THE BASIS OF A STIPULATED PRICE

AGREEMENT

THIS AGREEMENT, made this _____day of _____, 2015, by and between

The Alto Lakes Water & Sanitation District hereinafter called "OWNER" and _____ doing business as a corporation hereinafter called "CONTRACTOR".

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

1. The CONTRACTOR will commence and complete the construction of the **ALTO LAKES WATER DISTRIBUTION IMPROVEMENTS B** that includes all work under SECTION 00300 – Bid Form.

   The Project will consist of the following: The installation of approximately 4,000 linear feet of 6 inch waterline, 34 fire hydrants, 10 gate valves, 2 pressure reducing stations, 7,600 square yards of HMAC, 3-inch electrical conduits; pump station relocation, tie-ins, a Pre-Construction Video, Storm Water Erosion Control Plan, Trench Safety, Traffic Control and any other miscellaneous items to provide a complete project.

2. ENGINEER – The project has been designed by Parkhill, Smith & Cooper, Inc., 501 W. San Antonio, El Paso, Texas 79901, (915) 533-6811, who is hereafter called ENGINEER and who is to act as OWNER's representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

3. The CONTRACTOR shall furnish all Labor and Supervision, materials, supplies, tools, equipment, including subsidiary items and other services necessary for the construction and completion of the PROJECT as described herein. The Key Personnel submitted by the Contractor and approved by the Owner are included herein by reference as part of the Agreement.

4. CONTRACT TIME – The work will be substantially completed within 120 Calendar Days from date when the Contract Time commences to run as provided in Paragraph 2.03 of the General Conditions and as revised in the Supplementary Conditions with 150 Calendar Days. Final completion includes CONTRACTOR'S resolution of all punch list items and CONTRACTOR'S submission of required close-out documentation. Any failure of the CONTRACTOR to complete the project within the contract time will be considered a reach of this contract.

5. Liquidated Damages – OWNER AND CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss and public inconvenience if the Work is not completed and the submittals are not submitted within the times specified in Paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal proceeding the

actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER the sum per day as noted below per milestone for each and every milestone date as defined in Section 01010 of these Specifications and which the Contractor fails to meet. For each milestone date, liquidated damages shall be computed from the milestone date until the date the milestone task is completed.

	Liquidated Damages Per Day	
Description of Work	Milestone 1	Milestone 2
Milestone 1 Substantial Completion	$1500	
Milestone 2 Final Completion		$700

Milestone 1 (120 days after the day the Contract Time commences.)

Milestone 2 (150 days after the day the Contract Time commences.)

Liquidated Damages - The Contractor agrees to pay to Owner as Liquidated Damages, Dollars ($1500.00) per calendar day that expires after the time specified for Substantial Completion. After Substantial Completion, if the Contractor neglects, refuses or fails to complete the remaining work within the contract time or any proper extension thereof granted by the Engineer, Contractor shall pay Owner Dollars ($700.00) for each calendar day that expires after the time specified for Final Completion.

6. CONTRACT PRICE – Owner shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents in current funds, per the attached CONTRACTOR'S Bid in accordance with the below listed separate charges:

TOTAL MATERIALS TO BE INCORPORATED IN PROJECT $_____

TOTAL LABOR TO BE INCORPORATED IN PROJECT $_____

TOTAL RENTAL EQUIPMENT AND SUPPLIES $_____

OTHER (IE, BOND, INSURANCE, ETC.) $_____

TOTAL CONTRACT (MUST EQUAL TOTAL BID PRICE*) $_____

*New Mexico Gross Receipts Tax (GRT) will be added to this amount at the time of billing.

7. PAYMENT PROCEDURES

a) This is a Unit Price Work Agreement. The Contractor shall be paid based on the unit prices in the Bid Form and the number of units completed and accepted. The Engineer has 14 days to make recommendation of payment application.
b) CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.
c) Prior to Substantial Completion, progress payments will be made in an amount equal to the work completed by any stored materials.
d) Prior to Substantial Completion, progress payments will be made in an amount equal to the percentages indicated below, but, in each case, less the aggregate of payments previously made and less such amounts as ENGINEER shall determine, or OWNER may withhold, in accordance with Paragraph 14.02 of the General Conditions.
e) This contract allows the Owner to make payment within 45 days after submission of an undisputed request for payment.
f) Final Payment – Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by the ENGINEER as provided in said Paragraph 14.07.
g) Final Payment Documents – Prior to Final payment Contractor shall submit the following:
    1. Certificate of Substantial Completion
    2. Certification of Project Acceptance and Performance
    3. Labor Certification
    4. Record Drawings
    5. O&M Manuals
    6. Consent of Surety
    7. Affidavit of Payment and Release of Liens
    8. Letter from Owner Accepting Manuals and Record Drawings
    9. Final Payment Request
    10. Final Adjusting Change Order
h) The OWNER will pay to the CONTRACTOR in the manner and at such times as set forth in the General Contract Conditions such amounts as required by the CONTRACT DOCUMENTS.
i) This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns. IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement (3 COPIES) each of which shall be deemed an original on the date first above written.

8. CONTRACT DOCUMENTS

The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR concerning the Work consist of the following:

a) Advertisement for Bids-
b) Instructions to Bidders
c) Qualifications and Financial Disclosure Statement
d) Attorney's Review Certificate
e) Non-collusion Affidavit of Prime Bidder
f) BID FORM
g) WRD-225 – Bidder's Certifications

h) BID BOND
i) Standard Form of Agreement Between Owner and Contractor on the Basis of a Stipulated Price
j) Performance Bond
k) Payment Bond
l) Certificate of Insurance
m) General Contract Conditions for Construction
n) Supplemental Contract Conditions
o) ED-103 – Contractor's Act of Assurance
p) ED-104 – Contractor's Resolution on Authorized Representative
q) General Wage Rates
r) NOTICE OF AWARD
s) NOTICE TO PROCEED
t) CHANGE ORDER
DRAWINGS prepared by PARKHILL, SMITH & COOPER, INC.TITLED:
ALTO LAKES WATER DISTRIBUTION IMPROVEMENTS B,
numbered 1 through 24, Dated August 6, 2014.
u) SPECIFICATIONS prepared by PARKHILL, SMITH & COOPER, INC. TITLED:
ALTO LAKES WATER DISTRIBUTION IMPROVEMENTS B,
Dated August 6, 2014.
v) ADDENDA:

No. 1, dated _____, 2015

No. 2, dated_____, 2015

No. 3, dated _____,2015

OWNER:

ALTO LAKES WATER & SANITATION DISTRICT

By _____

Name _____

Title _____

(SEAL)

ATTEST:

Name_____
(Please Type)

Title_____

CONTRACTOR:

_____

BY_____

Name_____
(Please Type)

Title_____

(SEAL)

ATTEST:

Name_____
(Please Type)

Title_____

SECTION 00610

PERFORMANCE BOND

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

CONTRACTOR (Name and Address):

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

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

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

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

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

Attest: _____
Signature and Title:

EJCDC No. C-610 (2002 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.

3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:

3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

3.3. Owner has agreed to pay the Balance of the Contract Price to:

1. Surety in accordance with the terms of the Contract;

2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:

4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or

2. Deny liability in whole or in part and notify Owner citing reasons therefor.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker
Owner's Representative (Engineer or Other Party)

SECTION 00615
PAYMENT BOND

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

CONTRACTOR (Name and Address):

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

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

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

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

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

Attest: _____
Signature and Title:

EJCDC No. C-615 (2002 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety; that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker:
Owner's Representative (engineer or other party):

Contractor's Application for Payment No. _____

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer):
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

Application For Payment

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE..... $ _____

2. Net change by Change Orders..... $ _____

3. Current Contract Price (Line 1 ± 2)..... $ _____

4. TOTAL COMPLETED AND STORED TO DATE
(Column F on Progress Estimate)..... $ _____

5. RETAINAGE:

a. X _____ **Work Completed..... $** _____

b. X _____ **Stored Material..... $** _____

c. Total Retainage (Line 5a + Line 5b)..... $ _____

6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)..... $ _____

7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)..... $ _____

8. AMOUNT DUE THIS APPLICATION..... $ _____

9. BALANCE TO FINISH, PLUS RETAINAGE
(Column G on Progress Estimate + Line 5 above)..... $ _____

Contractor's Certification

The undersigned Contractor certifies that to the best of its knowledge: (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.

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding Agency (if applicable) (Date)

Endorsed by the Construction Specifications Institute.

Progress Estimate

Contractor's Application

For (contract):	Application Number:
Application Period:	Application Date:

A		B	Work Completed		E	F		G
Item		Scheduled Value	C	D	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F) B	Balance to Finish (B - F)
Specification Section No.	Description		From Previous Application (C+D)	This Period				
	Totals							

Progress Estimate

Contractor's Application

For (contract):							Application Number:			
Application Period:							Application Date:			
A				B	C	D	E	F		
Item		Bid Quantity	Unit Price	Bid Value	Estimated Quantity Installed	Value	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F) B	Balance to Finish (B - F)
Bid Item No.	Description									
	Totals									

Stored Material Summary

Contractor's Application

For (contract):								Application Number:		
Application Period:								Application Date:		
A	B	C	D		E		F			G
Invoice No.	Shop Drawing Transmittal No.	Materials Description	Stored Previously		Stored this Month		Incorporated in Work			Materials Remaining in Storage ($) (D + E - F)
			Date (Month/Year)	Amount ($)	Amount ($)	Subtotal	Date (Month/Year)	Amount ($)		
		Totals								

CERTIFICATE OF INSURANCE

ISSUE DATE

PRODUCER

INSURED

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

COMPANIES AFFORDING COVERAGE

COMPANY LETTER A

COMPANY LETTER B

COMPANY LETTER C

COMPANY LETTER D

COMPANY LETTER E

COVERAGES

THIS IS TO CERTIFY THAT POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS, AND CONDITIONS OF SUCH POLICIES.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE	POLICY EXPIRATION DATE	ALL LIMITS IN THOUSANDS
	GENERAL LIABILITY COMMERCIAL GENERAL LIABILITY CLAIMS MADE OCCURRENCE OWNER'S & CONTRACTORS PROTECTIVE				GENERAL AGGREGATE $ PRODUCTS-COMP/OPS AGGREGATE $ PERSONAL & ADVERTISING INJURY ★ $ EACH OCCURRENCE $ FIRE DAMAGE (ANY ONE FIRE) $ MEDICAL EXPENSES (ANY ONE PERSON) $
	AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS HIRED AUTOS NON-OWNED AUTOS GARAGE LIABILITY				CSL $ CSL $ CSL $ CSL $
	EXCESS LIABILITY OTHER THAN UMBRELLA FORM				$ EACH OCCURRENCE / AGGREGATE
	WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY				STATUTORY $ (EACH ACCIDENT) $ (DISEASE-POLICY LIMIT) $ (DISEASE-EACH EMPLOYEE)
	OTHER				

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/RESTRICTIONS/SPECIAL ITEMS

★ DELETE EMPLOYEE EXCLUSIONS

ADDITIONAL INSURED / CERTIFICATE HOLDER

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED OR MATERIALLY CHANGED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY SHALL PROVIDE 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT.

AUTHORIZED REPRESENTATIVE

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by

ACEC
American Council of Engineering Companies

The Associated General Contractors of America
Skill · Responsibility · Integrity

ASCE American Society of Civil Engineers

National Society of Professional Engineers
Professional Engineers in Private Practice

AMERICAN COUNCIL OF ENGINEERING COMPANIES

_____

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

_____

AMERICAN SOCIETY OF CIVIL ENGINEERS

_____

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by

CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

Page

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*—The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*—See Paragraph 11.01 for definition.

17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*—The individual or entity named as such in the Agreement.

20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*—Sections of Division 1 of the Specifications.

22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.

23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*—Polychlorinated biphenyls.

31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.

37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.

46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.

47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.

48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

49. *Unit Price Work*—Work to be paid for on the basis of unit prices.

50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of

the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation , (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or

2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the

Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

   a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

   b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

   a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

   b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

   c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other

professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all such information and data;

b. locating all Underground Facilities shown or indicated in the Contract Documents;

c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price

or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by

Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the 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 Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.

E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

   a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

   b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

6. include completed operations coverage:

    a. Such insurance shall remain in effect for two years after final payment.

    b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property

insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery

against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and

3) it has a proven record of performance and availability of responsive service.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

   a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

   b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

   c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.

   d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

      1) shall certify that the proposed substitute item will:

         a) perform adequately the functions and achieve the results called for by the general design,

         b) be similar in substance to that specified, and

         c) be suited to the same use as that specified;

      2) will state:

         a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,

         b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

         c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

      3) will identify:

         a) all variations of the proposed substitute item from that specified, and

         b) available engineering, sales, maintenance, repair, and replacement services; and

4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or

other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all

court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor

shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

    a. Submit number of copies specified in the General Requirements.

    b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

    a. Submit number of Samples specified in the Specifications.

    b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:

    a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

    b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

    c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

    d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop

Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage 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 but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor,

Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.

C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits

and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The

opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part;

2. approve the Claim; or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on

Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances:*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the

control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute

resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and

equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the

Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

   a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

   b. the Contract Price has been reduced by Change Orders;

   c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

   d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due:*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

   a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

   b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

   c. there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities

pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;

   b. consent of the surety, if any, to final payment;

   c. a list of all Claims against Owner that Contractor believes are unsettled; and

   d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due:*

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, 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 Contractor to Engineer with the Application for 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.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's repeated disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or

3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SECTION 00800

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC C-700 (2007 Edition). All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

SC-2.02 Copies of Documents

SC-2.02 Delete Paragraph 2.02.A in its entirety and insert the following in its place:

A. Owner shall furnish to Contractor up to three (3) printed or hard copies of the Drawings and Project Manual and one set in electronic format. Additional copies will be furnished upon request at the cost of reproduction.

SC-3.01 Intent

SC-3.01.B Add the following paragraphs immediately after Paragraph 3.01.B:

If there is any conflict between the provisions of the Contract Documents and any such referenced provisions, the language of the Contract Documents will take precedence over that of any standard specification, manual or code.

It is the intent of the Specifications and Drawings to describe a complete project to be constructed in accordance with the Contract Documents. The Contract Documents comprise the entire Agreement between OWNER and CONTRACTOR. They may be altered only by written Modification.

The Contract Documents are complementary; what is called for by one is as binding as if called for by all. If CONTRACTOR finds a conflict, error, or discrepancy in the Contract Documents, he shall call it to ENGINEER's attention in writing at once before proceeding with the Work affected thereby; however, he shall not be liable to OWNER or ENGINEER for his failure to discover any conflict, error, or discrepancy in the Specifications or Drawings. In resolving such conflicts, errors, or discrepancies, the documents shall be given precedence in the following order: Agreement, Modifications, Addenda, Supplemental Conditions, General Conditions, Bid Proposal, Instructions to Bidders, Technical Specifications, and Drawings. Figure dimensions on construction drawings shall govern over scale dimensions, and construction detailed drawings shall govern over other drawings. Any work that may reasonably inferred from the Specifications or Drawings as being required to produce the intended result shall be supplied whether or not it is specifically called for. Work, materials, or equipment described in words which so applied have a well-known technical or trade meaning shall be deemed to refer to such recognized standards.

SC-3.01.C Add the following after *"shall be issued"* in Paragraph 3.01.C:
in writing

SC-3.04.A Add the following after *"may be amended"* in Paragraph 3.04A:
in writing and signed by Owner, Engineer, and Contractor

SC-4.02 Subsurface and Physical Conditions

SC-4.02 Add the following new paragraphs immediately after Paragraph 4.02.B:

C. The following reports of explorations and tests of subsurface conditions at or contiguous to the Site are known to Owner:

1. Report dated December 20, 2013, prepared by AMEC Environment and Infrastructure, Inc., entitled: Geotechnical Study Alto Lakes Water System Improvements Alto Lakes, New Mexico.

a. None of the contents of such reports is "technical data" on which Contractor may rely.

D. The following drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) are known to Owner:

SC-4.04 Underground Facilities

SC-4.04 B1 Delete Paragraph 4.04 B1 in its entirety and insert the following:

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy (as defined in §62-14-5 NSMA 1978) in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. The contractor will proceed to work with the underground facility owner to relocate, preserve, or remove the undocumented or inaccurately marked underground facility to complete contract work. Compensation for such work, if any, will be negotiated by and between the Contractor and the facility owner, with no claim to the Owner by the Contractor for costs associated for resulting delays (Section 4.C §62-14-5 NMSA 1978).

   Concurrently the Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

SC-4.04B 2. Add the following new paragraph immediately after paragraph 4.04B 2.:

3. If Engineer concludes that no change in Contract Documents is required and a Work Directive or Change Order will not be issued and no equitable adjustment to Contract price or times, or both, will be made because of failure to locate underground facilities

with reasonable accuracy Contractor shall proceed with the work and if that means hand digging or vacuuming to expose the existing underground utilities and filing a claim against the owner of the underground utilities for the alleged increase in costs because of their failure to properly identify the location, Contractor shall do so pursuant to §62-14-5A, C NMSA 1978 which provides:

"c. If the owner or operator fails to correctly mark the underground facility after advance notice and such failure to correctly mark the facility results in additional costs to the person doing the excavating, then the owner or operator shall reimburse the person engaging in the excavation for the reasonable costs incurred."

SC-4.06 Hazardous Environmental Conditions

SC-4.06 Add the following subparagraphs 4.06.A.1 and 4.06.A.2:

1. The following reports regarding Hazardous Environmental Conditions at the Site are known to Owner:

SC-4.06 Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

B. Not Used.

SC-5.04 Contractor's Insurance

SC-5.04.B.6 Include completed operations coverage:

Delete Paragraph 5.04.B.6.b in its entirety and replace with the following:

SC-5.04.B.6.b. Contractor shall furnish to Owner and each other additional insured/co-insured identified in the Contract Documents, to whom evidence of insurance has been issued, evidence satisfactory to Owner and other additional insured/co-insured of continuation of such insurance at final payment for a duration of two years after final payment or equal to the correction period required under paragraph 13.07, whichever is longer.

SC-5.04 Add the following new paragraph immediately after Paragraph 5.04.B:

C. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverage under Paragraphs 5.04.A.1 and A.2 of the General Conditions:

a. State:	Statutory
b. Employer's Liability:	
Each accident	$100,000
Each employee disease	$100,000

Per Policy disease $500,000

2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverage and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

   a. General Aggregate $2,000,000

   b. Products – Completed Operations Aggregate $2,000,000

   c. Personal and Advertising Injury $1,000,000

   d. Each Occurrence (Bodily Injury and Property Damage) $1,000,000

   e. Property Damage liability insurance will provide Explosion, Collapse, and Under-ground coverage where applicable.

   f. Excess or Umbrella Liability
      General Aggregate $2,000,000
      Each Occurrence $2,000,000

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

   a. Bodily Injury:
      Each person $1,000,000
      Each Accident $1,000,000

   b. Property Damage:
      Each Accident
      $1,000,000

      or

   a. Combined Single Limit of $2,000,000

4. The Contractual Liability coverage required by Paragraph 5.04.B.4 of the General Conditions shall be provided by the CONTRACTOR as part of the CONTRACTOR's General Liability coverage.

5. The Certificate of Insurance shall name the Owner and Engineer as additional insured and provide a waiver of subrogation in favor of the Engineer on the Worker's Compensation and Employee Liability Insurance Certificates, Public Liability and Property Damage Liability Insurance, and Automobile Insurance.

SC-5.06 Property Insurance

SC-5.06.A. Delete Paragraph 5.06.A in its entirety and insert the following in its place:

A. Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof. Contractor shall be responsible for any deductible or self-insured retention. This insurance shall:

1. Include the interests of Owner, Contractor, Subcontractors, Engineer, and Engineer's Consultants and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or loss payee.

2. Be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss and damage to the Work, temporary buildings, falsework, and materials and equipment in transit and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by these Supplementary Conditions.

3. Include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

4. Cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer.

5. Allow for partial utilization of the Work by Owner.

6. Include testing and startup.

7. Be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.

8. Comply with the requirements of Paragraph 5.06.C of the General Conditions.

SC-5.06 Delete Paragraph 5.06.B

SC-5.06 Delete Paragraph 5.06.E

SC-5.09 Acceptance of Bonds and Insurance: Option to Replace

SC-5.09 Delete Paragraph 5.09.A in its entirety and insert the following in its place:

A. If OWNER has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the CONTRACTOR in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the OWNER shall so notify the CONTRACTOR in writing within 15 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. CONTRACTOR shall provide to the OWNER such additional information in respect of insurance provided as the OWNER may reasonably request.

SC-ARTICLE 5 – Bonds and Insurance

Add new section immediately after Paragraph 5.10

SC-5.11 Worker's Compensation Insurance Coverage

A. Definitions:

Certificate of coverage ("certificate")- A copy of a certificate of insurance, a certificate of insurance by the New Mexico Labor Department, or a coverage agreement showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project, for the duration of the project.

Duration of the project - includes the time from the beginning of the work on the project until the contractor's/person's work on the project has been completed and accepted by the governmental entity.

Persons providing services on the project includes all persons or entities performing all or part of the services the contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

B. The contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of New Mexico Labor Code for all employees of the contractor providing services on the project, for the duration of the project.

C. The Contractor must provide a certificate of coverage to the governmental entity prior to being awarded the contract.

D. If the coverage period shown on the contractor's current certificate of coverage ends during the duration of the project, the contractor must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended.

E. The contractor shall obtain from each person providing services on a project, and provide to the governmental entity:

(1) A certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project; and

(2) No later than seven days after receipt by the contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

F. The contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.

G. The contractor shall notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project.

H. The contractor shall post on each project site a notice, in the text, form and manner prescribed by the New Mexico Department of Workforce Solutions, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

I. The contractor shall contractually require each person with whom it contracts to provide services on a project, to:

(1) Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of New Mexico Labor Code for all of its employees providing services on the project, for the duration of the project;

(2) Provide to the contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;

(3) Provide the contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(4) Obtain from each other person with whom it contracts, and provide to the contractor:

(a) A certificate of coverage, prior to the other person beginning work on the project; and

(b) A new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(5) Retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

(6) Notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

(7) Contractually require each person with whom it contracts, to perform as required by paragraphs (1) - (7), with the certificates of coverage to be provided to the person for whom they are providing services.

J. By signing this contract or providing or causing to be provided a certificate of coverage, the contractor is representing to the governmental entity that all employees of the contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

K. The contractor's failure to comply with any of these provisions is a breach of contract by the contractor which entitles the governmental entity to declare the contract void if the contractor does not remedy the breach within ten days after receipt of notice of breach from the governmental entity.

SC-6.01 Supervision and Superintendence

SC-6.01.B Delete this paragraph in its entirety. Add the following new paragraph

SC-6.01.B: The basis of award to the Contractor was in part based on the experience and qualifications of the Key Personnel submitted by the Contractor and subsequently approved to perform work on this project, which is included and becomes part of the Contract Documents. These personnel shall not be changed by the Contractor without the written authorization from the Owner. Any proposed changes of key personnel may only be made with written authorization by the Owner, and only then if suitable replacement personnel are approved by the Owner. If Contractor does not provide suitable full time key personnel to the project the Owner may request that the Contractor suspend work until such time as qualified key personnel are made available. Any suspension of work by the Owner will be at the Contractor’s expense.

SC-6.10 Taxes

SC-6.10 Add a new paragraph immediately after Paragraph 6.10.A:

B. Owner is exempt from payment of sales and compensating use taxes of the State of New Mexico and of cities and counties thereof on all materials to be incorporated into the Work.

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.

2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

SC-6.17 Shop Drawings and Samples

SC-6.17 Add the following new paragraphs immediately after Paragraph 6.17.E:

F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than two submittals (initial submittal and one re-submittal). Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, Samples, or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.

G. Subsequent review after first resubmittal will be reviewed at a cost of $128.00 per hour.

H. In the event that Contractor requests a change of a previously approved item, Contractor shall reimburse Owner for Engineer's charges for its review time based on Engineer's current billing rates unless the need for such change is beyond the control of Contractor.

SC-7.02 Coordination

SC-7.02 Delete Paragraph 7.02.A in its entirety,

SC-7.04 Add the following new paragraph immediately after paragraph GC-7.03:

SC-7.04 Claims Between Contractors

A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, Engineer, or the construction coordinator, then Contractor (without involving Owner, Engineer, or construction coordinator) shall either (1) remedy the damage, (2) agree to compensate the other contractor for remedy of the damage, or (3) remedy the damage and attempt to settle with such other contractor by agreement, or otherwise resolve the dispute by arbitration or at law.

B. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner, Engineer, the construction coordinator and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages (including, but not limited to, fees and charges of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any other contractor against Owner, Engineer, consultants, or the construction coordinator to the extent said claim is based on or arises out of Contractor's performance of the Work. Should another contractor cause damage to the Work or property of Contractor or should the performance of work by any other contractor at the Site give rise to any other Claim, Contractor shall not institute any action, legal or equitable, against Owner, Engineer, or the construction coordinator or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from Owner, Engineer, or the construction coordinator on account of any such damage or Claim.

C. If Contractor is delayed at any time in performing or furnishing the Work by any act or neglect of another contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Article 12. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner, Engineer, and construction coordinator for any delay, disruption, interference, or hindrance caused by any other contractor. This paragraph does not prevent recovery from Owner, Engineer, or construction coordinator for activities that are their respective responsibilities.

SC-8.11 Evidence of Financial Arrangements

SC-8.11 Delete Paragraph 8.11 in its entirety.

SC-9.03 Project Representative

SC-9.03 Add the following new paragraphs immediately after Paragraph 9.03.A:

B. The Resident Project Representative (RPR) will be Engineer's employee or agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall be through or with the full knowledge and approval of Contractor. The RPR shall:

1. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.

2. Liaison:

   a. Serve as Engineer's liaison with Contractor, working principally through Contractor's authorized representative, assist in providing information regarding the intent of the Contract Documents.

   b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

   c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

3. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

4. Shop Drawings and Samples:

   a. Receive certain samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.

5. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

6. Review of Work and Rejection of Defective Work:

   a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

   b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

7. Inspections, Tests, and System Startups:

   a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.

   b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.

8. Records:

    a. Maintain records for use in preparing Project documentation.

9. Reports:

    a. Furnish to Engineer daily reports as required of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and Sample submittals.

    b. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition.

10. Payment Requests: Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

11. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

12. Completion:

    a. Participate in a Substantial Completion inspection, assist in the determination of Substantial Completion and the preparation of lists of items to be completed or corrected.

    b. Participate in a final inspection in the company of Engineer, Owner, and Contractor and prepare a final list of items to be completed and deficiencies to be remedied.

    c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the Notice of Acceptability of the Work.

C. The RPR shall not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, Suppliers, or Contractor's superintendent.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work unless such advice or directions are specifically required by the Contract Documents.

5. Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.

8. Authorize Owner to occupy the Project in whole or in part.

9. Shall not participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by Engineer.

SC-11.03 Unit Price Work

SC-11.03.D Delete Paragraph 11.03.D in its entirety and insert the following in its place:

D. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

3. If the Bid price of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement.

4. If there is no corresponding adjustment with respect to any other item of Work.

5. If Contractor believes that Contractor has incurred additional expense as a result thereof or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Article 10 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

SC 14.02 Progress Payment

14.02.C Change ten days to read 45 days.

14.07.C Change thirty days to read 45 days.

SC-15.01 Owner May Suspend Work

SC-15.01 B Add the following new paragraph after 15.01.A

B. The basis of award to the Contractor was in part based on the experience and qualifications of the Key Personnel submitted by the Contractor and subsequently approved to perform work on this project, which is included and becomes part of the Contract Documents. These personnel shall not be changed by the Contractor without the written authorization from the Owner. Any proposed changes of key personnel may only be made with written authorization by the Owner, and only then if suitable replacement personnel are approved by the Owner. If Contractor does not provide suitable full time key personnel to the project the Owner may request that the Contractor suspend work until such time as qualified key personnel are made available. Any suspension of work by the Owner will be at the Contractor's expense.

15.04 A iii Change "Owner fails for 30 days to pay….." to read "Owner fails for 45 days to pay…."

15.04 B Change "Owner has failed for 30 days….." to read "Owner has failed for 45 days ….."

SECTION 00840
Wage Rates

New Mexico Department of Workforce Solutions
Public Works
121 Tijeras Ave. NE, Suite 3000, Albuquerque, NM 87102
Phone: (505)-841-4400 fax to: (505) 841-4424 or Email to: public.works@state.nm.us

Wage Decision **# LI-14-1111 A**

NOTIFICATION OF AWARD (NOA)

THIS WAGE DECISION # EXPIRES FOR BIDS ON **11/08/14**

***Description and Location of Work*:** Alto Lakes Water & Sanitation District Distribution B
Installing approximately 2,200 linear feet of 6 inch waterline, 34 fire hydrants and placement of HMAC.

City of Alto County of Lincoln 214 Lakeshore Dr

REMINDER for Agency Conducting BID Process: **If bids are NOT submitted before new wage rates go into effect, a NEW wage decision WILL be required.**
After the Contracting Agency awards this project the Wage Rate Poster and the Wage Rate Packet, excluding this NOA and Subcontractor List, must be delivered to the ***GENERAL/PRIME CONTRACTOR.*** The Contracting Agency or its agent must complete this form (including the next page listing all of the subcontractors including all tiers of subcontractors) and fax or mail it to the address above. ***If the project is canceled,*** this form must be completed by the Contracting agency conducting the bid process and the wording "Cancelled" written on the form and send to the Labor Relations Division. Failure to submit the NOA in a timely manner is a violation of paragraph 11.1.2.9.B (3) of the Public Works Minimum Wage Act Policy Manual.

General/Prime Contractor Company Name:_____ License#:_____

Address:_____ City:_____ State:_____ Zip:_____

Telephone: _____ Fax:_____

Project Contact's name:_____E-Mail:_____

Approximate Date Work to Start:_____

Estimated Completion Date:_____

Estimated Cost of Project:_____

Bid Opening Date:_____

Note: The General/Prime Contractor **MUST** mail/fax in their Statement of Intent to Pay Prevailing Wages to the Contracting Agency or its agent before beginning work on the project. Each Subcontractor (and all tiers of subcontractors) **MUST** also mail/fax their Statement of Intent to Pay Prevailing Wages to the General/Prime Contractor 3 days after award of project. After work on the project is completed **and before, final payment,** is made to subcontractors and all tiers of subcontractors, the contractor and sub-contractors must mail/fax their Affidavit of Wages paid to the Contracting Agency for final payment.

Signature for Contracting Agency (or agent) _____
Printed Name_____
Email address for Contracting Agency (not agent)_____Required Field
Date _____

8/29/13

SUBCONTRACTOR LIST

DO NOT list suppliers or professional services (such as surveyors)

INCLUDE individual subcontractor dollar amount for project

Email to: public.works@state.nm.us or fax to: (505) 841-4424

Please include **2nd & 3rd Tier** subcontractors. Make extra copies of form if necessary.

Wage Decision. # **LI-14-1111 A**

General Contractor:_____

Company Name:_____
Address:_____City:_____State:____Zip:_____
E-Mail Address:_____ License No.:_____
Phone No.:_____Fax No.:_____ Sub ____ 2nd TIER ____ 3rd TIER ___
(To Whom) **(To Whom)**
Work to be performed: Start Date: Amount ($):

Company Name:_____
Address:_____City:_____State:____Zip:_____
E-Mail Address:_____ License No.:_____
Phone No.:_____Fax No.:_____ Sub ____ 2nd TIER ____ 3rd TIER ___
(To Whom) **(To Whom)**
Work to be performed: Start Date: Amount ($):

Company Name:_____
Address:_____City:_____State:____Zip:_____
E-Mail Address:_____ License No.:_____
Phone No.:_____Fax No.:_____ Sub ____ 2ne TIER ____ 3rd TIER ___
(To Whom) **(To Whom)**
Work to be performed: Start Date: Amount ($):

Company Name:_____
Address:_____City:_____State:____Zip:_____
E-Mail Address:_____ License No.:_____
Phone No.:_____Fax No.:_____ Sub ____ 2nd TIER ____ 3rd TIER ___
(To Whom) **(To Whom)**
Work to be performed: Start Date: Amount ($):

Company Name:_____
Address:_____City:_____State:____Zip:_____
E-Mail Address:_____ License No.:_____
Phone No.:_____Fax No.:_____ Sub ____ 2nd TIER ____ 3rd TIER ___
(To Whom) **(To Whom)**
Work to be performed: Start Date: Amount ($):

Company Name:_____
Address:_____City:_____State:____Zip:_____
E-Mail Address:_____ License No.:_____
Phone No.:_____Fax No.:_____ Sub ____ 2ne TIER ____ 3rd TIER ___
(To Whom) **(To Whom)**
Work to be performed: Start Date: Amount ($):

Alto Lakes Water & Sanitation District Distribution B: WAGE DECISION #: LI-14-1111 A
Installing approximately 2,200 linear feet of 6 inch waterline, 34 fire hydrants and placement of HMAC.

TYPE "A" - STREET, HIGHWAY, UTILITY & LIGHT ENGINEERING

Effective January 1, 2014

Trade Classification	Base Rate	Fringe Rate
Bricklayer/Blocklayer/Stonemason	17.74	0.26
Carpenter/Lather	15.99	0.44
Cement Mason	15.52	0.26
Ironworker	21.77	6.03
Painter (Brush/Roller/Spray)	17.56	0.44
Electricians (outside)		
Groundman	26.79	11.03
Equipment Operator	29.61	11.03
Lineman/Wireman or Tech	30.20	11.03
Cable Splicer	31.38	11.03
Plumber/Pipefitter	28.30	4.07
Laborers		
Group I	13.73	0.35
Group II	14.03	0.35
Group III	14.43	0.35
Operators		
Group I	15.74	0.26
Group II	15.94	0.26
Group III	16.52	0.26
Group IV	16.54	0.26
Group V	16.53	0.26
Group VI	16.69	0.26
Group VII	16.74	0.26
Group VIII	16.89	0.26
Group IX	17.39	0.26
Group X	18.19	0.26
Truck Drivers		
Group I	13.32	0.26
Group II	13.52	0.26
Group III	13.72	0.26
Group IV	13.92	0.26

NOTE: SUBSISTENCE AND INCENTIVE PAY DO NOT APPLY TO TYPE "A" CONSTRUCTION.

Type A construction: Laborers, Operators, and Truck Drivers

Laborer classification groups and wage spreads for type "A" construction:

(1) Group I (unskilled): -$0.30: building and common laborer; carpenter tender chainman; rodman; stakedriver; concrete buggy operator (hand); concrete workers; flagman; soil sample tester;

(2) Group II (semiskilled): (base): wagon, air tract, drill and diamond drillers' tender (outside); air and power tool man (not a carpenter's tool); asphalt heaterman; asphalt jointman; asphalt raker; batching plant scaleman; tenderers (to cement mason and plasterer); chain sawman; concrete power buggyman; concrete touch-up man; concrete sawman - coring mach.; curbing machine, asphalt or cement; cutting torchman; metal form setter-road; grade setter; hod carrier; mortar mixer and mason tender; powderman or blaster helper; sandblaster; scaler; vibratorman (hand type) ; vibratory compactor (hand type); window washer; nurseryman-gardener; wagon, air tract, drill and diamond driller (outside); roadway hardware worker;

(3) Group III (miscellaneous): +$0.40: gunite pumpcreteman and nozzleman; multi-plate setter; manhole builder; pipielayer; powderman-blaster-makeup; landscaper; traffic control technician; laboratory technician.

Equipment operator classification groups and wage spreads for type "A" construction:

(1) Group I: -$0.80: concr. paving curing machine;

(2) Group II: -$0.60: belt type conveyors (material and concrete); broom (self prop.); fork lift; grease truck oper.; head oiler; hydro lift; tractor (under 50 drawbar HP with or without attach.); indus. loco. brakeman; front end loader (2CY or less): fireman; oiler; screedman; roller (pull type); mulching machine, roller (self propelled);

(3) Group III: -$0.02: concr. paving form grader; concr. paving gang vibrator; concr. paving joint or saw mach.; concr. paving sub grader; tractor with backhoe attachment; subgrade or base finisher; power plant (elec. gen. or welding mach.);

(4) Group IV: (base): bulldozer (including self-propelled roller with dozer attachment); batch or continuous mix plant (concr., soil cement, or asph.); roller (steel wheel); front end loader (2 through 10CY); scraper oper., motor grader;

(5) Group V: +$0.00: asph. distr.; asph. paving or laydown mach.; asph. retort heater; mixer, heavy duty, asph. or soil cement; trenching mach.; clam type shaftmucker; backhoe, clamshell, dragline, gradall, shovel (under 3/4 CY); elevating grader or belt loader; cranes (crawler or mobile) under 20 ton; air compressor (300 CFM and over); crushing screening and washing plants; drlg. mach. (cable core or rotary); mixer, concr. (1 CY and

less); pump (6 in. intake or over); winch truck; hoist (1 drum); indus. loco. motorman; lumber stacker; tractor (50 drawbar HP or over);

(6) Group VI: +$0.15: concr. paver mixer; hoist (2 drums and over); side boom; traveling crane; piledriver; backhoe, clamshell, dragline, gradall, shovel (3/4 CY to 3 CY); cranes (crawler or mobile) 20 ton to 40 ton; front end loader (over 10 CY); mixer., concr. (over 1 CY); mechanic and/or welder;

(7) Group VII: +$0.20: concr. slip-form paving mach.; concr. paving finishing mach.; concr. paving longitudinal float; gunite mach.; refrig.; jumbo form or drlg.; stage; slusher; concr. paving spreader; pumpcrete mach.; grout pump oper.;

(8) Group VIII: +$0.35: mine hoist; bulldozer (multiple units); scraper (multiple units); mucking mach.; backhoe, clamshell, dragline, gradall, shovel (over 3 CY); cranes (crawler or mobile) over 40 tons;

(9) Group IX: +$0.85: belt loader (CMI type) oper.; pipemobile oper. assistant; derrick, cableway;

(10) Group X: +$1.65: pipemobile operator; mole operator.

Truck driver classification groups and wage spreads for type "A" construction:

(1) Group I: -$0.20: pick-up truck 3/4 ton or under; warehouseman; dump truck, under 8 cubic yards; flatbed, 1 1/2 ton or under;

(2) Group II: (BASE): dump truck, 8 to 16 cubic yards; tank truck, under 6,000 gallons; flatbed, over 1 1/2 ton;

(3) Group III: +$0.20: spreader box (self-propelled); distributor (asphalt) transit mix; lowboy, light equipment; off-highway hauler; tank truck, over 6,000 gallons; dump truck, over 16 cubic yards; trailer semi-trailer dump;

(4) Group IV: +$0.40: diesel-powered transport; lowboy, heavy equipment.

SUSANA MARTINEZ
GOVERNOR

JOHN SANCHEZ
LT. GOVERNOR

CELINA BUSSEY
SECRETARY

STATE OF NEW MEXICO
DEPARTMENT OF WORKFORCE SOLUTIONS
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Albuquerque, NM 87102
Telephone (505) 841-4405
Fax (505) 841-4420

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 assigned by statute to each project stakeholder.

Contracting Agency

- Ensure that all contractors/prime contractors wishing to bid on a Public Works project when the project is $60,000 or more are actively registered with the Labor Relations Division, Labor Enforcement Fund (LEF) prior to bidding.
- Provide completed Notice of Award (NOA) and Sub-Contractor list to Labor Relations Division promptly after the project is awarded.
- Provide updates to the Sub-Contractor list to the Labor Relations Division

General Contractor

- Provide to the Contracting Agency within 3 (Three) days of award a complete sub-contractor list and Statements of Intent (SOI) to pay Prevailing Wages for each contractor.
- Ensure that all sub-contractors wishing to bid on a Public Works project when their portion is over $60,000 are actively registered with the Labor Relations Division prior to bidding.
- Submit bi-weekly certified payrolls to the owner/contracting agency.
- Make certain NM Apprenticeship and Training Fund payments are to be paid either to an approved Apprenticeship program or to the Labor Relations Division.
- Confirm the Wage Rate poster, provided by the Labor Relations Division, 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.

Sub-Contractor

- Ensure that all sub-contractors wishing to bid on a Public Works project when their portion is over $60,000 are actively registered with the Labor Relations Division prior to bidding.
- Submit bi-weekly certified payrolls to the General Contractor(s).
- Make certain NM Apprenticeship and Training Fund payments are to be paid either to an approved Apprenticeship program or to the Labor Relations Division.

Additional Information

Reference material and forms for these requirements are available through the following New Mexico Workforce Solutions Web Link.
www.dws.state.nm.us/new/Labor_Relations/publicworks.html.

Additional Information

Additional information, requirements, and documents on these topics can be found through the Public Works web pages.

- Labor Enforcement Fund (LEF)
- Weekly Certified Payroll
- Public Works Apprenticeship and Training Fund (PWAT)
- Forms: Statement of Intent (SOI), Affidavit of Wages Paid (AWP)
- Prevailing Wage Rates (Base Rates, Fringe, and Apprenticeship Contributions)

CONTACT INFORMATION

Contact us for any questions relating to Public Works Projects.

Kim Kew at kim.kew@state.nm.us or 505-841-4405
Otis Caddy LynnO.Caddy@state.nm.us 505-841-4406
Stacey Lowrey Stacey.Lowrey@state.nm.us 505-841-4412

Change Order

No. 000

Date of Issuance: Effective Date:

Project:	Owner:	Owner's Contract No.:

Contract:	Date of Contract:

Contractor:	Engineer's Project No.:
Phone #:	

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments: (List documents supporting change):

CHANGE IN CONTRACT PRICE:	**CHANGE IN CONTRACT TIMES:**
Original Contract Price:	Original Contract Times: ☐ Working days ☐ Calendar days
	Substantial completion (days or date): _____
$_____	Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No._____ to No._____:	[Increase] [Decrease] from previously approved Change Orders No._____ to No._____:
	Substantial completion (days): _____
$_____	Ready for final payment (days): _____
Contract Price prior to this Change Order:	Contract Times prior to this Change Order:
	Substantial completion (days or date): _____
$_____	Ready for final payment (days or date): _____
[Increase] [~~Decrease~~] of this Change Order:	[Increase] [Decrease] of this Change Order:
	Substantial completion (days or date): _____
$_____	Ready for final payment (days or date): _____
Contract Price incorporating this Change Order:	Contract Times with all approved Change Orders:
	Substantial completion (days or date): _____
$_____	Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable): _____ Date: _____

EJCDC No. C-941 (2002 Edition)
Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.

CONTRACTOR'S ACT OF ASSURANCE

STATE OF NEW MEXICO §
§
COUNTY OF_____ §

BEFORE ME _____, a Notary Public duly commissioned and qualified in and for the County of _____ in the State of New Mexico came and appeared

_____, as represented by _____, the corporations _____, who declares he/she is authorized to represent _____ pursuant to provisions of a resolution adopted by said corporation on the _____ day of _____, 20_____ (a duly certified copy of such resolution is attached to and is hereby made a part of this document).

_____, as the representative of _____, declares that _____ assures the Alto Lakes Water & Sanitation District that it will construct _____ project at _____, New Mexico, in accordance with sound construction practice, all laws of the State of New Mexico, and the rules of the New Mexico Environmental Department.

GIVEN UNDER MY HAND and seal of office this _____ day of _____, 20____ A.D.

_____

_____
Printed Name

My Commission expires _____

ED-104
3/11/2013

CONTRACTOR'S RESOLUTION ON AUTHORIZED REPRESENTATIVE

_____
Name or Names

I hereby certify that it was RESOLVED by a quorum of the directors of the

_____, meeting on the
Name of Corporation

_____day of _____ 20_____, that _____,

_____, _____, and

_____, be, and hereby is/are authorized to act on behalf of

_____, as its representative in all business
name of corporation

transactions conducted in the State of New Mexico, and;

That all above resolution was unanimously ratified by the Board of Directors at said meeting and that the resolution has not been rescinded or amended and is now in full forces and effect; and;

In authentication of the adoption of this resolution, I subscribe my name and affix the seal of the corporation this _____ day of _____, 20__.

_____
Secretary

(seal)

TABLE OF CONTENTS

SECTION 01010

GENERAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SECTION INCLUDES

A. Summary of the Work including work by Others, Owner furnished items, contract time, Contractor responsibility for a complete facility, rights-of-way, Contractor's superintendance, safety and security, emergency communications, licenses, permits, and reports, personnel & equipment, preconstruction video tape of project site, staking out the work, location & protection of existing facilities, damage to private property, disruption of Owner's operations, nighttime, weekend, and holiday work, shop drawing review costs, approval of equipment and materials, testing, and work sequence.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Work under this contract is for the installation of summarized below, including all labor, materials, equipment, transportation, support services and facilities, construction dewatering, Storm Water Erosion Control Plan with BMPS, traffic control, , trench safety systems, and all other work associated with the construction of these facilities complete, in place.

1.4 SCOPE

A. The installation of approximately 4,000 linear feet of 6 inch waterline, 34 fire hydrants, 10 gate valves, 2 pressure reducing stations, 7,600 square yards of HMAC, 3-inch electrical conduits; pump station relocation, tie-ins, a Pre-Construction Video, Storm Water Erosion Control Plan, Trench Safety, Traffic Control and any other miscellaneous items to provide a complete project.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 CONTRACT TIME AND GENERAL ORDER OF CONSTRUCTION

A. There are fundamental tasks that shall be sequentially pursued by the Contractor in the process of completing the project. The Contractor shall incorporate each task described

herein into his construction schedule. The Contractor shall retain possession of all facilities until achieving Substantial Completion.

3.2 CONTRACT TIME

A. Completion of the project within the time allotted is of the essence. The Contractor shall commit all necessary forces and equipment to complete the project within the contract time allowed for meeting the milestones of the project.

B. Liquidated Damages – OWNER AND CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss and public inconvenience if the Work is not completed and the submittals are not submitted within the times specified in Paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER the sum per day as noted below per milestone for each and every milestone date as defined in Section 01010 of these Specifications and which the Contractor fails to meet. For each milestone date, liquidated damages shall be computed from the milestone date until the date the milestone task is completed.

	Liquidated Damages Per Day	
Description of Work	Milestone 1	Milestone 2
Milestone 1 Substantial Completion	$1500	
Milestone 2 Final Completion		$700

Milestone 1 (120 days after the day the Contract Time commences.)

Milestone 2 (150 days after the day the Contract Time commences.)

Liquidated Damages - The Contractor agrees to pay to Owner as Liquidated Damages, Dollars ($1500.00) per calendar day that expires after the time specified for Substantial Completion. After Substantial Completion, if the Contractor neglects, refuses or fails to complete the remaining work within the contract time or any proper extension thereof granted by the Engineer, Contractor shall pay Owner Dollars ($700.00) for each calendar day that expires after the time specified for Final Completion.

(NOTE: Liquidated damages apply to all Milestones listed above, in accordance with Section 00500.)

3.3 CONTRACTOR'S RESPONSIBILITY FOR COMPLETE FACILITY

A. It is the intent of these specifications that the Project be a complete workable facility, functioning in accordance with the general description provided herein. Therefore, it is the direct responsibility of the Contractor to furnish, install and construct the complete

facilities required by the plans and specifications for the prices stated in the Contract, and to take account of all subsidiary requirements of the equipment furnished to that end, so that the entire facilities function in accordance with the specified requirements.

3.4 RIGHTS-OF-WAY (ROW)

A. The project is located within streets of Lincoln County and existing utility easements.
B. The Contractor shall use the minimum area practicable for construction of the facilities, regardless of the type of right-of-way, and shall be governed by the specific requirements for each type of right-of-way as set out in the contract documents and agency permits. Excess excavated material shall be removed from the rights-of-way and disposed of by the Contractor as required by the governing agency and/or the Owner of the right-of-way. All rights-of-way shall be restored at a minimum, to their original condition. If necessary, verification of existing conditions shall be provided by viewing of the videotapes showing the route prior to construction. Such viewings shall be intended to resolve any potential disputes as to the condition of the right-of-way prior to construction.

3.5 LINCOLN COUNTY

A. General: Construction in Lincoln County Street right-of-way and City Property shall be carried on in a manner, which will cause a minimum of inconvenience to adjacent property owners. Provisions shall be made for notification of Lincoln County Engineering Department whenever work is to be carried on in any street and care shall be taken for the handling of traffic.
B. Traffic Control Plan: The Contractor shall prepare a traffic control plan and submit to the Lincoln County Engineering Department for approval at least three (3) weeks prior to beginning construction. Contractor shall not begin work until the Traffic Control Plan has been approved, a copy of which is to be provided to the Engineer. The Traffic Control Plan shall be prepared by the Contractor in accordance with the New Mexico Manual on Uniform Traffic Control Devices (latest revision). Including arrow boards and message boards as may be required by Lincoln County.

3.6 CONTRACTOR'S SUPERINTENDENCE

A. The Contractor shall keep on the project, at all times during its progress, a qualified competent Resident Superintendent, satisfactory to the Engineer. The Resident Superintendent shall speak English fluently and be capable of communicating with the Public, the Engineer, and the Owner. The Superintendent shall be cooperative, and authorized to receive orders and to act for the Contractor. In the event a competent Superintendent is not available the Owner may suspend work at no cost to the Owner as specified in Article 15, Paragraph 15.01.B of the Supplemental Conditions. Changes of Superintendent must be approved by the Engineer and the Owner.

3.7 SAFETY AND SECURITY

A. The Contractor shall be fully responsible for the safety and security of all work areas at all times. Security includes protection of both the Owner’s and Contractor’s properties. The Contractor shall take such measures as are necessary to prevent access of animals and unauthorized persons onto the project site. Such measures shall include fencing, posting of

signs, temporary closure of excavations, or other means, and shall be maintained throughout the course of the work including nighttime, weekend, and holiday periods.

3.8 CONTRACTOR EMERGENCY CONTACTS

A. In case of any emergency, the Contractor shall maintain, at all times during construction, a local telephone listing where responsible supervisory personnel may be contacted twenty-four hours a day. The telephone number shall be given to the dispatcher of Alto Lakes Water & Sanitation District (575) 336.4333 so that contact can be made in the event of any emergency.

3.9 LICENSES, PERMITS AND REPORTS

A. The Contractor is responsible for obtaining all permits other than those listed, as required for the project. The Contractor shall at his own expense procure other permits required.
B. The Contractor shall have in his possession at the job site all required permits. The Contractor shall comply with all State and local laws, ordinances, and rules and regulations relating to the performance of the work.

3.10 PERSONNEL AND EQUIPMENT

A. The Contractor shall employ only competent workmen for the execution of the work and all such work shall be performed under the direct supervision of the project Superintendent.
B. All workers employed by the Contractor shall have such skill and experience as will enable them to properly perform the duties assigned. Any person employed by the contractor or a subcontractor who, in the opinion of the Engineer, does not perform his work in a proper and skillful manner, or is disrespectful, intemperate, disorderly or otherwise objectionable, shall at the written request of the Engineer be forthwith reassigned or discharged and shall not be deployed again on any portion of the work without written consent of the Engineer.
C. Personnel shall be experienced and qualified to operate the equipment required to execute the project. Contractor shall be responsible for obtaining training for and maintaining current safety training of all personnel and subcontract personnel under his employment or his supervision.

3.11 VIDEO TAPE OF PROJECT

A. Prior to any construction, the site and pipeline route shall be video taped by the Contractor accompanied by the Engineer to show existing conditions of roadways, adjacent properties, structures and utilities. The video tape shall be converted to DVD format. Two copies of the videotape along with two DVD discs shall be given to the Engineer. The Engineer will review the video and DVD for completeness and quality. Should the Engineer determine that the video is not satisfactory the Contractor will be required to re-video the project at no expense to the owner. Video shall be recorded by walking the pipeline route. Payment for the video taping shall be for the lump sum price per job as shown on the proposal.

3.12 STAKING OUT THE WORK

A. The Engineer has set horizontal control points and semi-permanent benchmarks as shown on the drawings. The Contractor shall be responsible for all construction surveying and field staking; and shall be responsible for installing the pump station and all pipelines and other work to the lines and grades established from the Engineer's survey control points.

B. The Contractor must satisfy himself before commencing work as to the meaning or correctness of all horizontal control points and benchmarks, and no claim will be entertained for or on account of any alleged inaccuracies, unless the Contractor notified the Engineer thereof in writing before commencing the work thereon. The Contractor will be held responsible for the preservation of all such control points and benchmarks in their positions: in case any of them are lost or destroyed, all expense incurred by the Engineer in replacing them shall be charged against the Contractor and paid for by him before the completion and final acceptance of the work. Payment for the staking out of the work shall be included in the unit price for the Pump Station or in the per unit price of pipeline installed as shown on the proposal.

C. The Contractor shall have a registered professional land surveyor licensed in the state of New Mexico set off-set stakes at 50-foot intervals for installation of the pipeline(s), and easement stakes 100-foot intervals. The Contractor must preserve these stakes throughout the duration of construction. The Contractor shall provide cut sheets to the Engineer a minimum of seven (7) days ahead of pipe laying operations.

3.13 LOCATION AND PROTECTION OF EXISTING FACILITIES

A. The Contractor shall be fully responsible for all underground facilities, which are shown on the drawings or which can be located by the Contractor with reasonable effort, or which are brought to the attention of the Contractor, in any manner. He will not be held responsible for such underground facilities, with respect to which he could, otherwise have had no previous knowledge. The Contractor shall be responsible for notifying the Engineer if any unknown facilities are uncovered and for protecting those facilities after they are uncovered.

B. The Contractor shall be responsible for the protection of all electric poles, light poles, etc., which occur along the pipeline routes. The Contractor shall provide whatever temporary shoring is necessary to ensure that all poles are adequately supported, braced, etc.; so that the pole does not sink, shift, tilt, or otherwise move from its original position. Any removal of guy wires or anchors and setting of any wires or anchors shall be done at the Contractor’s expense. Any measures the Contractor intends to use to support any type of pole shall be based upon prior approval of the owner of the pole, with documentation provided to the Engineer.

C. The Contractor shall coordinate with Lincoln County, ALW&SD, local gas company, telephone company, AT&T, Windstream, Otero County Electric, their subcontractors, as well as any other utility company for the relocation, bypassing or protection of existing utilities. Any work associated with the relocation or bypassing of existing utilities shall be reflected in the Contractor’s project schedule. In order to complete the work expeditiously and without delay to the project, all requirements of the Contract Documents shall apply to the utility or subcontractor performing any relocation, bypassing or protection of existing utilities. All work associated with relocating, bypassing or protection of existing utilities shall be at the expense of the Contractor, unless otherwise noted on the drawings. Prior to the commencement of any relocation or bypass work, the Contractor shall submit his plan for carrying out the work to the Engineer for approval.

3.14 DAMAGE TO PRIVATE PROPERTY

A. The Contractor shall be responsible for any damage to private property caused by the construction project. The Contractor, upon receipt of a complaint of damage, shall within 15 days, respond in writing with a proposal to repair said damage or a letter with reasons explaining why the damage was not caused by the construction.
B. Except for extenuating circumstances beyond the control of the Contractor, the damage shall be repaired completely within 30 days of the complaint.
C. All repairs will be solely the responsibility of the Contractor.

3.15 DISRUPTION OF OWNER'S OPERATIONS

A. The Contractor shall be fully responsible for acts which disrupt operations of the District's systems, including piping, equipment which is part of the Owner's Operation.
Damage to facilities or notification from the Owner of damage shall be corrected by the Contractor. The Contractor shall be responsible for notifying the Engineer of any disruptions caused by damage occurring during performance of the work.

3.16 NIGHTTIME, WEEKEND AND HOLIDAY WORK

A. If the Contractor desires to perform any work between the hours of 5 p.m. and 7 a.m., or that exceeds 8 hours per day, Monday through Friday, or on Saturdays, Sundays or legal holidays, he shall request permission from the Owner, through the Engineer, in writing at least seven (7) days in advance of starting such work. The Contractor shall acquire any necessary permits associated with such work and comply with all permit conditions and all laws and ordinances related thereto.
B. Any work outside the normal working hours that require RPR observation, the Contractor shall reimburse the Owner all costs associated with the overtime at the rate of $128.00 per hour.

3.17 SHOP DRAWING REVIEW COSTS

A. One initial shop drawing submittal and one re-submittal will be reviewed by the Engineer at no cost to the Contractor. Subsequent reviews on resubmitted shop drawings will be reviewed at a cost to the Contractor of $110.00 per hour.

3.18 APPROVAL OF EQUIPMENT AND MATERIALS

A. All equipment and materials shall be new and shall be designed for the function and service specified herein. No equipment or materials shall be used in the project except those that have been approved by the Engineer. Approval for installation or incorporation in the project will be given only after submittal and subsequent examination of shop and installation drawings, manufacturer's specifications, test results, or other data required in the various sections of these specifications. Final approval and acceptance of items will be made only after such items are in operation and have met all specified tests.

3.19 AS-BUILT DIMENSIONS & DRAWINGS

A. The Contractor shall make appropriate and accurate daily measurements of facilities constructed (horizontal and vertical) and keep accurate records of all facilities.
B. The Contractor's "As-Built" drawings will be reviewed as a condition of payment each month based on being up to date and acceptably accurate to the site conditions.
C. Upon completion of each facility, the Contractor shall furnish the Engineer with one set of direct prints, marked with red pencil, to show as built dimensions and locations of work constructed.
D. A dedicated set of project drawings shall be maintained by the Contractor for only As-Built Records.

3.20 TESTS

A. Tests specified in the Technical Specifications shall fall into four categories:
    1. Those required for approval of materials prior to use, which serve the same purpose as shop drawings or samples.
    2. Those required by law.
    3. Those necessary for acceptance of equipment, and/or facilities.
    4. Those made during the progress of the Work to check compliance with the requirements of the Contract Documents.
B. The Contractor shall bear all the costs of the tests in the first three categories.
C. The tests made in the fourth category will be made at the discretion of the Engineer and all costs thereof will be borne by the Owner, except that the Contractor shall furnish the materials for the sample and shall cooperate with the Engineer, or Testing Laboratory, in securing such samples. In addition, all failing tests in this category shall be borne by the Contractor.
D. The tests in the fourth category shall include tests normally performed by a commercial testing laboratory for materials such as: density tests for pipe bedding, trench and/or structural backfill, sub-grade, base course, and hot mix; proctor tests and Atterberg Limits for pipe bedding, trench and/or structural backfill, sub-grade and base course; in place densities for Asphalt pavement, including Marshall stability, Asphalt extraction and gradation tests; cylinders for concrete compressive strength, mortar cubes and prisms for grout strength.

3.21 TIE-IN

A. Contractor to coordinate with the Owner all tie-ins 72 hours in advance to any work. Contractor to have all tie-ins ready prior to the water being turned off to the residents. Water is to be off-line for a maximum of four (4) hours. Contractor to distribute notifications to residents 72 hours in advance to water being turned off.

3.22 SUBSTANTIAL COMPLETION

A. Substantial Completion is the condition upon which, in the opinion of the Owner and Engineer, the work is installed so that it is sufficiently complete, in accordance with the Contract Documents, so that the work can be fully utilized for the purposes for which it is intended. To attain substantial completion, all work must have passed all testing associated with the work in accordance with the Contract Documents. No significant work can remain

to be completed on the project to attain this substantial completion status. In order to achieve substantial completion, only minor punch list items can remain to be completed.

B. Substantial Completion Time is shown in Section 00300 and Section 00500.

3.23 FINAL COMPLETION

A. Final completion shall be obtained once the Contractor has completed all punch-list items to the satisfaction of the Engineer, has submitted red-lined as-built drawings, and has submitted **all contract close-out documentation**.

B. Final Completion will be Thirty (30) Days after Substantial Completion.

3.24 PAYMENT

A. Payment for all work in this Section will be included in the Lump Sum or Unit Bid Price as shown in the Contractor's Bid Proposal. Such payment shall be complete compensation for the complete performance of the work including all subsidiary or incidental items necessary to complete the work in accordance with the drawings and specifications. No separate payment will be made for compliance with this section.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SCOPE

A. General scope of work under each bid item includes all labor, equipment and materials required for construction of completely functional and operational facilities as shown on the Drawings and in these Specifications.

B. All estimated quantities for unit price bid items stipulated in the bid proposal are approximate and are to be used only (a) as a basis for estimating the probable cost of the work and (b) for the purpose of comparing the bids submitted for the work. The actual amount of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for unit price work and materials will be the actual amount of work done and material furnished as measured by the Engineer.

C. All measurements and payments will be based on completed and accepted work performed in strict accordance with the Drawings and Specifications and in accordance with contract unit bid prices. Incidental work and items not listed in the contract-unit bid price schedule will not be paid for separately, but will be included in the payment for the listed item or items and shall be full compensation for all labor, equipment, materials, testing and incidentals necessary to perform the work in accordance with these contract documents.

D. Separate payment will not be made for related items of subsidiary work, but will be considered as part of the bid items in the proposal. Payment will be made for all work covered in this section at the contract unit price bid items or be included in the lump sum bid item prices for items in the proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications.

PART 2 - PRODUCT – NONE

PART 3 - EXECUTION

3.0 MEASUREMENT

A. Two general classes of pay items exist consisting of:

1. Unit price Items: Payment for the various unit price items will be made at the particular contract price per unit as shown on the proposal. The unit price for the individual pipeline items shall specifically include all costs associated with the following: construction staking, construction facilities, coordination, site

preparation, excavation, thrust restraint, backfilling and compacting for utilities, protection of adjacent utilities and pertinent structures, fittings, removal and reinstallation of mailboxes and traffic signs, protection of irrigation ditches, all pipe bedding, all pipe and accessories, joint bonding and test stations, concrete, and all other items of the project not indicated as being covered under the other specific bid items shown in the Proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications.

2. Lump Sum Items: Lump sum items are to be paid for at a lump sum price per job, not in measured increments. Lump sum items shall include all work and materials involved in the installation, construction or performance of work, including incidental and subsidiary items as may be required to complete that item as shown on the drawings and designated in the specifications.

3.1 MOBILIZATION

A. Measurement for mobilization and demobilization shall be paid on a Lump Sum (L.S.) basis for the mobilization and demobilization of equipment, support vehicles, personnel and tools, for the completion of the part of the project for which it pertains.

B. Payment shall include all costs for Contractor's mobilization and demobilization, insurance and bond, construction permits and fees, job trailers, site administration expenses, stand pipe and temporary meter service, expenses for noise mitigation and construction water needs. This shall include all costs for contract closeout, site cleanup, and all costs associated with Contractor's demobilization from site. This bid item shall be limited to a maximum of five (5) percent of the bid price for the part of the project to which it pertains. **Bid Item No. 1**

3.2 PRE AND POST CONSTRUCTION VIDEO

A. Payment for video tape of project shall be paid for on Lump Sum (L.S.) basis. Prior to any construction, the site shall be video recorded by the Contractor accompanied by the Engineer, to show existing conditions of the project area, adjacent properties, structures and utilities of the base bid and any additive alternatives that are awarded. The Contractor is also required to complete a post construction video after the area is restored. The video tape shall be converted to DVD format. Two copies of the videotape along with two DVD discs for each segment of the project as determined by the Engineer shall be given to the Engineer. Payment for the videos shall be for the lump sum price per job as shown on the proposal.

B. Payment will be broken into 2 sections; Pre-construction and Post-construction. Contractor will be paid 50% per each video. **Bid Item No. 2**

3.3 PUMP STATION MODIFICATIONS

A. Payment for the pump station modification shall be paid for on a Lump Sum (L.S.) basis. Price shall include the relocation of the existing pump station to the new location shown in the plans. Work included is surveying, new concrete slab, moving existing pump house, relocating existing electrical, new ductile iron piping, new PVC piping, fittings, valves, coordination with ALW&SD and country club, clearing and grubbing, restraints, new flow meter, new pressure gauge, excavation, compaction, concrete, labor and

equipment and all miscellaneous items to complete this work. Payment shall be complete compensation for the complete performance of the work in accordance with the drawings and provisions of these specifications.

B. Contractor will relocate the existing pump. **Bid Item No. 3**

3.4 6 INCH PVC WATER PIPELINE

A. Payment for 6 inch piping shall be paid on a Linear Foot (LF) basis. Price shall include pipelines of the class specified, including surveying and staking, clearing and grubbing, excavation, backfill, bedding material, compaction, removal of leftover spoil material, saw cutting exist HMAC prior to excavation, pot holing for existing utilities, 8"-base course, 4" of 2 sack or HMAC cap, tracer wire with bonnet box, marking tape, fittings, transition couplings, disinfection, testing, and thrust restraint. Length of pipe will be determined by measurement along the centerline of the pipe alignment using horizontal stationing, installed with no deduction being made for fittings. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and provisions of these specifications.

B. Testing of all pipelines shall be paid for as part of the unit price per linear foot of the pipeline bid item indicated on the proposal. Five percent (5%) of the pipeline unit price will be withheld until the pipeline is successfully tested per the specifications.

C. Trench Safety to be subsidiary to pipe installation.

D. Contractor to include costs of all pressure classes of 6 inch PVC pipe specified for the project. Refer to Pipe Schedule Section 02600 of the Specifications. **Bid Item No. 4**

3.5 PRESSURE REDUCING STATION

A. Installation of the new pressure reducing stations shall be paid for at a unit price per each (EA). The unit price shall include, pressure reducing valves, ductile iron pipe, gate valves, fittings, piping, concrete vault with access manway lid, excavation, pot holing for existing utilities, trench safety, backfilling, compaction, labor, equipment and any miscellaneous items to complete this work. Also included will be start up training to be given to ALW&SD. The testing of pressure reducing stations will be under system operating conditions. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications. **Bid Item No. 5**

3.6 FIRE HYDRANT ON NEW WATER MAIN

A. Fire hydrants shall be paid for at a unit price per each (EA) constructed. This unit price shall include the hydrant, including excavation and backfill, compaction, trench safety, 8 inch base course, 4 inch of 2-sack or HMAC cap, required fittings, thrust restraint, 6-inch gate valve with bonnet box and cover, 6-inch pipe, potholing existing utilities, surveying, bollards and hydrant appurtenances, tracer wire with bonnet box, testing coordination and any miscellaneous items to complete this work. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications. **Bid Item No. 6**

3.7 FIRE HYDRANT ON EXISTING WATER MAIN

A. Fire hydrants shall be paid for at a unit price per each (EA) constructed. This unit price shall include the hydrant, including excavation and backfill, compaction, locating existing water main, bollards, trench safety, required fittings, thrust restraint, pot holing existing utilities, dewatering, 2-sack, surveying, 6-inch gate valve with bonnet box and cover, tracer wire with bonnet box, 6-inch pipe and hydrant appurtenances, testing, coordination, and any miscellaneous items to complete this work. Also included with this item will be the proper removal and disposal of any AC pipe in accordance with local, State and Federal guidelines. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications. **Bid Item No. 7**

B. Any HMAC replacement required for this work will be paid under **Bid Item No. 8**

3.8 HMAC (1-1/2 INCH OVERLAY)

A. Payment for HMAC pavement shall be paid for at a unit price per Square Yard (SY). Price shall include the lay down of new 1-1/2-inch thick HMAC (NMDOT Type B) pavement over trench and existing pavement and includes all preparation (power cleaning, tack coat, pot hole repair) of existing pavement and cleanup, transitions to existing pavement and driveways. HMAC shall be limited to the areas within the limits shown in the drawings. The actual number of square yards of pavement to be paid shall not exceed the area of the surfacing specified in the drawings. Any pavement replacement outside the limits shown in the drawings shall be replaced without compensation to the Contractor. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications. **Bid Item No. 8**

3.9 3/4 INCH SERVICE CONNECTIONS (TO EXISTING METER CANS)

A. Payment for water service connections shall be paid for at a unit price per each (EA). This unit price shall include polyethylene pipe (CTS), fittings, connecting new water service from new main line to existing water meters, saddles, corporation stop, excavation, bedding material, backfill, compaction, marking tape, curb stops, trench safety, 8 inch base course, 4 inch of 2-sack or HMAC cap, outside of roadway landscape removal and replacement, labor and equipment and all miscellaneous items to complete this work. Payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications. **Bid Item No. 9**

3.10 3/4 INCH SERVICE CONNECTIONS (TO NEW METER CANS)

A. Payment for water service connections shall be paid for at a unit price per each (EA). This unit price shall include polyethylene pipe (CTS), fittings, connecting new water service from new main line to new meter can, saddles, corporation stop, excavation, bedding material, backfill, compaction, marking tape, curb stops, meter cans, trench safety, 8 inch base course, 4 inch of 2-sack or HMAC Cap, outside of roadway landscape removal and replacement, compaction, labor and equipment and all miscellaneous items to complete this work. Contractor to account for all variances in size of water service connections in his bid price. Payment shall be complete compensation for the complete performance of

the work in accordance with the drawings and the provisions of these specifications. **Bid Item No. 10**

3.11 1 INCH COMBINATION AIR VALVE (CAV)

A. CAV shall be paid for at a unit price per each (EA). This unit price shall include: CAV, valve box, isolation gate valve, concrete, fittings, piping, pot-holing existing utilities, excavation, bedding material, backfill, 8 inch base course, 4 inch of 2-sack or HMAC cap, compaction, equipment, labor and any miscellaneous item to complete this work. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications.
Bid Item No. 11

3.12 CUT AND PLUG

A. Payment for cut and plug shall be paid on a unit price per each (EA). Price shall include, plugging the abandoned waterline, cutting existing waterlines, cap or plug, concrete, excavation, backfill, compaction, spoil and pipe disposal, 8 inch base course, 4 inch of 2-sack or HMAC Cap, line location and any other miscellaneous items to complete this work. Contractor will account for all various pipe sizes as shown on the drawings in his bid. Such payment shall be complete compensation for the complete performance of this work in accordance with the drawings and specifications. **Bid Item No. 12**

3.13 3 INCH ELECTRICAL CONDUITS IN COMMON WATERLINE TRENCH

A. Payment for three, 3-inch electrical conduits shall be paid on a unit price per Linear Foot (L.F.) of common waterline trench. Price shall include the installation of three, 3-inch electrical PVC conduits, fittings, coordination with Otero County Electric, and marking tape. Paid length will be determined by measurement along center line of common waterline trench using horizontal waterline stationing with no deductions being made for fittings. Cost for this item shall be for placement in trench. Costs for excavation, bedding material, compaction, trench safety are included in **Bid Item No. 4**. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of the specifications**.**

B. Conduit and associated fittings will be supplied by Otero County Electric.
Bid Item No. 13

3.14 3 INCH ELECTRICAL CONDUIT SWEEPS

A. Payment for 3-inch electrical conduit sweeps, as indicated on drawings, shall be paid on a unit price per each (EA). Price shall include the installation of 3-inch electrical PVC conduits, fittings, excavation, bedding material, labor, equipment, marking tape, backfill, compaction, 8 inch base course, 4 inch of 2-sack or HMAC Caps, end caps, marking post, coordination with Otero County Electric and any other miscellaneous cost to complete this work. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of the specifications**.**
Conduit and associated fittings will be supplied by Otero County Electric.
Bid Item No. 14

B. Cost to include either Type 1 or Type 2 sweeps as shown in the drawings from the common waterline trench to 18-inches beyond the edge of pavement.

3.15 FURNISH AND INSTALL TIE-IN WITH 6-INCH GATE VALVE

A. Tie-ins shall be paid on an each (EA) basis. Payment shall include size verification, equipment, labor, material, coordination with Owner, excavation, bedding material, backfill, compaction, spoil and pipe disposal, 8 inch base course, 4 inch of 2-sack or HMAC Cap, trench safety, fittings, cut-in sleeves, transition couplings, line dewatering, restraints, pot-holing existing utilities, 6 inch gate valve with bonnet box and cover, and any other miscellaneous items to complete this work.

B. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications.
Bid Item No. 15.

C. All HMAC replacement will be included with **Bid Item No. 8**

3.16 FURNISH AND INSTALL STORM WATER EROSION CONTROL PLAN

A. NPDES Best Management Practices (BMP's) required during construction of the water lines and fire hydrants shall be paid on a Lump Sum (LS) basis. Work includes permitting, installation, maintenance and removal of BMP's throughout the line construction duration. Payment includes full compensation for this item of work, as described herein in accordance with the drawings and specifications.

B. Bid item will be paid for monthly, determined by dividing the total bid price by the Contract duration. **Bid Item No. 16**

3.17 TRAFFIC CONTROL

A. Traffic control shall be paid on a Lump Sum (LS) basis and shall include coordinating traffic control requirements with the required governing agencies; preparing traffic control plans in conformance with the New Mexico Manual on Uniform Traffic Control Devices For Streets And Highways (latest edition); submitting traffic control plans to the governing agency, Lincoln County and the engineer as applicable; obtaining approval of the traffic control plans prior to beginning construction in areas affecting traffic; provide two (2) approved copies of the traffic control to the engineer; providing and installing all traffic control devices and personnel as required to implement and maintain the approved traffic control plans for the duration of the project; including all equipment, materials, coordination and manpower. No measurement of work or material included in this item shall be made. All materials and work associated with this item shall be included with the price of the item. Bid item will be paid for monthly, determined by dividing the total bid price by the Contract duration. Such payment shall be complete compensation for the complete performance of this work in accordance with the drawings and these specifications.

B. Price will also include 2 electronic message boards to be placed in two locations along Highway 48. Message boards to be operational during the closing of Deer Valley to traffic.
Bid Item No. 17

3.18 GATE VALVES ON EXISTING WATERLINES (6 INCH)

A. Gate valves shall be paid for on an each (EA) basis for replacement of existing valves with new valves or installation of new valve on existing pipeline. Price shall include 6-inch gate valve with bonnet box and cover, removal of existing valve, cut-in sleeves, line dewatering, excavation, bedding material, back fill, compaction, required fittings, thrust restraints, concrete, 2-sack, spoil and pipe disposal, labor, equipment coordination with the Owner and any other miscellaneous items to complete this work. Payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications. **Bid Item No. 18**

B. Costs for this item to include the removal and disposal of any AC waterlines according to any Local, State & Federal guidelines.

C. Gate valves for fire hydrants shall be paid under **Bid Item 6 or 7**

D. Any HMAC required for this work will be paid under **Bid Item No. 8**

E. Locations for valves to be replaced or for new valves to be installed on existing mains will be field determined by Owner during Construction.

3.19 FURNISH AND INSTALL 4 INCH TRAFFIC STRIPING

A. Payment for 4 inch striping shall be paid by linear foot (LF) unit price. Price shall include all equipment, labor, materials, coordination with Lincoln County and other miscellaneous items to complete this work. Such payment shall complete compensation for the complete performance of the work in accordance with the drawings and specifications.
Bid Item No. 19

END OF SECTION

SECTION 01040

COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

PART 2 - PRODUCT – NONE

PART 3 - EXECUTION

3.1 GENERAL COORDINATION

A. The Contractor shall be responsible for ascertaining the nature and extent of any collateral work done by others. The Contractor shall include in his bid all costs associated with coordinating with others. The Contractor shall not be entitled to additional compensation resulting from coordination of this work with simultaneous or collateral work on other projects. If necessary to avoid or minimize damage or delay, the Contractor shall redeploy his work force to other areas of the work, at no cost to the Owner.

3.2 COORDINATION WITH THE OWNER

A. All coordination between the Contactor and the Owner shall be through the Engineer. The Contractor's work shall not interfere with the continual use of the existing facilities. The Contractor shall be responsible for coordinating all work. The Contractor shall give a **72 hour** notice to the Owner and Engineer prior to starting any work at tie in locations.

3.3 COORDINATION WITH THE PROPERTY OWNERS

A. The Contractor shall be responsible for the notification of property owners, business and residents along the pipeline route to explain the construction to them 72 hours in advance of construction. The Contractor shall be responsible for providing access to all business, schools and residences for all property owners, customers and residents at all times. Any resident unable to park their vehicles at their residence due to construction shall be provided with a secure place to park as near to the residence as possible by the Contractor at no cost to the Owner.

3.4 COORDINATION WITH POLICE, FIRE, AND EMS

A. The Contractor will be responsible for coordination with school district buses, sheriff, fire and EMS agencies. This coordination will include notification at least 1 week in advance of work affecting traffic flow through a given area. This will require coordination with the development and implementation of the traffic control plan.

3.5 COORDINATION WITH VARIOUS AGENCIES AND DEPARTMENTS

A. The Contractor shall be responsible for coordination with the Owner, Lincoln County or any other utilities/agencies involved.

3.6 PAYMENT

A. Payment for all work covered in this section will be included as part of the unit price per unit or lump sum at the tie-ins for the installation of facilities as indicated in the Proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and specifications. No separate payment will be made for compliance with this section.

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 - General Requirements apply to work of this Section.

1.2 SECTION INCLUDES

A. Submittal procedures.
B. Construction progress schedules.

1.3 SUBMITTAL PROCEDURES

A. Submit to Engineer and Owner for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
B. Transmit each submittal with Contractor's standard transmittal letter including Contractor's name, address and phone number.
C. Sequentially number transmittal forms using Section number or Contractors other sequential numbering system.
D. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing sheet and detail number(s), and specification Section number, appropriate to submittal.
E. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.
F. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items.
G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
H. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.
I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
J. Submittals not requested will not be recognized or processed.
K. Format
    1. Submit all submittals digitally using .PDF file extension. Each submittal shall be a single .PDF file including transmittal letter. Multiple files for the same submittal will not be accepted.
    2. Submittals in any other format, including .ZIP files, will be rejected.
    3. Hard copies will not be accepted.
    4. To ensure each page is legible, .PDF pages of drawings shall be the same size/scale as a hard copy. Where applicable, scale symbols should be provided to indicate scale. Illegible submittals will be rejected.
    5. Submittals will be uploaded to Engineers Info Exchange Website.

L. At Engineer's option, submittals will not be individually marked, but will be reviewed using Engineer's standard submittal review form.

1.4 RESUBMITTAL REQUIREMENTS

A. Revise and resubmit submittals, as required, and resubmit complete submittal package per original to meet requirements as specified and as noted on submittal reviews.
B. Mark as RESUBMITTAL.
C. Re-use original transmittal number and supplement with sequential alphabetical or numeric suffix for each re-submittal.

1.5 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule in duplicate for Engineer's and Engineer's review within 15 days after date established in Notice to Proceed.
B. Revise and resubmit as required.
C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
D. Submit a horizontal bar chart with separate line for each section of Work, identifying first work day of each week.
E. Indicate estimated percentage of completion for each item of Work at each submission.
F. Revisions To Schedules:
    1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
    2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
    3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

PART 2 - PRODUCT – NONE

PART 3 - EXECUTION – NONE

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SCOPE

A. The Contractor shall make his own arrangements for a supply of potable drinking water for his employees and shall keep such supply available at all times.
B. Water to be used for construction and testing shall be furnished to the Contractor by the Owner. See 2.1 in this Section.

1.3 INSTRUCTIONS TO CONTRACTORS REQUESTING FIRE HYDRANT METER

A. The Contractor must complete a Fire Hydrant Meter Application for a fire hydrant meter with the Alto Lakes Water and Sanitation District located at 214 Lakeshore Dr. Alto, NM 88312. For information, please contact 575.336.4333. Billing rate for construction water will be as established in the latest Rules and Regulations.
B. Readings will be taken monthly from the fire hydrant meter by Utility. Consumption will be billed monthly by the 15th of the month. Payment is due 10 working days later. If not paid, fire hydrant meter will be removed.
C. Immediately after completion of the construction project, the Contractor must complete the Meter Removal Form requesting removal of the meter. The Utility will remove the meter within two working days.
D. A final bill will be consolidated for any damages to the fire hydrant or the fire hydrant meter in addition to any assessments due to violations. Charges will be deducted from the original deposit. Any shortages must be paid before Final Acceptance of the project will be made; any overages will be refunded within 15 days of payment of the final bill.

1.4 NOTES TO CONTRACTORS

A. Additional fire hydrant meters will not be issued for other fire hydrants within a 2,000-foot radius of the fire hydrant requested. Deposits and Set-up/Removal fees are due for each meter on a project.
The fire hydrant meter shall not be moved for any reason by the Contractor. If the Contractor needs to move the meter to another fire hydrant, the Contractor must contact Alto Lakes Water and Sanitation District at 575.336.4333. Only one meter will be issued for the project.

1. Neither non-metered consumption removal of the meter, nor tampering with the fire hydrant or valve will be allowed under any circumstances. The Contractor agrees that by executing the Fire Hydrant Meter Application any violations of these requirements shall be grounds for immediate removal of the meter and a $500 assessment for water losses for each occurrence.
2. The adapter that is installed for use of the Fire Department on the fire hydrant meter must not be removed. This is considered as tampering and violation fees will be assessed.

PART 2 - PRODUCT

2.1 CONSTRUCTION WATER

A. The Alto Lakes Water & Sanitation District will supply 150,000 gallons of water to be used for testing, dust control and miscellaneous uses. All water over 150,000 gallons will be billed accordingly to the current Alto Lakes Water & Sanitation District Bulk Rates.

PART 3 - EXECUTION

3.1 SANITARY FACILITIES

A. The Contractor shall provide adequate toilet facilities for use by his personnel and shall maintain such facilities in a clean and sanitary condition throughout the construction period. Such facilities shall be conveniently located for use by the personnel and the entire area shall be maintained in a clean and sanitary condition. After completion of the work, all temporary toilet facilities shall be removed from the site. No toilet facility shall be located within 150’ of an existing well.

3.2 TRAFFIC PLAN: Refer to Section 01010 of these specifications.

3.3 DUST CONTROL

A. The Contractor shall furnish and maintain at all times equipment necessary to affect the control of dust over the entire working area. The control of dust shall mean that no construction activity shall take place without applying such reasonable measures as may be required to prevent particulate matter from becoming airborne so that it remains visible beyond the limits of construction.

3.4 CONSTRUCTION STAGING AREA

A. The Contractor shall be responsible for obtaining (at his/her cost) a construction staging area for equipment and materials storage, construction offices, etc., that the Contractor feels is necessary for the project.
B. The Contractor may obtain, at his choosing, permission from private property owners to stage materials within private property, at such reasonable distances that are in the vicinity of the installation. The Contractor must provide documentation from the property owner indicating that he has been granted permission.

3.5 OFFICE FACILITIES

A. The Contractor shall provide office facilities for the Engineer. The office shall be a minimum of 200 square feet in size. The office will be equipped with toilet facilities and be adequately lighted, heated and cooled. The office will be furnished with a desk, chair, plan table, table and chairs for meetings and a locking file cabinet. Contractor shall provide internet access and make all necessary provisions for its placement and safety throughout the duration of the project. Contractor shall provide weekly cleanup of the office facilities to include sweeping and cleaning of the bathroom. The contractor shall be responsible for all maintenance of the facilities. Location of the office will be determined after the award of the contract and mutually agreed upon by the Owner and Engineer.

3.6 PAYMENT

A. Payment for all work covered in this section will be included as part of the mobilization line item as indicated in the Proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and specifications.

END OF SECTION

SECTION 01600

PROGRESS SCHEDULES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SCOPE

A. The work shall be executed with such progress as required to prevent any delay to other contractors, the contract milestones, or the general completion of the project.

B. The Contractor shall provide a statement to the Engineer describing his computerized scheduling capability for review and approval. This statement shall include the following as a minimum:

1. Identification, qualifications, and experience of the member(s) of the Contractor's scheduling staff or any other Consultant's staff.
2. References of not less than two previous projects on which the Contractor or Consultant has utilized computerized CPM scheduling, which were of not less than one-quarter of the value of the present contract.
3. The name and description of the project management software and computer hardware to be utilized on this Contract.

1.3 CONSTRUCTION SCHEDULE

A. The Contractor shall show the sequence and interdependence of activities required for complete performance of all the work. The Contractor's Construction Schedule shall begin with the date of the Notice To Proceed and conclude with the date of Final Completion of the Contract. Float or slack time accrues to the benefit of the Owner but is a resource available to both parties as needed to meet contract milestones and the contract completion date. Accordingly, no time extensions will be granted nor delay damages paid until a delay occurs which extends the work beyond the Contract completion date.

B. Pursuant to the Float Sharing requirements of the Contract Documents, (1) use of float suppression techniques such as preferential sequencing, use of lead/lag logic restraints, extended Activity times, or imposed dates and (2) use of Float Time disclosed or implied by the use of alternate float suppression techniques shall be shared to the proportionate benefit of the Owner, Contractor, and Contractor's Subcontractors.

C. Comments made by the Engineer on the Contractor's Construction Schedule during review will not relieve the Contractor from compliance with requirements of the Contract Documents. This review is only for general conformance with the schedule concept of the project and general compliance with the information given in the Contract Documents."

1.4 SUBMITTALS

A. The Contractor shall submit the following items as specified in this section:

1. Overall schedule

2. Scheduled reports
3. Progress Reports

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall execute work at such times and on such parts of the project, and with such forces, materials, and equipment, to assure completion in the time established by the Contract.

3.2 ACTIVITY COORDINATION

A. To ensure consistency with General Contractor's breakdown of work and nomenclature, each Subcontractor shall work in concert with the General Contractor throughout all aspects of schedule development.

3.3 ACTIVITIES

A. The work activities comprising the Contractor's Construction Schedule shall be of sufficient detail to assure adequate planning and execution of the work, such that the schedules provide an appropriate basis for monitoring and evaluating the progress of the work. A work activity is defined as an activity which requires time and resources (manpower, equipment, and/or material) to complete.

B. Show information in such detail that duration times of activities will range normally from one to fifteen calendar days. However, no activity shall have more than thirty (30) calendar days' duration for any onsite operation. Selected exceptions may be approved by the Engineer where sub-networks will be used. The selection and number of the Contractor's construction activities shall be subject to review of the Engineer.

C. If requested by the Engineer, the Contractor, at the Contractor's sole expense, shall provide highly detailed short-term schedules for specific crucial items (work-arounds, start-up, etc.)

3.4 SCHEDULE

A. Preliminary Network Analysis: Within 15 calendar days after the date of Award of the Contract the Contractor shall submit a preliminary network analysis indicating the Contractor's planned operations for the first 60 days after the notice to proceed. This should also indicate the Contractor's general approach to the remainder of the work and the cost of activities expected to be completed or partially completed before submittal and review of the completed network analysis.

B. Completed Network Analysis: Within 45 calendar days after the date of Award of The Contract or 10 days after the Notice To Proceed, whichever date is earlier, the Contractor shall submit a completed CPM network analysis including diagrams, mathematical

analysis, and computer printouts, as determined in consultation with the Engineer. This analysis is for review and acceptance as a condition precedent to approval of first pay application.

C. Detailed Network Diagram: The Contractor's Construction Schedule shall include time-scaled network diagrams based on calendar days. The network diagrams shall be Critical Path Method (CPM) precedence format and shall show the sequence and interdependence of activities required for complete performance of the work. A calendar shall be shown on all sheets.

D. Each activity shall be plotted so that the beginning and completion dates of said activity can be accurately determined by graphical comparison with the calendar scale.

3.5 SCHEDULED REPORTS

A. The Contractor shall prepare schedule listings of the information in the network diagram in tabular format, sorted according to early start, within responsibility, or as directed by Engineer.

B. The schedule listings shall show activity numbers, description, responsibility, total duration in work days, percent complete, early-start date, late-start date, early-finish date, and total float for each activity in the network diagram.

C. The Overall Schedule and subsequent revisions shall reflect actual progress of the project. The Contractor shall sign and submit one reproducible and three copies of the initial Overall Schedule and each revision.

D. If the initial submittal or a subsequent revision does not meet the requirements specified, the Contractor shall revise the Overall Schedule and resubmit until it is acceptable to the Engineer. Failure to submit and adequately update the Overall Schedule, and schedule reports, will be considered cause for withholding partial payments otherwise due under the Contract.

3.6 PROGRESS REPORTS

A. Once biweekly on a date mutually agreed upon by the Contractor, Owner's Representative, and Engineer, a meeting will be held at which time the schedule will be reviewed. Immediately prior to the meeting the Contractor shall obtain the necessary information to update the Overall Schedule to reflect progress to date and furnish sufficient copies of the updated schedule at the meeting for review.

The schedule provided by the Contractor at the biweekly meetings with the Engineer and Owner shall be a detailed two (2) week look ahead schedule for the work to be performed during the current week and subsequent week period. This schedule shall be updated biweekly by the Contractor with copies available for the biweekly meetings. The Contractor shall invite his subcontractors to participate in the biweekly meetings, or if requested by the Engineer.

B. In updating the schedule, progress will be reviewed for the following items:

1. To identify those activities started and completed during the previous period.
2. For remaining duration, from the date of update, required to complete each activity started but not completed.
3. For review of durations for activities not yet started.
4. For addition of Change Orders and proposed sequencing changes to the network diagram and schedule listings.

C. At least twice each month, and utilizing data accumulated during the previous joint Owner-Engineer-Contractor reviews, Contractor shall revise the network diagram and generate updated schedule reports.

D. Whenever revised scheduling documents are submitted, they shall be accompanied by a written narrative report. The narrative report shall:

1. Describe amount of progress since the last revision in terms of activities started, continuing, and completed.
2. Describe problem areas, current and anticipated delay factors, and the estimated impact on performance of other activities and completion dates.
3. Explain corrective action taken or proposed.

3.7 MAINTAINING SCHEDULE

A. If at any time during the project the Contractor fails to complete an activity by its latest scheduled completion date, which late completion will impact the end date of the work past the Contract substantial completion due date, the Contractor shall submit within 7 calendar days plans to reorganize the work force to return to the original schedule for review and approval of owner.

B. The Contractor will add equipment, or construction forces, as well as increase working hours, if operations fall behind schedule at any time.

C. Addition of equipment or construction forces, increasing working hours, or other method, manner, or procedure to return to the contractually required completion date will not be justification for an increase in Contract Price or treated as an acceleration.

D. Contractor shall plan, schedule, and coordinate construction operations and activities in a manner that will facilitate progress of work.

3.8 PAYMENT

A. Payment for all work covered in this section will be included in the Lump Sum Price for mobilization as shown in the contractor's Bid Proposal. Such payment shall be complete compensation for the complete performance of the work including all subsidiary or incidental items necessary to complete the work in accordance with the drawings and specifications. No separate payment will be made for compliance with this section.

END OF SECTION

SECTION 02010

SUBSURFACE INVESTIGATION

PART 1 - GENERAL

1.1 SOIL BORINGS

A. Soil borings were taken on November 21, 2013 by AMEC Earth and Environmental, Inc. throughout the project area to determine design parameters for the installation of the pipelines. The soil borings were not made for trench safety design. These borings represent the conditions encountered in the bore hole on the date of the boring, determined by normal geotechnical techniques. The geotechnical report dated December 20, 2013 are available for information purposes only and are not part of the Contract Documents. Any interpretations or conclusions drawn from the information presented are done at the Contractor's sole risk. The soil boring report is available for prospective bidders to review at the Engineer's office PARKHILL, SMITH & COOPER, INC., 501 W. SAN ANTONIO, EL PASO, TEXAS 79901; 915.533.6811 or at ALTO LAKES WATER AND SANITATION DISTRICT OFFICE, located at 214 LAKESHORE DR. ALTO, NM 88312. If the Contractor requires more information concerning soil conditions or groundwater at these or other locations, the Contractor shall obtain that information at his own expense.

PART 2 - PRODUCT

NOT USED

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 02100

SITE PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SCOPE

A. The work covered by this section of the specifications consists of preparing the jobsite for construction operations by the removal and disposal of all obstructions from rights-of-way and designated easements where removal of such obstructions is not otherwise provided for in the drawings and specifications.
B. Such obstructions shall include abandoned structures and utility lines, fences, trees, shrubs, vegetation, curbs, gutters, sidewalks, driveways, pavement, concrete and stone rubble, rubbish and all other miscellaneous debris.
C. The Contractor shall furnish all materials, equipment, tools, labor, superintendence and incidentals required to perform the work as indicated on the drawings, as required by the Engineer, and as specified herein.

PART 2 - PRODUCT – NONE

PART 3 - EXECUTION

3.1 OBSTRUCTIONS OTHER THAN VEGETATION

A. All concrete, pavement, fences, rubble, trash and miscellaneous debris shall be removed to a width equal to the limits of excavation shown on the drawings. All remaining holes shall be backfilled with material meeting the requirements for fill and backfill material as stipulated in Section 02222 - Excavation, Backfilling and Compacting for Pavement and then tamped as directed by the Engineer. The Contractor shall complete this operation by blading, bulldozing, or other approved methods so that the jobsite shall be free of holes, ditches, and other abrupt changes in elevation and irregularities of contour.
B. Abandoned storm sewers, culverts, sanitary sewers, conduits and water pipes over 3 inches in diameter, which lie in the path of construction, shall be removed from the limits of construction and plugged with concrete to form a tight closure. All debris and/or rubble from removing any abandoned item from the path of construction will be removed from the site at no cost to the Owner.

3.2 CLEARING

A. Clearing shall consist of removal and disposal of trees and other vegetation as well as down timber, snags, brush and rubbish within the working areas as shown in the drawings.

B. Clearing shall only be as wide as is necessary for pipeline installation. Individual trees, groups of trees or other vegetation not required to be removed and occurring outside the earthwork area shall be protected against unnecessary cutting, breaking or skinning of roots, skinning and brushing of bark, or smothering of trees by stockpiling construction materials or excavated materials within drip lines.

3.3 GRUBBING

A. Stumps, matted roots and roots larger than 2 inches in diameter shall be removed from within 6 inches of the surface of areas on which fills are to be constructed except in roadways. Materials as described above within 18 inches of finished subgrade of roadways in either cut or fill sections shall be removed. Grubbing width shall equal the limits of excavation shown on the drawings. Areas disturbed by grubbing will be filled as specified in Section 02221 - Excavating, Backfilling and Compacting for Utilities and Section 02222 - Excavating, Backfilling and Compacting for Pavement.

3.4 DISPOSAL

A. The Contractor shall dispose of all material removed from the jobsite in a manner satisfactory to the Engineer. Disposal of materials removed from the jobsite shall also be in accordance with all local, state and federal government regulations.

3.5 PAYMENT

A. Payment for all work covered in this section will be included as part of the unit price for the installation of the pipelines as indicated in the Proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and specifications. No separate payment will be made for compliance with this section.

END OF SECTION

SECTION 02221

EXCAVATING, BACKFILLING AND COMPACTING FOR UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SCOPE

A. This section covers all excavating, backfilling and compacting of trenches for pipe and pipe accessories and other utilities.
B. There shall be no separate pay item for excavating, backfilling and compacting trenches. Over excavation not at the direction of the Engineer is to be corrected by the Contractor at the Contractor's expense. OSHA regulations and Part 3 of this section will apply to all excavation and trenching.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 TRENCHES

A. Pipe trenches shall be excavated to the lines, and grades shown on the drawings or as established by the Engineer. Before excavation begins in paved areas, the existing pavement shall be cut or sawed to a neat line by methods that meet the approval of the Engineer. The maximum width of the trench from the pipe invert to the top of the trench shall be as detailed on the Limits of Excavation indicated on the Contract Drawings. The procedures for the treatment of trench walls shall be as prescribed by the trench safety system. In some areas of limited right-of-way or when necessary to protect existing facilities, the slope of the trench wall shall be limited. Where necessary to stay within the maximum width limits at the top of the pipe, the trench shall be adequately braced and sheeted. The Contractor shall be fully responsible for any damage to adjacent structures due to inadequate trench wall supporting devices.
B. Where special pipe bedding material is not required, the trench shall be excavated to an even grade so that the bottom of the pipe will rest on the bottom of the trench throughout the entire length of the pipe. In obtaining a true and even grade, the excavated trench bottom shall be wetted as necessary to facilitate compaction. The bottom of the trench shall be compacted by mechanical means to consolidate all loose material disturbed during excavation.

No compaction tests will be required on the bottom of the trench, however, the entire width and length of trench shall be compacted such that no loose material remains. Any part of the trench excavated below grade shall be corrected by filling with approved materials and thoroughly compacting. If clay, rock or other unyielding material is encountered in the bottom of the trench, it shall be removed to a depth of six (6) inches below grade, refilled with selected materials, and compacted to a minimum of 90% maximum density and ± 2% optimum moisture in accordance with ASTM D-1557 to specified grade.

C. Bell holes of ample dimensions shall be dug at each joint to permit the jointing of the pipe to be made properly, and to prevent the pipe from resting on or being supported by the bell.

D. Trench digging machinery may be used to make trench excavations except in places where operation of same would cause damage to existing structures either above or below ground. In such instances, hand methods shall be employed. The Contractor shall locate all existing underground lines, whether or not they are shown on the drawings, sufficiently in advance of trenching operations to prevent any damage thereto. Extreme care shall be taken to prevent such damage and the Contractor shall be fully responsible for damage to any such lines. The Contractor shall pothole and locate all utility lines at least 10 days or 500 feet ahead of pipeline placement operations (whichever is more), to allow the Engineer a minimum of 4 working days to initiate any necessary changes in alignment and/ or grade of the pipeline.

E. There will be no classification of excavated materials and all materials encountered shall be excavated as required. Adjacent structures shall be protected from damage by construction equipment. Excavated material may be stockpiled along the side of the trench in accordance with the approved trench safety plan and in a manner which will not endanger the work. Within street rights-of-way excavated material shall be removed as necessary from the street to allow traffic to pass in a safe manner. In no case will excavated material be allowed to be stockpiled in street or public rights of way.

F. Excavation for manholes shall be made as required providing space for constructing the structure and trench safety system if applicable.

G. The use of explosives will not be permitted.

3.2 TRENCH EXCAVATION SAFETY SYSTEM

A. This item covers the requirements for the Contractor to provide the design and construction of trench safety system for all trenches excavated. The Contractor will be required to install a trench system to provide for the safe excavation of all trenches exceeding a depth of five (5) feet as per OSHA standards. It shall be the duty and responsibility of the Contractor and all of its subcontractors to be familiar and comply with all requirements of Public Law 91-596, 29 U.S.C. Specs. 651 et. Seq., the Occupational Safety and Health Act of 1970 (OSHA), and all amendments thereto, and to enforce and comply with all provisions of this act. In addition, on projects in which trench excavation will exceed five (5’), the Contractor and all of its subcontractors shall comply with all requirements of 29 C.F.R. secs., and 1926.652 and 1926.653, OSHA Safety and Health Standards, which are more fully described herein.

3.3 DESCRIPTION

A. This section shall govern the Trench Safety Systems required for the construction of all trench excavation to be utilized in the project including all additional excavation and backfill necessitated by the safety system. Trench Safety Systems shall be suitable for construction of pipelines, utilities, etc. that are installed below grade and shall be sufficient to fully protect public or private property including other existing utilities and structures below, or above grade.

Trench Safety Systems include, but are not limited to, sloping of side of excavation, sheeting, trench boxes or trench shields, sheet piling, cribbing, bracing, shoring, dewatering, or diversion of water to provide an adequately dry trench or hole for installation of pipe.

B. The Contractor shall be responsible for the design of systems, and procedures such as the use of sheet piling, shoring, or other means of temporary support to protect existing buildings, streets, highways, water conveying structures, and any other structures. In the case of existing utilities, the Contractor may elect, at his cost, to remove the utilities under the stipulated condition that the removal and subsequent replacement of these utilities shall meet with the approval of the Engineer, the Owner, the Utility owner, and all agencies having jurisdiction of the structure or property. In all cases, the Contractor shall be fully responsible for the protection of public or private property and for any person or persons, who, as a result of the Contractor's work, may be injured.

C. The successful responsible bidder will be required to submit 4 sets of trench excavation plans with a trench safety system to the Owner for review within 10 calendar days of Notice of Award.

D. Plans must be designed and sealed by a professional engineer registered in the State of New Mexico with professional experience in geotechnical engineering. The Contractor is responsible for obtaining borings and soil analysis as required for the design and preparation of the trench excavation plan and trench safety system. The trench excavation plan and the trench safety system are to be designed in conformance with OSHA standards and regulations.

E. No trenching in excess of five (5) feet below existing grade will be allowed until the trench excavation plan is reviewed and returned to the Contractor. Any changes in the trench excavation plan after initiation of construction will not cause an Extension of Time or Change Order but such changes will require the same review process as the original excavation plan.

F. The Contractor accepts sole responsibility for compliance with all applicable safety requirements. The review is only for general conformance with OSHA safety standards; and review of the trench excavation plan does not relieve the Contractor of any or all construction means, methods, technique and procedures. Any property damage or bodily injury, including death that arises from use of the trench excavation plan shall remain the sole responsibility and liability of the Contractor.

3.4 CONSTRUCTION METHODS

A. Trench Safety Systems shall be accomplished in accordance with the detailed specifications set out in the provisions of Excavations, Trenching, and Shoring, Federal Occupational Safety and Health Administration (OSHA) Standards, 29 CFR, Part 1926, Subpart P, as amended including proposed Rules published in the Federal Register (Vol. 54, No. 209) on Tuesday, October 31, 1989 or subsequent revisions. The sections that are incorporated into these specifications by reference include Sections 1926-650 through 1926-653.

3.5 SAFETY PROGRAM

A. The Contractor shall submit a safety program specifically for the construction of trench excavations together with the trench excavation plans for Trench Safety Systems. The trench safety program shall be in accordance with OSHA Standards governing the presence and activities of individuals working in and around trench excavation.

Contractors have two generally accepted methods, or combinations thereof, to meet OSHA Standards for Trench Excavation:

1. Utilization of Trench Box.
2. Shoring, Sheeting, and Bracing Methods.
3. Sloping, Benching.

B. Contractor electing to utilize a Trench Box must submit physical dimensions, materials, position in the trench, expected loads, and the strength of the box. The Trench Box shall be designed by a Professional Engineer.

C. Contractor electing to utilize Shoring, Sheeting, and Bracing must submit dimensions and materials of all uprights, stringers, cross-bracing, and spacing required to meet OSHA requirements, all designed by a Professional Engineer.

D. Contractor electing to utilize sloping and benching methods shall have methods designed by a Professional Engineer.

E. The Safety Program must indicate in which areas the Plan will be utilized.

F. No claims for delay will be permitted for Contractor delay in obtaining approval of the safety program.

3.6 INSPECTION

A. The Contractor shall provide a qualified person to make daily inspections of the Trench Safety Systems to ensure that the systems meet OSHA requirements. The Contractor shall provide this person’s name as part of the post-bid, pre-award Key Personnel Qualifications submittal. The Contractor shall maintain a permanent record of daily inspections.

B. If the evidence of possible cave-ins, or slides, is apparent, all work in the trench shall cease until the necessary precautions have been taken by the Contractor to safeguard personnel entering the trench. It is the sole duty, responsibility, and prerogative of the Contractor, not the Owner or the Owner's designated representative, to determine the specific applicability of the designed trench safety systems to each field condition encountered on the project.

3.7 INDEMNIFICATION

A. The Contractor shall indemnify and hold harmless the Owner, its employees and agents, from any and all damages, costs (including without limitation, legal fees, court costs, and the cost of investigation), judgments or claims, by anyone, including workers or the general public, for injury or death of persons resulting from the collapse or failure of trenches constructed under this contract.

B. The Contractor acknowledges and agrees that this indemnity provision provides indemnity for the Owner in case that claims are made that the Owner is negligent either by act or omission in providing for trench safety, including, but not limited to inspections, failure to issue stop work orders and the hiring of the Contractor.

3.8 EMERGENCIES

A. In any emergency situation which may threaten or affect the safety or welfare of persons or property, the Contractor shall act at it's discretion to prevent possible damage, injury, or loss. Any additional compensation or extension of time claimed for such action shall be considered in view of the cause of the emergency and in accordance with the general conditions.

3.9 OSHA SAFETY AND HEALTH REGULATION PART 1926

A. See OSHA reprint, EXHIBIT A at the end of this section.

3.10 OPEN TRENCH RESTRICTION

A. Stringing out pipe, ahead of trenching operations, in street right-of-way shall be limited to the linear footage of pipeline that can be installed in one days work. Under no circumstances will pipe be allowed to be strung out or stored in street-right-of-ways for any longer than one day. Except where otherwise specified, indicated on the Plans, or accepted in writing by the Engineer, the maximum length of open trench, where the construction is in any stage of completion, shall not exceed the lengths as set forth below. The definition of "open trench" for the purpose of this description will include excavation, pipe laying, backfilling, and pavement replacement. The descriptions under the area designations are general in nature and may be amended in writing by the Engineer due to particular or peculiar field conditions.
   1. Business District Areas – 200 Linear Feet.
   2. Residential Areas – Three (3) Blocks or 300 linear feet, whichever is the least.
   3. Undeveloped Areas 300 Linear Feet (open trench shall not exceed length of one days pipe laying).

B. The contractor shall complete backfill of all trenches prior to removing dewatering operations from the area to prevent the possibility of pipe flotation, if applicable.

C. Any excavated areas shall be considered as "open trench" until all pavement replacements have been brought up to existing grade with temporary or permanent pavement replacement. If temporary material is used, contractor shall maintain on a daily basis or until all trenches outside of pavement replacement areas have been backfilled, compacted and replaced to original condition in accordance with these Contract Documents. Trenches across streets shall be completely backfilled, and temporary or permanent pavement placed at the end of each day's work laying the pipe.

D. The Contractor shall provide substantial steel plates, properly secured in place, with adequate trench bracing which shall be used to bridge across trenches at street and alley crossings and at commercial and residential driveways, where trench backfill and temporary patches have not been completed before the end of the contractor's regular work hours. Safe and convenient passage for pedestrians shall be provided at all times. The Engineer may designate an enclosed or railed passage for the safe access of pedestrian traffic at any location adjacent to construction activities as he deems necessary. **Access to fire stations, fire hydrants, schools, hospitals, EMS and emergency response shall be maintained at all times**.

3.11 BEDDING

A. Bedding and bedding zone for the pipe shall be as specified in the applicable portions of Section 02730 - PIPE INSTALLATION.

3.12 BACKFILLING

A. All trenches shall be backfilled in accordance with this section as soon as practicable after the pipe has been installed with the specified bedding condition. As soon as practicable after laying and jointing of the pipe, the completion of bedding, and the completion of structures, the trench shall be backfilled.

3.13 MATERIAL

A. The backfill material immediately adjacent to the pipe or bedding material shall meet the gradation requirements specified in Section 02730. The material shall be free from rocks, boulders, clay or other unsuitable material(s).

3.14 PLACEMENT OF BACKFILL

A. If the bedding requirements do not require bedding zone material to the top or above the pipe, the first lift of backfill material shall be placed carefully under and around the pipe and thoroughly compacted by means of mechanical tamps to the spring line of the pipe. When the first lift has been compacted by mechanical tamps, the second lift shall be to one foot above the top of the pipe and compacted as specified. Placing each lift will be dependent upon the diameter of the pipe and in no case shall each lift exceed 8 inches in thickness based upon loose measure. The backfilling of the remainder of the trench shall be done in the following manner: The backfill material shall be placed in the trench in layers not to exceed 8 inches, moistened or aerated as necessary to obtain optimum moisture, and compacted with approved mechanical compaction equipment until the required density is obtained. Vibratory rollers may not be used in city streets. Depending upon the mechanical compaction equipment used, the Engineer may allow the Contractor to lay thicker lifts. If the Contractor feels it can achieve passing density tests, based upon the density requirements of the contract with thicker lifts than 8 inches by loose measure, it shall first submit it’s proposed method of compaction, type of equipment to be used and the desired lift thickness. The Engineer shall make the determination as to whether or not the Contractor’s proposed methods are acceptable. In utilizing existing spoil for backfill material, any spoil that contains obvious and excessive amounts of clay and/or large cobbles (+3”) shall not be acceptable for use in any zone.

B. The Engineer shall make the determination as to whether excavated spoil is acceptable for backfill material.

C. Density requirements shall be as follows:
   1. For all backfill in areas to be paved, a density of not less than 95 percent per ASTM D-1557 shall be obtained from the top of subgrade to 18 inches below the top of subgrade. A density of 90 percent per ASTM D-1557 shall be obtained from 18 inches below the top of subgrade to top of pipe bedding zone.
   2. For all backfill not in paved areas, density of not less than 90% per ASTM D-1557 shall be obtained from top of pipe bedding zone to the ground surface.
   3. The jetting method of water tamping or the water ponding method will not be allowed.
   4. Slamming the excavator bucket down on backfill is not an acceptable means for compaction. Contractor shall use sheepsfoot wheel rollers or other approved mechanical compaction equipment and techniques.

3.15 FIELD QUALITY CONTROL

A. Field densities of the backfill shall be taken every 300 linear feet of pipe installation, in accordance with ASTM D2922, at the following depths:
   1. 1/3 pipe height
   2. Springline
   3. Top of pipe
   4. Every lift thereafter to ground surface

B. Additionally, one moisture density curve shall be obtained for each type of material used in accordance with ASTM D1557, and one sieve analysis and one plasticity index for each type of imported material used in accordance with ASTM C136 and D4318.

3.16 BACKFILL AND MAINTENANCE

A. Following the completion of backfilling, the Contractor will maintain the trench surface in a satisfactory manner until final completion and acceptance of the finished project. The maintenance shall include blading from time to time as necessary, filling depressions caused by settlement, and other work required to keep the areas and roads in satisfactory condition.

B. Any settlement which occurs before and during the 1-year warranty period shall be repaired by the Contractor at his expense.

3.17 PAYMENT

A. Payment for all work covered in this section, will be included as part of the unit bid price for the installation of the pipelines as shown in the Contractor’s Bid Proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and specifications. No separate payment will be made for compliance with this section. Work repaired for Trench Safety will be included in other Bid Items as the contractor sees appropriate.

END OF SECTION

OSHA Part 1926.650

Excavation Safety

If it is necessary to stand at the outboard or inboard edge of the deckload where less than 24 inches of bulwark, rail, coaming, or other protection exists, all employees shall be provided with a suitable means of protection against falling from the deckload.

(d) *First-aid and lifesaving equipment.* (1) Provisions for rendering first aid and medical assistance shall be in accordance with subpart D of this part.

(2) The employer shall ensure that there is in the vicinity of each barge in use at least one U.S. Coast Guard-approved 30-inch lifering with not less than 90 feet of line attached, and at least one portable or permanent ladder which will reach the top of the apron to the surface of the water. If the above equipment is not available at the pier, the employer shall furnish it during the time that he is working the barge.

(3) Employees walking or working on the unguarded decks of barges shall be protected with U.S. Coast Guard-approved work vests or buoyant vests.

(e) *Commercial diving operations.* Commercial diving operations shall be subject to subpart T of part 1910, §§ 1910.401–1910.441, of this chapter.

[39 FR 22801, June 24, 1974, as amended at 42 FR 37674, July 22, 1977]

§ 1926.606 Definitions applicable to this subpart.

(a) *Apron*—The area along the waterfront edge of the pier or wharf.

(b) *Bulwark*—The side of a ship above the upper deck.

(c) *Coaming*—The raised frame, as around a hatchway in the deck, to keep out water.

(d) *Jacob s ladder*—A marine ladder of rope or chain with wooden or metal rungs.

(e) *Rail*, for the purpose of § 1926.605, means a light structure serving as a guard at the outer edge of a ship's deck.

Subpart P Excavations

AUTHORITY: Sec. 107, Contract Worker Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333); Secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12–71 (36 FR 8754), 8–76 (41 FR 25059), or 9–83 (48 FR 35736), as applicable, and 29 CFR part 1911.

SOURCE: 54 FR 45959, Oct. 31, 1989, unless otherwise noted.

§ 1926.650 Scope, application, and definitions applicable to this subpart.

(a) *Scope and application.* This subpart applies to all open excavations made in the earth's surface. Excavations are defined to include trenches.

(b) *Definitions applicable to this subpart.*

Accepted engineering practices means those requirements which are compatible with standards of practice required by a registered professional engineer.

Aluminum Hydraulic Shoring means a pre-engineered shoring system comprised of aluminum hydraulic cylinders (crossbraces) used in conjunction with vertical rails (uprights) or horizontal rails (walers). Such system is designed, specifically to support the sidewalls of an excavation and prevent cave-ins.

Bell-bottom pier hole means a type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a belled shape.

Benching (Benching system) means a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Cave-in means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Cross braces mean the horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or wales.

Excavation means any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Faces or *sides* means the vertical or inclined earth surfaces formed as a result of excavation work.

Failure means the breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

Hazardous atmosphere means an atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

Kickout means the accidental release or failure of a cross brace.

Protective system means a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

Ramp means an inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.

Registered Professional Engineer means a person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

Sheeting means the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield (Shield system) means a structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either premanufactured or job-built in accordance with §1926.652 (c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

Shoring (Shoring system) means a structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sides. See "Faces."

Sloping (Sloping system) means a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Stable rock means natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Structural ramp means a ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.

Support system means a structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Tabulated data means tables and charts approved by a registered professional engineer and used to design and construct a protective system.

Trench (Trench excavation) means a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 m) or less

(measured at the bottom of the excavation), the excavation is also considered to be a trench.

Trench box. See "Shield."

Trench shield. See "Shield."

Uprights means the vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called "sheeting."

Wales means horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

§ 1926.651 Specific excavation requirements.

(a) *Surface encumbrances.* All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

(b) *Underground installations.* (1) The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation.

(2) Utility companies or owners shall be contacted within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation. When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours (unless a longer period is required by state or local law), or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used.

(3) When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.

(4) While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees.

(c) *Access and egress*—(1) *Structural ramps.* (i) Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

(ii) Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement.

(iii) Structural members used for ramps and runways shall be of uniform thickness.

(iv) Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

(v) Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

(2) *Means of egress from trench excavations.* A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet (7.62 m) of lateral travel for employees.

(d) *Exposure to vehicular traffic.* Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

(e) *Exposure to falling loads.* No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with § 1926.601(b)(6), to provide adequate protection for the operator during loading and unloading operations.

(f) *Warning system for mobile equipment.* When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

(g) *Hazardous atmospheres*—(1) *Testing and controls.* In addition to the requirements set forth in subparts D and E of this part (29 CFR 1926.50–1926.107) to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply:

(i) Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet (1.22 m) in depth.

(ii) Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation in accordance with subparts D and E of this part respectively.

(iii) Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.

(iv) When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

(2) *Emergency rescue equipment.* (i) Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.

(ii) Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a life-line securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

(h) *Protection from hazards associated with water accumulation.* (1) Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

(2) If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.

(3) If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person and compliance with paragraphs (h)(1) and (h)(2) of this section.

(i) *Stability of adjacent structures.* (1) Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

(2) Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably

expected to pose a hazard to employees shall not be permitted except when:

(i) A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or

(ii) The excavation is in stable rock; or

(iii) A registered professional engineer has approved the determination that the structure is sufficently removed from the excavation so as to be unaffected by the excavation activity; or

(iv) A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

(3) Sidewalks, pavements, and appurtenant structure shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

(j) *Protection of employees from loose rock or soil.* (1) Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.

(2) Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet (.61 m) from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

(k) *Inspections.* (1) Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

(2) Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

(l) Walkways shall be provided where employees or equipment are required or permitted to cross over excavations. Guardrails which comply with §1926.502(b) shall be provided where walkways are 6 feet (1.8 m) or more above lower levels.

[54 FR 45959, Oct. 31, 1989, as amended by 59 FR 40730, Aug. 9, 1994]

§ 1926.652 Requirements for protective systems.

(a) *Protection of employees in excavations.* (1) Each employee in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with paragraph (b) or (c) of this section except when:

(i) Excavations are made entirely in stable rock; or

(ii) Excavations are less than 5 feet (1.52m) in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

(2) Protective systems shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

(b) *Design of sloping and benching systems.* The slopes and configurations of sloping and benching systems shall be selected and constructed by the employer or his designee and shall be in accordance with the requirements of paragraph (b)(1); or, in the alternative, paragraph (b)(2); or, in the alternative, paragraph (b)(3), or, in the alternative, paragraph (b)(4), as follows:

(1) *Option (1) Allowable configurations and slopes.* (i) Excavations shall be sloped at an angle not steeper than one and one-half horizontal to one vertical

(34 degrees measured from the horizontal), unless the employer uses one of the other options listed below.

(ii) Slopes specified in paragraph (b)(1)(i) of this section, shall be excavated to form configurations that are in accordance with the slopes shown for Type C soil in Appendix B to this subpart.

(2) *Option (2) Determination of slopes and configurations using Appendices A and B.* Maximum allowable slopes, and allowable configurations for sloping and benching systems, shall be determined in accordance with the conditions and requirements set forth in appendices A and B to this subpart.

(3) *Option (3) Designs using other tabulated data.* (i) Designs of sloping or benching systems shall be selected from and be in accordance with tabulated data, such as tables and charts.

(ii) The tabulated data shall be in written form and shall include all of the following:

(A) Identification of the parameters that affect the selection of a sloping or benching system drawn from such data;

(B) Identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe;

(C) Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

(iii) At least one copy of the tabulated data which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the Secretary upon request.

(4) *Option (4) Design by a registered professional engineer.* (i) Sloping and benching systems not utilizing Option (1) or Option (2) or Option (3) under paragraph (b) of this section shall be approved by a registered professional engineer.

(ii) Designs shall be in written form and shall include at least the following:

(A) The magnitude of the slopes that were determined to be safe for the particular project;

(B) The configurations that were determined to be safe for the particular project; and

(C) The identity of the registered professional engineer approving the design.

(iii) At least one copy of the design shall be maintained at the jobsite while the slope is being constructed. After that time the design need not be at the jobsite, but a copy shall be made available to the Secretary upon request.

(c) *Design of support systems, shield systems, and other protective systems.* Designs of support systems shield systems, and other protective systems shall be selected and constructed by the employer or his designee and shall be in accordance with the requirements of paragraph (c)(1); or, in the alternative, paragraph (c)(2); or, in the alternative, paragraph (c)(3); or, in the alternative, paragraph (c)(4) as follows:

(1) *Option (1) Designs using appendices A, C and D.* Designs for timber shoring in trenches shall be determined in accordance with the conditions and requirements set forth in appendices A and C to this subpart. Designs for aluminum hydraulic shoring shall be in accordance with paragraph (c)(2) of this section, but if manufacturer's tabulated data cannot be utilized, designs shall be in accordance with appendix D.

(2) *Option (2) Designs Using Manufacturer s Tabulated Data.* (i) Design of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data shall be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

(ii) Deviation from the specifications, recommendations, and limitations issued or made by the manufacturer shall only be allowed after the manufacturer issues specific written approval.

(iii) Manufacturer's specifications, recommendations, and limitations, and manufacturer's approval to deviate from the specifications, recommendations, and limitations shall be in written form at the jobsite during construction of the protective system. After that time this data may be stored off the jobsite, but a copy shall

be made available to the Secretary upon request.

(3) *Option (3) Designs using other tabulated data.* (i) Designs of support systems, shield systems, or other protective systems shall be selected from and be in accordance with tabulated data, such as tables and charts.

(ii) The tabulated data shall be in written form and include all of the following:

(A) Identification of the parameters that affect the selection of a protective system drawn from such data;

(B) Identification of the limits of use of the data;

(C) Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

(iii) At least one copy of the tabulated data, which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the Secretary upon request.

(4) *Option (4) Design by a registered professional engineer.* (i) Support systems, shield systems, and other protective systems not utilizing Option 1, Option 2 or Option 3, above, shall be approved by a registered professional engineer.

(ii) Designs shall be in written form and shall include the following:

(A) A plan indicating the sizes, types, and configurations of the materials to be used in the protective system; and

(B) The identity of the registered professional engineer approving the design.

(iii) At least one copy of the design shall be maintained at the jobsite during construction of the protective system. After that time, the design may be stored off the jobsite, but a copy of the design shall be made available to the Secretary upon request.

(d) *Materials and equipment.* (1) Materials and equipment used for protective systems shall be free from damage or defects that might impair their proper function.

(2) Manufactured materials and equipment used for protective systems shall be used and maintained in a manner that is consistent with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards.

(3) When material or equipment that is used for protective systems is damaged, a competent person shall examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service.

(e) *Installation and removal of support*—(1) *General.* (i) Members of support systems shall be securely connected together to prevent sliding, falling, kickouts, or other predictable failure.

(ii) Support systems shall be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.

(iii) Individual members of support systems shall not be subjected to loads exceeding those which those members were designed to withstand.

(iv) Before temporary removal of individual members begins, additional precautions shall be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system.

(v) Removal shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation.

(vi) Backfilling shall progress together with the removal of support systems from excavations.

(2) *Additional requirements for support systems for trench excavations.* (i) Excavation of material to a level no greater than 2 feet (.61 m) below the bottom of the members of a support system shall be permitted, but only if the system is designed to resist the forces calculated for the full depth of the trench, and

there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

(ii) Installation of a support system shall be closely coordinated with the excavation of trenches.

(f) *Sloping and benching systems.* Employees shall not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

(g) *Shield systems* (1) *General.* (i) Shield systems shall not be subjected to loads exceeding those which the system was designed to withstand.

(ii) Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.

(iii) Employees shall be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.

(iv) Employees shall not be allowed in shields when shields are being installed, removed, or moved vertically.

(2) *Additional requirement for shield systems used in trench excavations.* Excavations of earth material to a level not greater than 2 feet (.61 m) below the bottom of a shield shall be permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

APPENDIX A TO SUBPART P—SOIL CLASSIFICATION

(a) *Scope and application* (1) *Scope.* This appendix describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. The appendix contains definitions, sets forth requirements, and describes acceptable visual and manual tests for use in classifying soils.

(2) *Application.* This appendix applies when a sloping or benching system is designed in accordance with the requirements set forth in §1926.652(b)(2) as a method of protection for employees from cave-ins. This appendix also applies when timber shoring for excavations is designed as a method of protection from cave-ins in accordance with appendix C to subpart P of part 1926, and when aluminum hydraulic shoring is designed in accordance with appendix D. This Appendix also applies if other protective systems are designed and selected for use from data prepared in accordance with the requirements set forth in §1926.652(c), and the use of the data is predicated on the use of the soil classification system set forth in this appendix.

(b) *Definitions.* The definitions and examples given below are based on, in whole or in part, the following: American Society for Testing Materials (ASTM) Standards D653–85 and D2488; The Unified Soils Classification System, The U.S. Department of Agriculture (USDA) Textural Classification Scheme; and The National Bureau of Standards Report BSS–121.

Cemented soil means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

Cohesive soil means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

Dry soil means soil that does not exhibit visible signs of moisture content.

Fissured means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

Granular soil means gravel, sand, or silt, (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

Layered system means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

Moist soil means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

Plastic means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

Saturated soil means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.

Soil classification system means, for the purpose of this subpart, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the environmental conditions of exposure.

Stable rock means natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

Submerged soil means soil which is underwater or is free seeping.

Type A means cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:

(i) The soil is fissured; or

(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or

(iii) The soil has been previously disturbed; or

(iv) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or

(v) The material is subject to other factors that would require it to be classified as a less stable material.

Type B means:

(i) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or

(ii) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.

(iii) Previously disturbed soils except those which would otherwise be classed as Type C soil.

(iv) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or

(v) Dry rock that is not stable; or

(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type C means:

(i) Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or

(ii) Granular soils including gravel, sand, and loamy sand; or

(iii) Submerged soil or soil from which water is freely seeping; or

(iv) Submerged rock that is not stable, or

(v) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

Unconfined compressive strength means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

Wet soil means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

(c) *Requirements*—(1) *Classification of soil and rock deposits.* Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of this appendix.

(2) *Basis of classification.* The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis. Such analyses shall be conducted by a competent person using tests described in paragraph (d) below, or in other recognized methods of soil classification and testing such as those adopted by the America Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.

(3) *Visual and manual analyses.* The visual and manual analyses, such as those noted as being acceptable in paragraph (d) of this appendix, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits.

(4) *Layered systems.* In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

(5) *Reclassification.* If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

(d) *Acceptable visual and manual tests.* (1) *Visual tests.* Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

(i) Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained

material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.

(ii) Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.

(iii) Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.

(iv) Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.

(v) Observe the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.

(vi) Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.

(vii) Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

(2) *Manual tests.* Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

(i) *Plasticity.* Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as ⅛-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of ⅛-inch thread can be held on one end without tearing, the soil is cohesive.

(ii) *Dry strength.* If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

(iii) *Thumb penetration.* The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. (This test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designation D2488—"Standard Recommended Practice for Description of Soils (Visual—Manual Procedure).") Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a miminum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.

(iv) *Other strength tests.* Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shearvane.

(v) *Drying test.* The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.54 cm) and six inches (15.24 cm) in diameter until it is thoroughly dry:

(A) If the sample develops cracks as it dries, significant fissures are indicated.

(B) Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as a unfissured cohesive material and the unconfined compressive strength should be determined.

(C) If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

APPENDIX B TO SUBPART P—SLOPING AND BENCHING

(a) *Scope and application.* This appendix contains specifications for sloping and benching when used as methods of protecting employees working in excavations from cave-ins. The requirements of this appendix apply when the design of sloping and benching protective systems is to be performed in accordance with the requirements set forth in §1926.652(b)(2).

(b) *Definitions.*

Actual slope means the slope to which an excavation face is excavated.

Distress means that the soil is in a condition where a cave-in is imminent or is likely

to occur. Distress is evidenced by such phenomena as the development of fissures in the face of or adjacent to an open excavation; the subsidence of the edge of an excavation; the slumping of material from the face or the bulging or heaving of material from the bottom of an excavation; the spalling of material from the face of an excavation; and ravelling, i.e., small amounts of material such as pebbles or little clumps of material suddenly separating from the face of an excavation and trickling or rolling down into the excavation.

Maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V).

Short term exposure means a period of time less than or equal to 24 hours that an excavation is open.

(c) *Requirements* (1) *Soil classification.* Soil and rock deposits shall be classified in accordance with appendix A to subpart P of part 1926.

(2) *Maximum allowable slope.* The maximum allowable slope for a soil or rock deposit shall be determined from Table B–1 of this appendix.

(3) *Actual slope.* (i) The actual slope shall not be steeper than the maximum allowable slope.

(ii) The actual slope shall be less steep than the maximum allowable slope, when there are signs of distress. If that situation occurs, the slope shall be cut back to an actual slope which is at least ½ horizontal to one vertical (½H:1V) less steep than the maximum allowable slope.

(iii) When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved. Surcharge loads from adjacent structures shall be evaluated in accordance with §1926.651(i).

(4) *Configurations.* Configurations of sloping and benching systems shall be in accordance with Figure B–1.

TABLE B-1

MAXIMUM ALLOWABLE SLOPES

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V)[1] FOR EXCAVATIONS LESS THAN 20 FEET DEEP.[3]
STABLE ROCK TYPE A [2] TYPE B TYPE C	VERTICAL (90°) 3/4 : 1 (53°) 1:1 (45°) 1½: 1 (34°)

NOTES:

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
2. A short-term maximum allowable slope of 1/2H:1V (63°) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4H:1V (53°).
3. Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

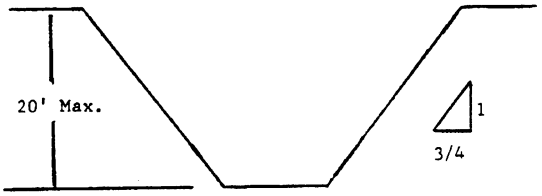
Figure B 1

Slope Configurations

(All slopes stated below are in the horizontal to vertical ratio)

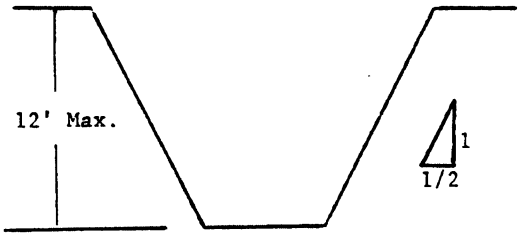
B 1.1 Excavations made in Type A soil.

1. All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of ¾:1.



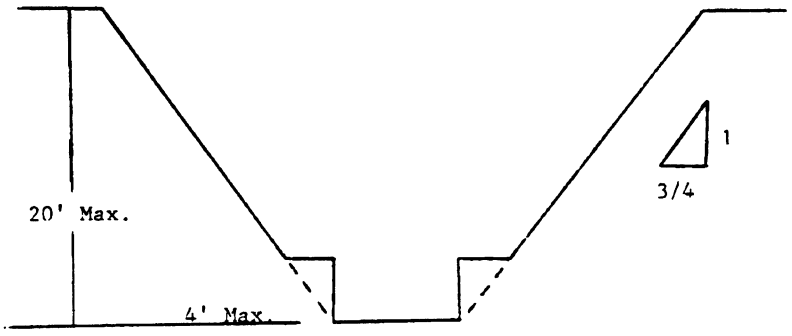
SIMPLE SLOPE—GENERAL

Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of ½:1.

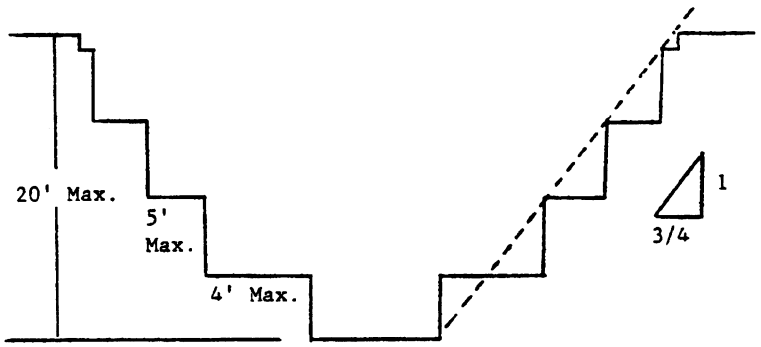


SIMPLE SLOPE—SHORT TERM

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of ¾ to 1 and maximum bench dimensions as follows:

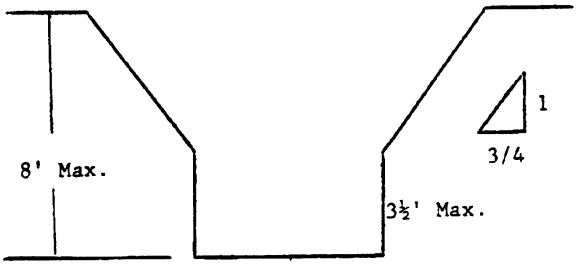


SIMPLE BENCH



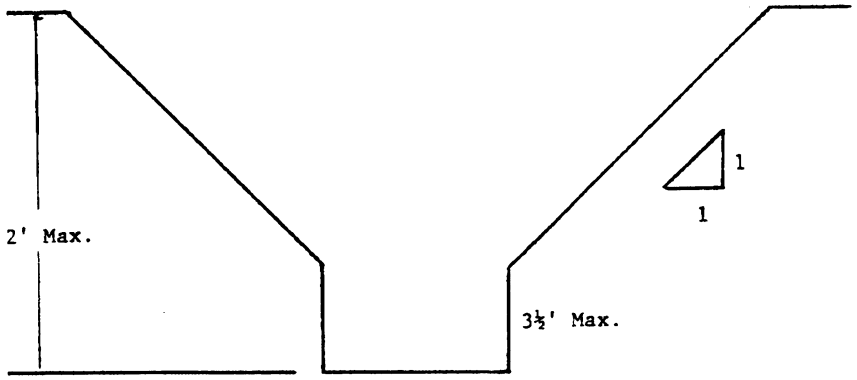
MULTIPLE BENCH

3. All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical side of 3½ feet.



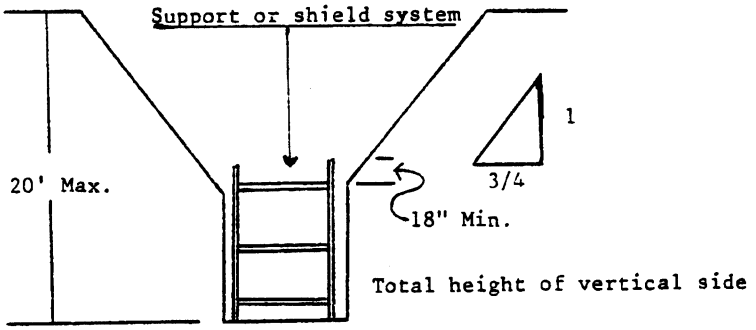
UNSUPPORTED VERTICALLY SIDED LOWER PORTION—MAXIMUM 8 FEET IN DEPTH

All excavations more than 8 feet but not more than 12 feet in depth which unsupported vertically sided lower portions shall have a maximum allowable slope of 1:1 and a maximum vertical side of 3½ feet.



UNSUPPORTED VERTICALLY SIDED LOWER PORTION—MAXIMUM 12 FEET IN DEPTH

All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of ¾:1. The support or shield system must extend at least 18 inches above the top of the vertical side.

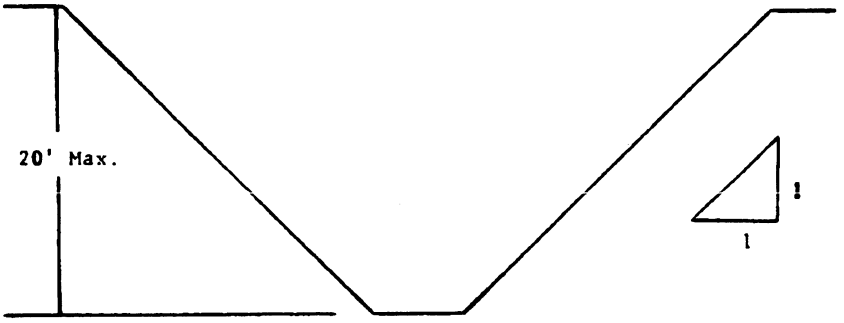


SUPPORTED OR SHIELDED VERTICALLY SIDED LOWER PORTION

4. All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other options permitted under § 1926.652(b).

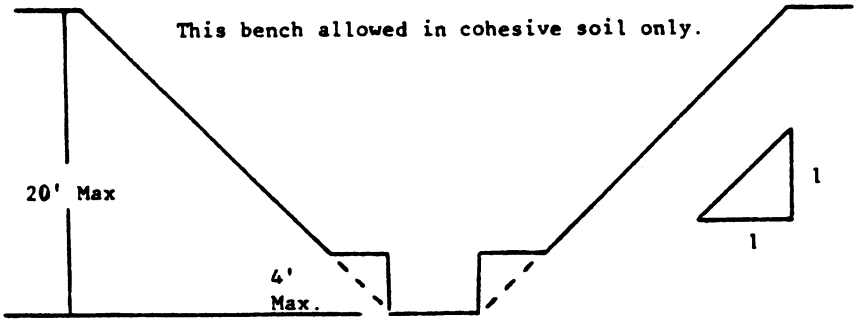
B–1.2 Excavations Made in Type B Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

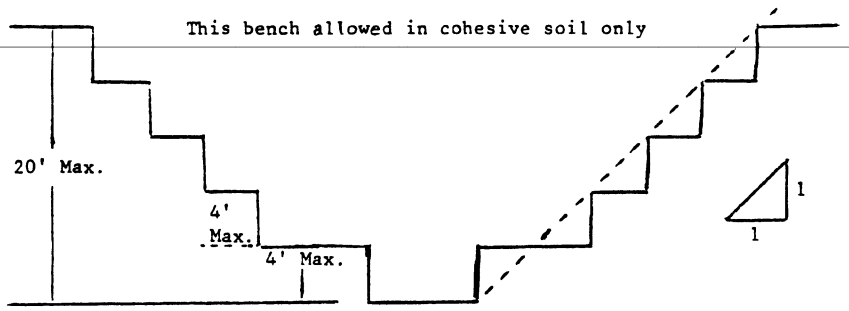


SIMPLE SLOPE

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:

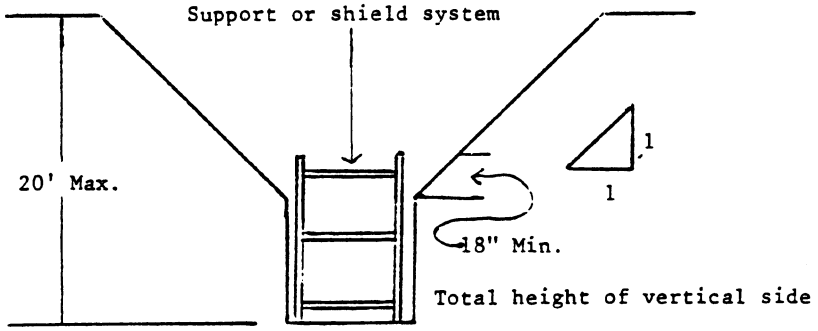


SINGLE BENCH



MULTIPLE BENCH

3. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.

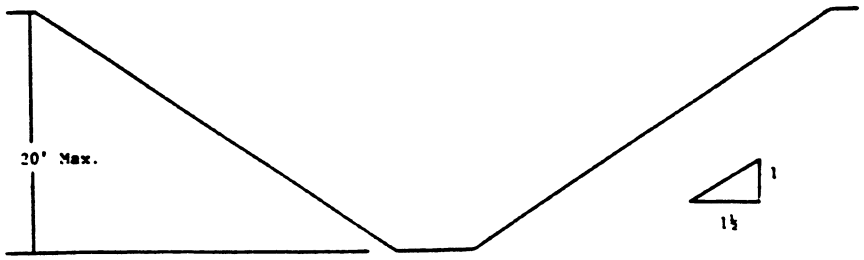


VERTICALLY SIDED LOWER PORTION

4. All other sloped excavations shall be in accordance with the other options permitted in §1926.652(b).

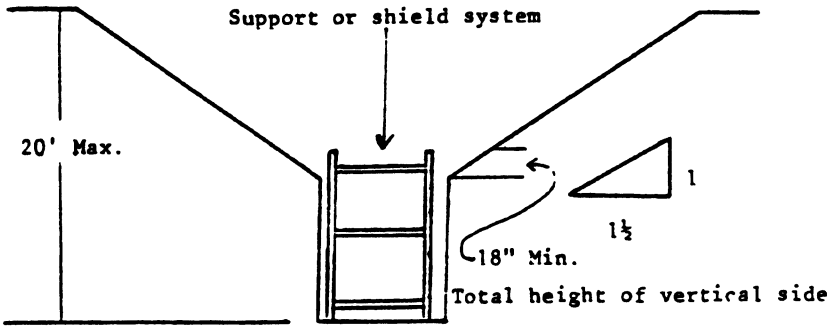
B–1.3 EXCAVATIONS MADE IN TYPE C SOIL

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1½:1.



SIMPLE SLOPE

2. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1½:1.

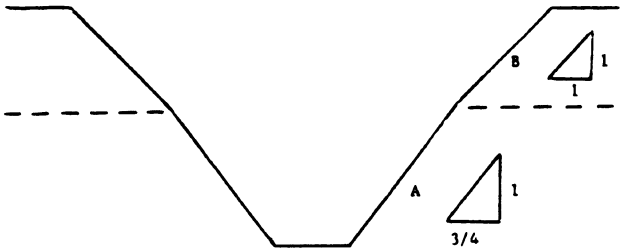


VERTICAL SIDED LOWER PORTION

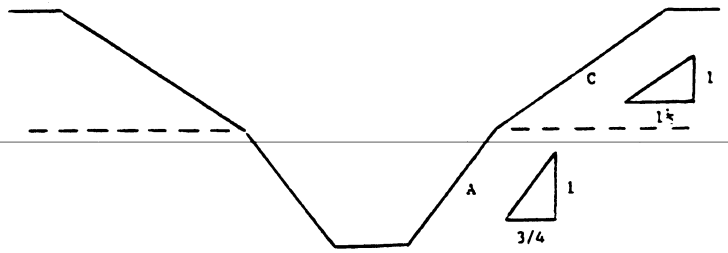
3. All other sloped excavations shall be in accordance with the other options permitted in §1926.652(b).

B–1.4 Excavations Made in Layered Soils

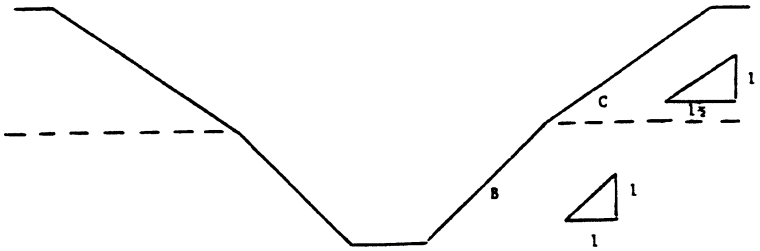
1. All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth below.



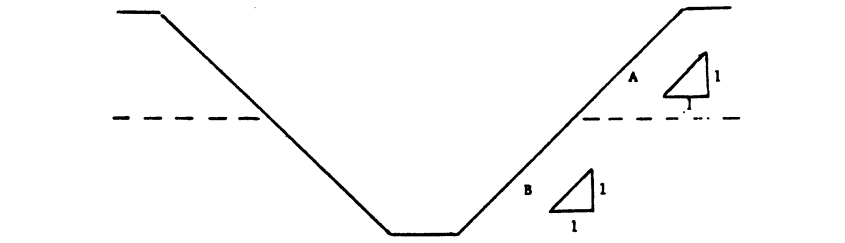
B OVER A



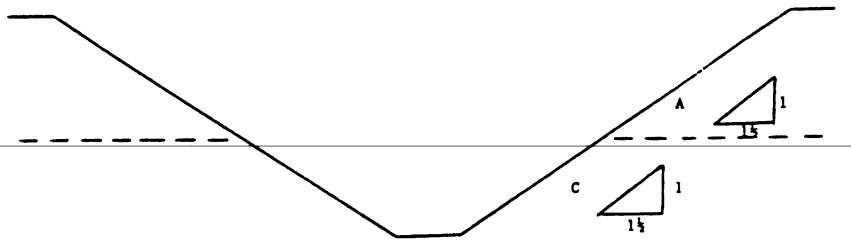
C OVER A



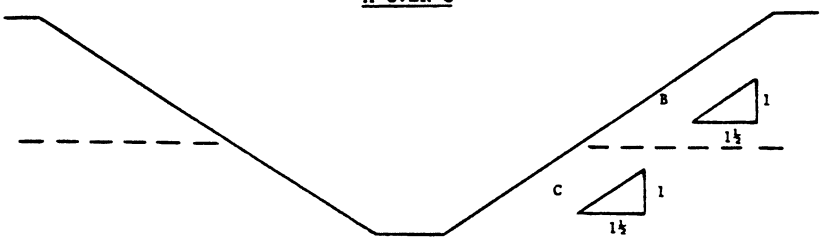
C OVER B



A OVER B



A OVER C



B OVER C

2. All other sloped excavations shall be in accordance with the other options permitted in §1926.652(b).

APPENDIX C TO SUBPART P—TIMBER SHORING FOR TRENCHES

(a) *Scope.* This appendix contains information that can be used timber shoring is provided as a method of protection from caveins in trenches that do not exceed 20 feet (6.1 m) in depth. This appendix must be used when design of timber shoring protective systems is to be performed in accordance with §1926.652(c)(1). Other timber shoring configurations; other systems of support such as hydraulic and pneumatic systems; and other protective systems such as sloping, benching, shielding, and freezing systems must be designed in accordance with the requirements set forth in §1926.652(b) and §1926.652(c).

(b) *Soil Classification.* In order to use the data presented in this appendix, the soil type or types in which the excavation is made must first be determined using the soil classification method set forth in appendix A of subpart P of this part.

(c) *Presentation of Information.* Information is presented in several forms as follows:

(1) Information is presented in tabular form in Tables C–1.1, C–1.2, and C–1.3, and Tables C–2.1, C–2.2 and C–2.3 following paragraph (g) of the appendix. Each table presents the minimum sizes of timber members to use in a shoring system, and each table contains data only for the particular soil type in which the excavation or portion of

the excavation is made. The data are arranged to allow the user the flexibility to select from among several acceptable configurations of members based on varying the horizontal spacing of the crossbraces. Stable rock is exempt from shoring requirements and therefore, no data are presented for this condition.

(2) Information concerning the basis of the tabular data and the limitations of the data is presented in paragraph (d) of this appendix, and on the tables themselves.

(3) Information explaining the use of the tabular data is presented in paragraph (e) of this appendix.

(4) Information illustrating the use of the tabular data is presented in paragraph (f) of this appendix.

(5) Miscellaneous notations regarding Tables C–1.1 through C–1.3 and Tables C–2.1 through C–2.3 are presented in paragraph (g) of this Appendix.

(d) *Basis and limitations of the data.*—(1) *Dimensions of timber members.* (i) The sizes of the timber members listed in Tables C–1.1 through C–1.3 are taken from the National Bureau of Standards (NBS) report, "Recommended Technical Provisions for Construction Practice in Shoring and Sloping of Trenches and Excavations." In addition, where NBS did not recommend specific sizes of members, member sizes are based on an analysis of the sizes required for use by existing codes and on empirical practice.

(ii) The required dimensions of the members listed in Tables C–1.1 through C–1.3 refer to actual dimensions and not nominal dimensions of the timber. Employers wanting to use nominal size shoring are directed to Tables C–2.1 through C–2.3, or have this choice under §1926.652(c)(3), and are referred to The Corps of Engineers, The Bureau of Reclamation or data from other acceptable sources.

(2) *Limitation of application.* (i) It is not intended that the timber shoring specification apply to every situation that may be experienced in the field. These data were developed to apply to the situations that are most commonly experienced in current trenching practice. Shoring systems for use in situations that are not covered by the data in this appendix must be designed as specified in §1926.652(c).

(ii) When any of the following conditions are present, the members specified in the tables are not considered adequate. Either an alternate timber shoring system must be designed or another type of protective system designed in accordance with §1926.652.

(A) When loads imposed by structures or by stored material adjacent to the trench weigh in excess of the load imposed by a two-foot soil surcharge. The term "adjacent" as used here means the area within a horizontal distance from the edge of the trench equal to the depth of the trench.

(B) When vertical loads imposed on cross braces exceed a 240-pound gravity load distributed on a one-foot section of the center of the crossbrace.

(C) When surcharge loads are present from equipment weighing in excess of 20,000 pounds.

(D) When only the lower portion of a trench is shored and the remaining portion of the trench is sloped or benched unless: The sloped portion is sloped at an angle less steep than three horizontal to one vertical; or the members are selected from the tables for use at a depth which is determined from the top of the overall trench, and not from the toe of the sloped portion.

(e) *Use of Tables.* The members of the shoring system that are to be selected using this information are the cross braces, the uprights, and the wales, where wales are required. Minimum sizes of members are specified for use in different types of soil. There are six tables of information, two for each soil type. The soil type must first be determined in accordance with the soil classification system described in appendix A to subpart P of part 1926. Using the appropriate table, the selection of the size and spacing of the members is then made. The selection is based on the depth and width of the trench where the members are to be installed and, in most instances, the selection is also based on the horizontal spacing of the crossbraces. Instances where a choice of horizontal spacing of crossbracing is available, the horizontal spacing of the crossbraces must be chosen by the user before the size of any member can be determined. When the soil type, the width and depth of the trench, and the horizontal spacing of the crossbraces are known, the size and vertical spacing of the crossbraces, the size and vertical spacing of the wales, and the size and horizontal spacing of the uprights can be read from the appropriate table.

(f) *Examples to Illustrate the Use of Tables C 1.1 through C 1.3.*

(1) *Example 1.*

A trench dug in Type A soil is 13 feet deep and five feet wide.

From *Table C 1.1*, for acceptable arrangements of timber can be used.

Arrangement #B1

Space 4×4 crossbraces at six feet horizontally and four feet vertically.

Wales are not required.

Space 3×8 uprights at six feet horizontally. This arrangement is commonly called "skip shoring."

Arrangement #B2

Space 4×6 crossbraces at eight feet horizontally and four feet vertically.

Space 8×8 wales at four feet vertically.

Space 2×6 uprights at four feet horizontally.

Arrangement #B3

Space 6×6 crossbraces at 10 feet horizontally and four feet vertically.
Space 8×10 wales at four feet vertically.
Space 2×6 uprights at five feet horizontally.

Arrangement #B4

Space 6×6 crossbraces at 12 feet horizontally and four feet vertically.
Space 10×10 wales at four feet vertically.
Spaces 3×8 uprights at six feet horizontally.

(2) *Example 2.*

A trench dug in Type B soil in 13 feet deep and five feet wide. From Table C–1.2 three acceptable arrangements of members are listed.

Arrangement #B1

Space 6×6 crossbraces at six feet horizontally and five feet vertically.
Space 8×8 wales at five feet vertically.
Space 2×6 uprights at two feet horizontally.

Arrangement #B2

Space 6×8 crossbraces at eight feet horizontally and five feet vertically.
Space 10×10 wales at five feet vertically.
Space 2×6 uprights at two feet horizontally.

Arrangement #B3

Space 8×8 crossbraces at 10 feet horizontally and five feet vertically.
Space 10×12 wales at five feet vertically.
Space 2×6 uprights at two feet vertically.

(3) *Example 3.*

A trench dug in Type C soil is 13 feet deep and five feet wide.

From Table C–1.3 two acceptable arrangements of members can be used.

Arrangement #B1

Space 8×8 crossbraces at six feet horizontally and five feet vertically.
Space 10×12 wales at five feet vertically.
Position 2×6 uprights as closely together as possible.
If water must be retained use special tongue and groove uprights to form tight sheeting.

Arrangement #B2

Space 8×10 crossbraces at eight feet horizontally and five feet vertically.
Space 12×12 wales at five feet vertically.
Position 2×6 uprights in a close sheeting configuration unless water pressure must be resisted. Tight sheeting must be used where water must be retained.

(4) *Example 4.*

A trench dug in Type C soil is 20 feet deep and 11 feet wide. The size and spacing of members for the section of trench that is over 15 feet in depth is determined using Table C–1.3. Only one arrangement of members is provided.

Space 8×10 crossbraces at six feet horizontally and five feet vertically.
Space 12×12 wales at five feet vertically.
Use 3×6 tight sheeting.

Use of Tables C–2.1 through C–2.3 would follow the same procedures.

(g) *Notes for all Tables.*

1. Member sizes at spacings other than indicated are to be determined as specified in §1926.652(c), "Design of Protective Systems."

2. When conditions are saturated or submerged use Tight Sheeting. Tight Sheeting refers to the use of specially-edged timber planks (e.g., tongue and groove) at least three inches thick, steel sheet piling, or similar construction that when driven or placed in position provide a tight wall to resist the lateral pressure of water and to prevent the loss of backfill material. Close Sheeting refers to the placement of planks side-by-side allowing as little space as possible between them.

3. All spacing indicated is measured center to center.

4. Wales to be installed with greater dimension horizontal.

5. If the vertical distance from the center of the lowest crossbrace to the bottom of the trench exceeds two and one-half feet, uprights shall be firmly embedded or a mudsill shall be used. Where uprights are embedded, the vertical distance from the center of the lowest crossbrace to the bottom of the trench shall not exceed 36 inches. When mudsills are used, the vertical distance shall not exceed 42 inches. Mudsills are wales that are installed at the toe of the trench side.

6. Trench jacks may be used in lieu of or in combination with timber crossbraces.

7. Placement of crossbraces. When the vertical spacing of crossbraces is four feet, place the top crossbrace no more than two feet below the top of the trench. When the vertical spacing of crossbraces is five feet, place the top crossbrace no more than 2.5 feet below the top of the trench.

TABLE C-1.1

TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *

SOIL TYPE A P_a = 25 X H + 72 psf (2 ft Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (ACTUAL) AND SPACING OF MEMBERS **													
	CROSS BRACES							WALES		UPRIGHTS				
	HORIZ. SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERT. SPACING (FEET)	SIZE (IN)	VERT. SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET)				
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE	4	5	6	8
5 TO 10	UP TO 6	4X4	4X4	4X6	6X6	6X6	4	Not Req'd	---				2X6	
	UP TO 8	4X4	4X4	4X6	6X6	6X6	4	Not Req'd	---					2X8
	UP TO 10	4X6	4X6	4X6	6X6	6X6	4	8X8	4			2X6		
	UP TO 12	4X6	4X6	6X6	6X6	6X6	4	8X8	4				2X6	
10 TO 15	UP TO 6	4X4	4X4	4X6	6X6	6X6	4	Not Req'd	---				3X8	
	UP TO 8	4X6	4X6	6X6	6X6	6X6	4	8X8	4		2X6			
	UP TO 10	6X6	6X5	6X6	6X8	6X8	4	8X10	4			2X6		
	UP TO 12	6X6	6X6	6X6	6X8	6X8	4	10X10	4				3X8	
15 TO 20	UP TO 6	6X6	6X6	6X6	6X8	6X8	4	6X8	4	3X6				
	UP TO 8	6X6	6X6	6X6	6X8	6X8	4	8X8	4	3X6				
	UP TO 10	8X8	8X8	8X8	8X8	8X10	4	8X10	4	3X6				
	UP TO 12	8X8	8X8	8X8	8X8	8X10	4	10X10	4	3X6				
OVER 20	SEE NOTE 1													

* Mixed oak or equivalent with a bending strength not less than 850 psi.
** Manufactured members of equivalent strength may by substituted for wood.

TABLE C-1.2

TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *

SOIL TYPE B $P_a = 45 \times H + 72$ psf (2 ft. Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (ACTUAL) AND SPACING OF MEMBERS**														
	CROSS BRACES							WALES		UPRIGHTS					
	HORIZ. SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERT. SPACING (FEET)	SIZE (IN.)	VERT. SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET)				
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE	2	3		
5 TO 10	UP TO 6	4X6	4X6	6X6	6X6	6X6	5	6X8	5			2X6		
	UP TO 8	6X6	6X6	6X6	6X8	6X8	5	8X10	5			2X6		
	UP TO 10	6X6	6X6	6X6	6X8	6X8	5	10X10	5			2X6		
	See Note 1													
10 TO 15	UP TO 6	6X6	6X6	6X6	6X8	6X8	5	8X8	5		2X6			
	UP TO 8	6X8	6X8	6X8	8X8	8X8	5	10X10	5		2X6			
	UP TO 10	8X8	8X8	8X8	8X8	8X10	5	10X12	5		2X6			
	See Note 1													
15 TO 20	UP TO 6	6X8	6X8	6X8	8X8	8X8	5	8X10	5	3X6				
	UP TO 8	8X8	8X8	8X8	8X8	8X10	5	10X12	5	3X6				
	UP TO 10	8X10	8X10	8X10	8X10	10X10	5	12X12	5	3X6				
	See Note 1													
OVER 20	SEE NOTE 1													

* Mixed oak or equivalent with a bending strength not less than 850 psi.
** Manufactured members of equivalent strength may by substituted for wood.

TABLE C-1.3

TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *

SOIL TYPE C P_a = 80 X H + 72 psf (2 ft. Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (ACTUAL) AND SPACING OF MEMBERS**														
	CROSS BRACES									UPRIGHTS					
	HORIZ. SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERT. SPACING (FEET)	SIZE (IN.)	VERT. SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET) (See Note 2)					
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE					
5 TO 10	UP TO 6	6X8	6X8	6X8	8X8	8X8	5	8X10	5	2X6					
	UP TO 8	8X8	8X8	8X8	8X8	8X10	5	10X12	5	2X6					
	UP TO 10	8X10	8X10	8X10	8X10	10X10	5	12X12	5	2X6					
	See Note 1														
10 TO 15	UP TO 6	8X8	8X8	8X8	8X8	8X10	5	10X12	5	2X6					
	UP TO 8	8X10	8X10	8X10	8X10	10X10	5	12X12	5	2X6					
	See Note 1														
	See Note 1														
15 TO 20	UP TO 6	8X10	8X10	8X10	8X10	10X10	5	12X12	5	3X6					
	See Note 1														
	See Note 1														
	See Note 1														
OVER 20	SEE NOTE 1														

* Mixed Oak or equivalent with a bending strength not less than 850 psi.

** Manufactured members of equivalent strength may be substituted for wood.

TABLE C-2.1

TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *
SOIL TYPE A P_a = 25 X H ± 72 psf (2 ft. Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (S4S) AND SPACING OF MEMBERS **													
	CROSS BRACES							WALES		UPRIGHTS				
	HORIZ. SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERT. SPACING (FEET)	SIZE (IN)	VERT. SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET)				
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE	4	5	6	8
5 TO 10	UP TO 6	4X4	4X4	4X4	4X4	4X6	4	Not Req'd	Not Req'd				4X6	
	UP TO 8	4X4	4X4	4X4	4X6	4X6	4	Not Req'd	Not Req'd					4X8
	UP TO 10	4X6	4X6	4X6	6X6	6X6	4	8X8	4			4X6		
	UP TO 12	4X6	4X6	4X6	6X6	6X6	4	8X8	4				4X6	
10 TO 15	UP TO 6	4X4	4X4	4X4	6X6	6X6	4	Not Req'd	Not Req'd				4X10	
	UP TO 8	4X6	4X6	4X6	6X6	6X6	4	6X8	4		4X6			
	UP TO 10	6X6	6X6	6X6	6X6	6X6	4	8X8	4			4X8		
	UP TO 12	6X6	6X6	6X6	6X6	6X6	4	8X10	4		4X6		4X10	
15 TO 20	UP TO 6	6X6	6X6	6X6	6X6	6X6	4	6X8	4	3X6				
	UP TO 8	6X6	6X6	6X6	6X6	6X6	4	8X8	4	3X6	4X12			
	UP TO 10	6X6	6X6	6X6	6X6	6X8	4	8X10	4	3X6				
	UP TO 12	6X6	6X6	6X6	6X8	6X8	4	8X12	4	3X6	4X12			
OVER 20	SEE NOTE 1													

* Douglas fir or equivalent with a bending strength not less than 1500 psi.
** Manufactured members of equivalent strength may be substituted for wood.

TABLE C-2.2

TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *

SOIL TYPE B P_a = 45 X H + 72 psf (2 ft. Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (S4S) AND SPACING OF MEMBERS **													
	CROSS BRACES						WALES		UPRIGHTS					
	HORIZ. SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERT. SPACING (FEET)	SIZE (IN.)	VERT. SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET)				
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE	2	3	4	6
5 TO 10	UP TO 6	4X6	4X6	4X6	6X6	6X6	5	6X8	5			3X12 4X8		4X12
	UP TO 8	4X6	4X6	6X6	6X6	6X6	5	8X8	5		3X8		4X8	
	UP TO 10	4X6	4X6	6X6	6X6	6X8	5	8X10	5			4X8		
	See Note 1													
10 TO 15	UP TO 6	6X6	6X6	6X6	6X8	6X8	5	8X8	5	3X6	4X10			
	UP TO 8	6X8	6X8	6X8	8X8	8X8	5	10X10	5	3X6	4X10			
	UP TO 10	6X8	6X8	8X8	8X8	8X8	5	10X12	5	3X6	4X10			
	See Note 1													
15 TO 20	UP TO 6	6X8	6X8	6X8	6X8	8X8	5	8X10	5	4X6				
	UP TO 8	6X8	6X8	6X8	8X8	8X8	5	10X12	5	4X6				
	UP TO 10	8X8	8X8	8X8	8X8	8X8	5	12X12	5	4X6				
	See Note 1													
OVER 20	SEE NOTE 1													

* Douglas fir or equivalent with a bending strength not less than 1500 psi.

** Manufactured members of equivalent strength may be substituted for wood.

TABLE C-2.3

TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *

SOIL TYPE C P_a = 80 X H + 72 psf (2 ft. Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (S4S) AND SPACING OF MEMBERS **													
	CROSS BRACES							WALES			UPRIGHTS			
	HORIZ. SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERT. SPACING (FEET)	SIZE (IN)	VERT. SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET)				
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE				
5 TO 10	UP TO 6	6X6	6X6	6X6	6X6	8X8	5	8X8	5	3X6				
	UP TO 8	6X6	6X6	6X6	8X8	8X8	5	10X10	5	3X6				
	UP TO 10	6X6	6X6	8X8	8X8	8X8	5	10X12	5	3X6				
	See Note 1													
10 TO 15	UP TO 6	6X8	6X8	6X8	8X8	8X8	5	10X10	5	4X6				
	UP TO 8	8X8	8X8	8X8	8X8	8X8	5	12X12	5	4X6				
	See Note 1													
	See Note 1													
15 TO 20	UP TO 6	8X8	8X8	8X8	8X10	8X10	5	10X12	5	4X6				
	See Note 1													
	See Note 1													
	See Note 1													
OVER 20	SEE NOTE 1													

* Douglas fir or equivalent with a bending strength not less than 1500 psi.

** Manufactured members of equivalent strength may be substituted for wood.

APPENDIX D TO SUBPART P—ALUMINUM HYDRAULIC SHORING FOR TRENCHES

(a) *Scope.* This appendix contains information that can be used when aluminum hydraulic shoring is provided as a method of protection against cave-ins in trenches that do not exceed 20 feet (6.1m) in depth. This appendix must be used when design of the aluminum hydraulic protective system cannot be performed in accordance with §1926.652(c)(2).

(b) *Soil Classification.* In order to use data presented in this appendix, the soil type or types in which the excavation is made must

first be determined using the soil classification method set forth in appendix A of subpart P of part 1926.

(c) *Presentation of Information.* Information is presented in several forms as follows:

(1) Information is presented in tabular form in Tables D–1.1, D–1.2, D–1.3 and E–1.4. Each table presents the maximum vertical and horizontal spacings that may be used with various aluminum member sizes and various hydraulic cylinder sizes. Each table contains data only for the particular soil type in which the excavation or portion of the excavation is made. Tables D–1.1 and D–1.2 are for vertical shores in Types A and B soil. Tables D–1.3 and D1.4 are for horizontal waler systems in Types B and C soil.

(2) Information concerning the basis of the tabular data and the limitations of the data is presented in paragraph (d) of this appendix.

(3) Information explaining the use of the tabular data is presented in paragraph (e) of this appendix.

(4) Information illustrating the use of the tabular data is presented in paragraph (f) of this appendix.

(5) Miscellaneous notations (footnotes) regarding Table D–1.1 through D–1.4 are presented in paragraph (g) of this appendix.

(6) Figures, illustrating typical installations of hydraulic shoring, are included just prior to the Tables. The illustrations page is entitled "Aluminum Hydraulic Shoring; Typical Installations."

(d) *Basis and limitations of the data.*

(1) Vertical shore rails and horizontal wales are those that meet the Section Modulus requirements in the D–1 Tables. Aluminum material is 6061–T6 or material of equivalent strength and properties.

(2) Hydraulic cylinders specifications. (i) 2-inch cylinders shall be a minimum 2-inch inside diameter with a minimum safe working capacity of no less than 18,000 pounds axial compressive load at maximum extension. Maximum extension is to include full range of cylinder extensions as recommended by product manufaturer.

(ii) 3-inch cylinders shall be a minimum 3-inch inside diameter with a safe working capacity of not less than 30,000 pounds axial compressive load at extensions as recommended by product manufacturer.

(3) Limitation of application.

(i) It is not intended that the aluminum hydraulic specification apply to every situation that may be experienced in the field. These data were developed to apply to the situations that are most commonly experienced in current trenching practice. Shoring systems for use in situations that are not covered by the data in this appendix must be otherwise designed as specified in §1926.652(c).

(ii) When any of the following conditions are present, the members specified in the Tables are not considered adequate. In this case, an alternative aluminum hydraulic shoring system or other type of protective system must be designed in accordance with §1926.652.

(A) When vertical loads imposed on cross braces exceed a 100 Pound gravity load distributed on a one foot section of the center of the hydraulic cylinder.

(B) When surcharge loads are present from equipment weighing in excess of 20,000 pounds.

(C) When only the lower portion or a trench is shored and the remaining portion of the trench is sloped or benched unless: The sloped portion is sloped at an angle less steep than three horizontal to one vertical; or the members are selected from the tables for use at a depth which is determined from the top of the overall trench, and not from the toe of the sloped portion.

(e) *Use of Tables D 1.1, D 1.2, D 1.3 and D 1.4.* The members of the shoring system that are to be selected using this information are the hydraulic cylinders, and either the vertical shores or the horizontal wales. When a waler system is used the vertical timber sheeting to be used is also selected from these tables. The Tables D–1.1 and D–1.2 for vertical shores are used in Type A and B soils that do not require sheeting. Type B soils that may require sheeting, and Type C soils that always require sheeting are found in the horizontal wale Tables D–1.3 and D–1.4. The soil type must first be determined in accordance with the soil classification system described in appendix A to subpart P of part 1926. Using the appropriate table, the selection of the size and spacing of the members is made. The selection is based on the depth and width of the trench where the members are to be installed. In these tables the vertical spacing is held constant at four feet on center. The tables show the maximum horizontal spacing of cylinders allowed for each size of wale in the waler system tables, and in the vertical shore tables, the hydraulic cylinder horizontal spacing is the same as the vertical shore spacing.

(f) *Example to Illustrate the Use of the Tables:*

(1) Example 1:

A trench dug in Type A soil is 6 feet deep and 3 feet wide. From Table D–1.1: Find vertical shores and 2 inch diameter cylinders spaced 8 feet on center (o.c.) horizontally and 4 feet on center (o.c.) vertically. (See Figures 1 & 3 for typical installations.)

(2) Example 2:

A trench is dug in Type B soil that does not require sheeting, 13 feet deep and 5 feet wide. From Table D–1.2: Find vertical shores and 2 inch diameter cylinders spaced 6.5 feet o.c. horizontally and 4 feet o.c. vertically. (See Figures 1 & 3 for typical installations.)

(3) A trench is dug in Type B soil that does not require sheeting, but does experience some minor raveling of the trench face. The

trench is 16 feet deep and 9 feet wide. From Table D–1.2: Find vertical shores and 2 inch diameter cylinder (with special oversleeves as designated by footnote #B2) spaced 5.5 feet o.c. horizontally and 4 feet o.c. vertically, plywood (per footnote (g)(7) to the D–1 Table) should be used behind the shores. (See Figures 2 & 3 for typical installations.)

(4) Example 4: A trench is dug in previously disturbed Type B soil, with characteristics of a Type C soil, and will require sheeting. The trench is 18 feet deep and 12 feet wide. 8 foot horizontal spacing between cylinders is desired for working space. From Table D–1.3: Find horizontal wale with a section modulus of 14.0 spaced at 4 feet o.c. vertically and 3 inch diameter cylinder spaced at 9 feet maximum o.c. horizontally. 3x12 timber sheeting is required at close spacing vertically. (See Figure 4 for typical installation.)

(5) Example 5: A trench is dug in Type C soil, 9 feet deep and 4 feet wide. Horizontal cylinder spacing in excess of 6 feet is desired for working space. From Table D–1.4: Find horizontal wale with a section modulus of 7.0 and 2 inch diameter cylinders spaced at 6.5 feet o.c. horizontally. Or, find horizontal wale with a 14.0 section modulus and 3 inch diameter cylinder spaced at 10 feet o.c. horizontally. Both wales are spaced 4 feet o.c. vertically. 3x12 timber sheeting is required at close spacing vertically. (See Figure 4 for typical installation.)

(g) *Footnotes, and general notes, for Tables D 1.1, D 1.2, D 1.3, and D 1.4.*

(1) For applications other than those listed in the tables, refer to §1926.652(c)(2) for use of manufacturer's tabulated data. For trench depths in excess of 20 feet, refer to §1926.652(c)(2) and §1926.652(c)(3).

(2) 2 inch diameter cylinders, at this width, shall have structural steel tube (3.5x3.5x0.1875) oversleeves, or structural oversleeves of manufacturer's specification, extending the full, collapsed length.

(3) Hydraulic cylinders capacities. (i) 2 inch cylinders shall be a minimum 2-inch inside diameter with a safe working capacity of not less than 18,000 pounds axial compressive load at maximum extension. Maximum extension is to include full range of cylinder extensions as recommended by product manufacturer.

(ii) 3-inch cylinders shall be a minimum 3-inch inside diameter with a safe work capacity of not less than 30,000 pounds axial compressive load at maximum extension. Maximum extension is to include full range of cylinder extensions as recommended by product manufacturer.

(4) All spacing indicated is measured center to center.

(5) Vertical shoring rails shall have a minimum section modulus of 0.40 inch.

(6) When vertical shores are used, there must be a minimum of three shores spaced equally, horizontally, in a group.

(7) Plywood shall be 1.125 in. thick softwood or 0.75 inch. thick, 14 ply, arctic white birch (Finland form). Please note that plywood is not intended as a structural member, but only for prevention of local raveling (sloughing of the trench face) between shores.

(8) See appendix C for timber specifications.

(9) Wales are calculated for simple span conditions.

(10) See appendix D, item (d), for basis and limitations of the data.

ALUMINUM HYDRAULIC SHORING
TYPICAL INSTALLATIONS

FIGURE NO. 1
VERTICAL ALUMINUM HYDRAULIC SHORING (SPOT BRACING)

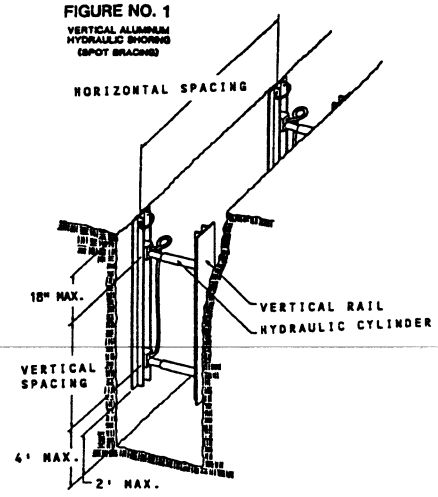


FIGURE NO. 2
VERTICAL ALUMINUM HYDRAULIC SHORING (WITH PLYWOOD)

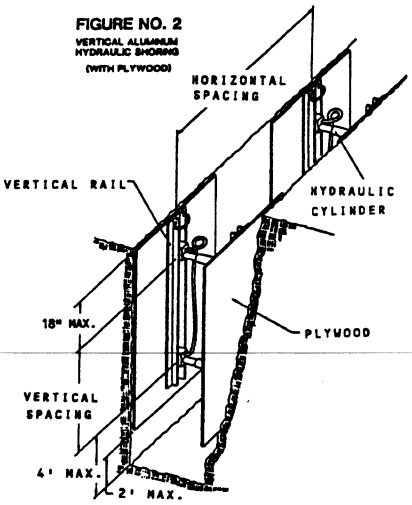


FIGURE NO. 3
VERTICAL ALUMINUM HYDRAULIC SHORING (STACKED)

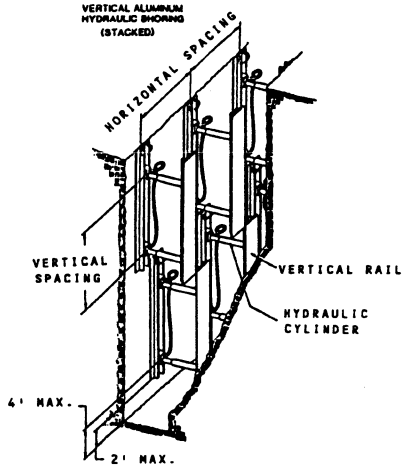


FIGURE NO. 4
ALUMINUM HYDRAULIC SHORING WALER SYSTEM (TYPICAL)

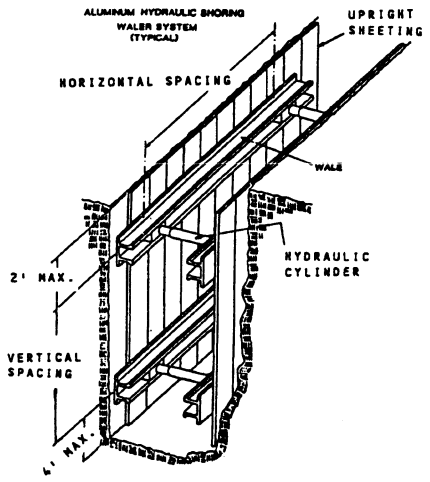


TABLE D - 1.1
ALUMINUM HYDRAULIC SHORING
VERTICAL SHORES
FOR SOIL TYPE A

DEPTH OF TRENCH (FEET)	HYDRAULIC CYLINDERS				
	MAXIMUM HORIZONTAL SPACING (FEET)	MAXIMUM VERTICAL SPACING (FEET)	WIDTH OF TRENCH (FEET)		
			UP TO 8	OVER 8 UP TO 12	OVER 12 UP TO 15
OVER 5 UP TO 10	8	4	2 INCH DIAMETER	2 INCH DIAMETER NOTE (2)	3 INCH DIAMETER
OVER 10 UP TO 15	8				
OVER 15 UP TO 20	7				
OVER 20	NOTE (1)				

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, Item (g)
Note (1): See Appendix D, Item (g) (1)
Note (2): See Appendix D, Item (g) (2)

TABLE D - 1.2
ALUMINUM HYDRAULIC SHORING
VERTICAL SHORES
FOR SOIL TYPE B

DEPTH OF TRENCH (FEET)	HYDRAULIC CYLINDERS				
	MAXIMUM HORIZONTAL SPACING (FEET)	MAXIMUM VERTICAL SPACING (FEET)	WIDTH OF TRENCH (FEET)		
			UP TO 8	OVER 8 UP TO 12	OVER 12 UP TO 15
OVER 5 UP TO 10	8	4	2 INCH DIAMETER	2 INCH DIAMETER NOTE (2)	3 INCH DIAMETER
OVER 10 UP TO 15	6.5				
OVER 15 UP TO 20	5.5				
OVER 20	NOTE (1)				

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, Item (g)
Note (1): See Appendix D, Item (g) (1)
Note (2): See Appendix D, Item (g) (2)

TABLE D - 1.3
ALUMINUM HYDRAULIC SHORING
WALER SYSTEMS
FOR SOIL TYPE B

DEPTH OF TRENCH (FEET)	WALES		HYDRAULIC CYLINDERS						TIMBER UPRIGHTS		
			WIDTH OF TRENCH (FEET)						MAX.HORIZ.SPACING (ON CENTER)		
	VERTICAL SPACING (FEET)	* SECTION MODULUS (IN^3)	UP TO 8		OVER 8 UP TO 12		OVER 12 UP TO15		SOLID SHEET	2 FT.	3 FT.
			HORIZ. SPACING	CYLINDER DIAMETER	HORIZ. SPACING	CYLINDER DIAMETER	HORIZ. SPACING	CYLINDER DIAMETER			
OVER 5 UP TO 10	4	3.5	8.0	2 IN	8.0	2 IN NOTE(2)	8.0	3 IN	—	—	3x12
		7.0	9.0	2 IN	9.0	2 IN NOTE(2)	9.0	3 IN			
		14.0	12.0	3 IN	12.0	3 IN	12.0	3 IN			
OVER 10 UP TO 15	4	3.5	6.0	2 IN	6.0	2 IN NOTE(2)	6.0	3 IN	—	3x12	—
		7.0	8.0	3 IN	8.0	3 IN	8.0	3 IN			
		14.0	10.0	3 IN	10.0	3 IN	10.0	3 IN			
OVER 15 UP TO 20	4	3.5	5.5	2 IN	5.5	2 IN NOTE(2)	5.5	3 IN	3x12	—	—
		7.0	6.0	3 IN	6.0	3 IN	6.0	3 IN			
		14.0	9.0	3 IN	9.0	3 IN	9.0	3 IN			
OVER 20	NOTE (1)										

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, Item (g)
Notes (1): See Appendix D, item (g) (1)
Notes (2): See Appendix D, Item (g) (2)
* Consult product manufacturer and/or qualified engineer for Section Modulus of available wales.

TABLE D - 1.4
ALUMINUM HYDRAULIC SHORING
WALER SYSTEMS
FOR SOIL TYPE C

DEPTH OF TRENCH (FEET)	WALES		HYDRAULIC CYLINDERS						TIMBER UPRIGHTS		
			WIDTH OF TRENCH (FEET)						MAX.HORIZ SPACING (ON CENTER)		
	VERTICAL SPACING (FEET)	* SECTION MODULUS (IN^3)	UP TO 8		OVER 8 UP TO 12		OVER 12 UP TO 15		SOLID SHEET	2 FT.	3 FT.
			HORIZ. SPACING	CYLINDER DIAMETER	HORIZ. SPACING	CYLINDER DIAMETER	HORIZ. SPACING	CYLINDER DIAMETER			
OVER 5 UP TO 10	4	3.5	6.0	2 IN	6.0	2 IN NOTE(2)	6.0	3 IN	3x12	—	—
		7.0	6.5	2 IN	6.5	2 IN NOTE(2)	6.5	3 IN			
		14.0	10.0	3 IN	10.0	3 IN	10.0	3 IN			
OVER 10 UP TO 15	4	3.5	4.0	2 IN	4.0	2 IN NOTE(2)	4.0	3 IN	3x12	—	—
		7.0	5.5	3 IN	5.5	3 IN	5.5	3 IN			
		14.0	8.0	3 IN	8.0	3 IN	8.0	3 IN			
OVER 15 UP TO 20	4	3.5	3.5	2 IN	3.5	2 IN NOTE(2)	3.5	3 IN	3x12	—	—
		7.0	5.0	3 IN	5.0	3 IN	5.0	3 IN			
		14.0	6.0	3 IN	6.0	3 IN	6.0	3 IN			
OVER 20	NOTE (1)										

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, Item (g)
Notes (1): See Appendix D, item (g) (1)
Notes (2): See Appendix D, Item (g) (2)
* Consult product manufacturer and/or qualified engineer for Section Modulus of available wales.

APPENDIX E TO SUBPART P—ALTERNATIVES TO TIMBER SHORING

Figure 1. Aluminum Hydraulic Shoring

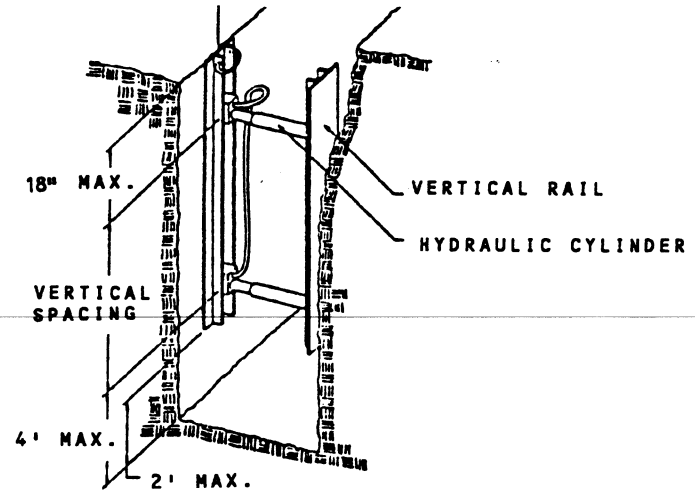


Figure 2. Pneumatic/hydraulic Shoring

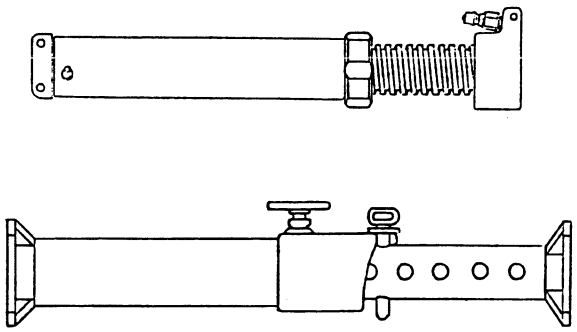


Figure 3. Trench Jacks (Screw Jacks)

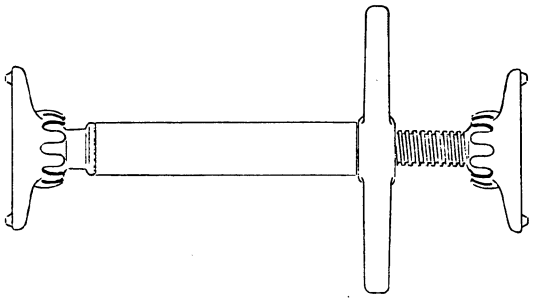
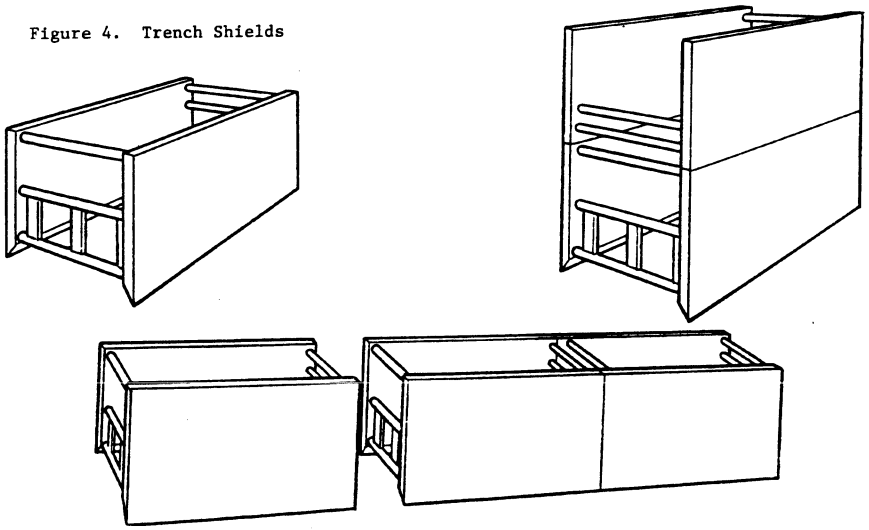


Figure 4. Trench Shields



APPENDIX F TO SUBPART P—SELECTION OF PROTECTIVE SYSTEMS

The following figures are a graphic summary of the requirements contained in subpart P for excavations 20 feet or less in depth. Protective systems for use in excavations more than 20 feet in depth must be designed by a registered professional engineer in accordance with §1926.652 (b) and (c).

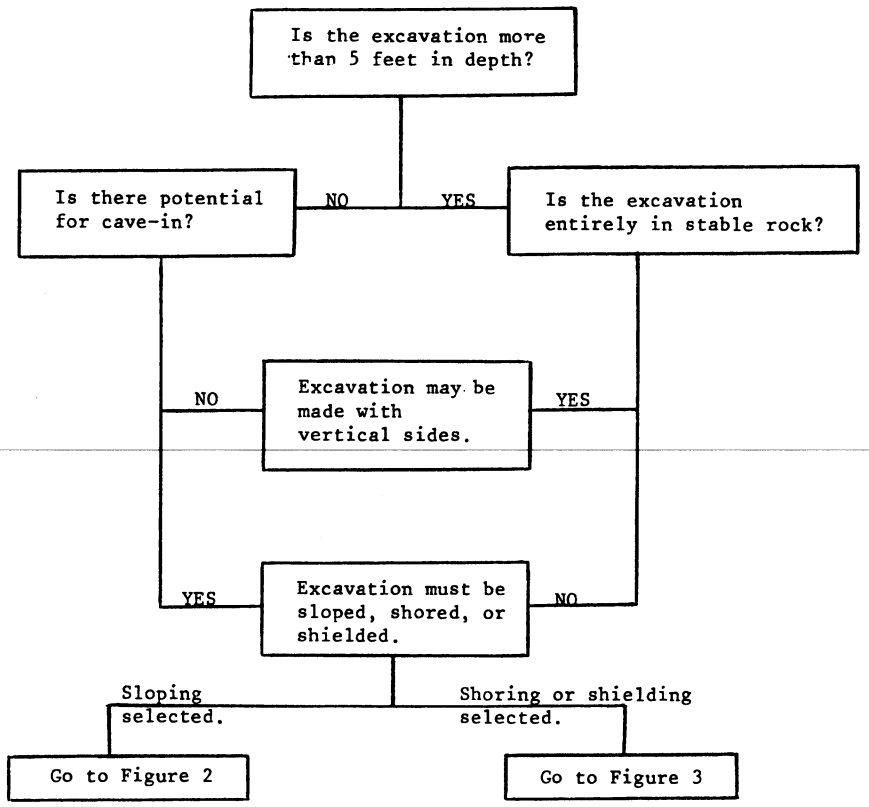


FIGURE 1 - PRELIMINARY DECISIONS

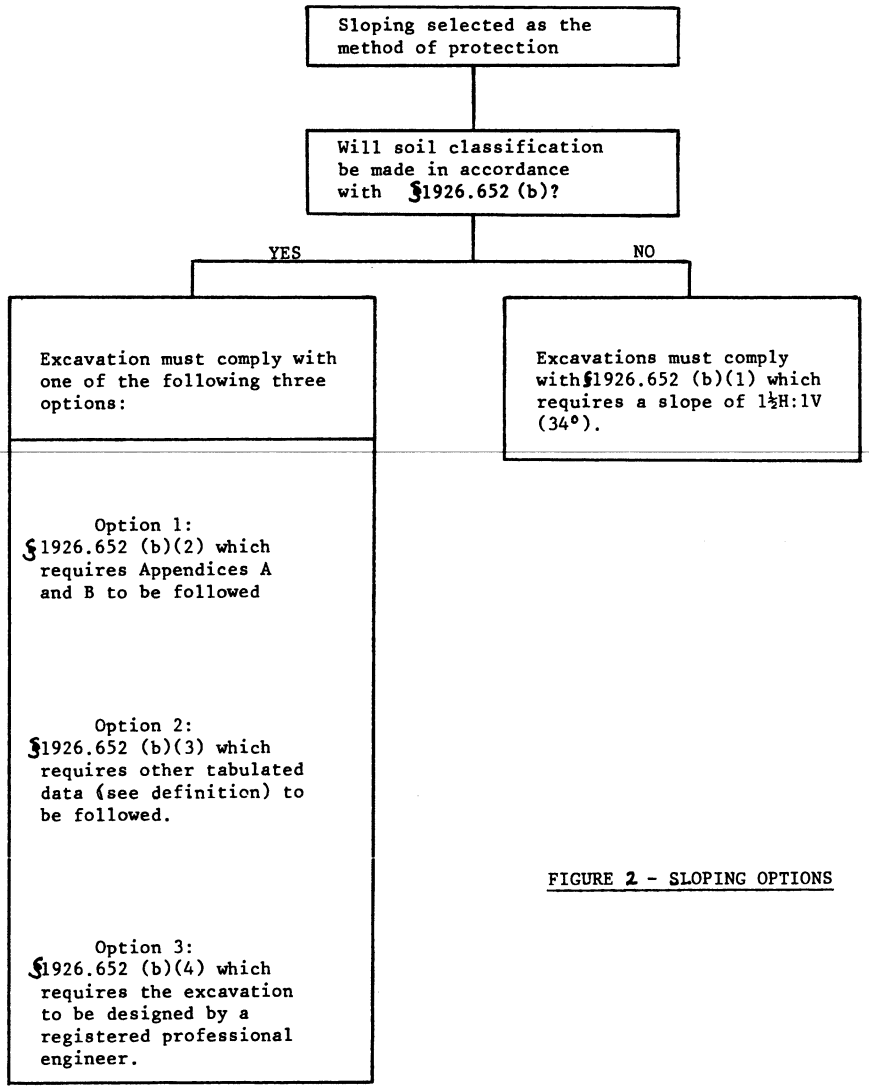


FIGURE 2 - SLOPING OPTIONS

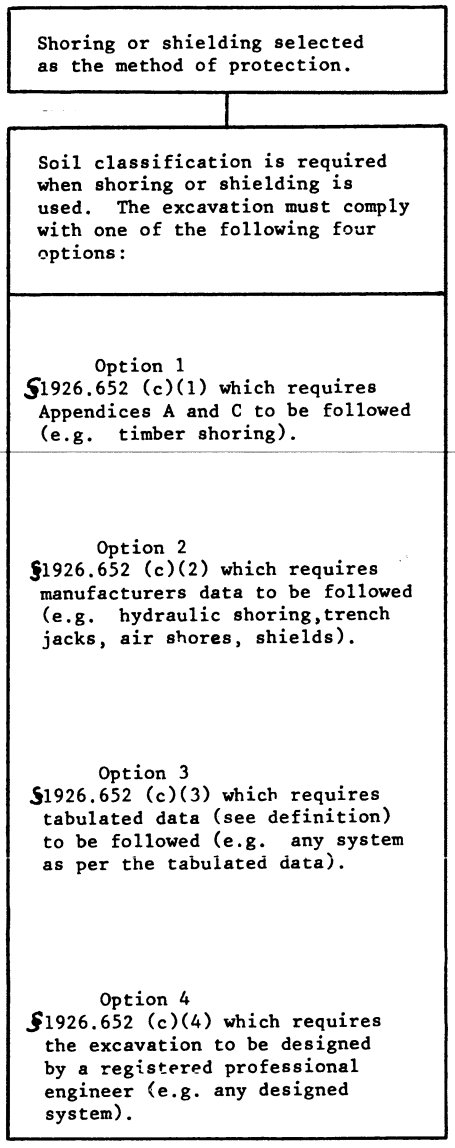


FIGURE 3 - SHORING AND SHIELDING OPTIONS

SECTION 02222

EXCAVATING, BACKFILLING, AND COMPACTING FOR PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SCOPE

A. The work covered by this section of the specifications consists of all earthwork required to prepare ground surfaces upon which roadway pavement and concrete items such as curbs, gutters, sidewalks, driveways and drainage structures are to be constructed. The work shall include removal and disposal of any unacceptable or excess materials and any necessary dewatering or rock excavation.

B. The Contractor shall furnish all materials, equipment, tools, labor, superintendence and incidentals required to perform the work as indicated on the drawings, as required by the Engineer, and as specified herein.

C. This work shall be performed to prepare ground surfaces in those areas where roadway pavement or concrete curbs, gutters, sidewalks, drainage structures and/or similar items have been removed or damaged during construction of the pipeline and its accessories and must be reconstructed or repaired. Preparation of the ground surfaces shall include all necessary grading excavating, filling, backfilling, borrowing and stockpiling of material, disposing of unacceptable or excess material, wetting, compacting, shaping and rolling.

D. Trench width at the top of the excavation shall be limited to limits indicated on the drawings. Any excess excavation beyond this width and any repairs due to this excess excavation shall be at the Contractors expense.

E. The work shall be performed to the dimensions, typical sections, and lines and grades indicated on the drawings or established by the Engineer and in accordance with these specifications.

F. It shall be the responsibility of the Contractor to fully inform himself as to job site conditions and materials to be encountered prior to submitting his Proposal, and he shall include in that proposal all costs of such preliminary investigations; as well as all costs for performing the work covered by this section, including any necessary dewatering or rock excavation.

G. The use of explosives in performing this work will not be permitted.

PART 2 - PRODUCTS – NONE

PART 3 - EXECUTION

3.1 GRADING AND EXCAVATING

A. This work shall consist of removing all materials to the dimensions, typical sections, lines and grades shown on the drawings or established by the Engineer. The work shall include removal of all materials encountered, regardless of their nature; removal of materials which are unsuitable for use in subgrades, fills and backfills; stockpiling of suitable soils for use in fills or backfills; and the satisfactory disposal of unsuitable soil, vegetation, debris, or any other deleterious materials encountered within areas of excavation.

B. All areas involved in the construction shall be graded as shown on the drawings or as required by the Engineer. These areas shall be shaped to drain away from the construction area and shall be maintained free of trash and debris until final completion of the work.

C. If unsuitable soils such as clay, or silty sands or trash are exposed at the depths to which excavation is required by the Contract Drawings, these unacceptable soils or trash will be removed as required by the Engineer. The full cost of excavation required to remove unacceptable materials and to fill in these areas with acceptable material shall be borne by the Contractor. The Contractor may review the available boring logs, and may perform additional soils investigations, at the Contractors expense, to ascertain whether removal of such undesirable soils or trash in any other areas of the pipeline routes, may be required.

D. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific written authorization of the Engineer. Unauthorized excavation, as well as remedial work performed outside of the contract limits, and not authorized by the Engineer, shall be at the expense of the Contractor.

E. Prior to placement of fill or backfill, all excavations and potential fill materials shall be inspected and approved by the Engineer. The excavation shall be underlain by natural non-expansive soils and not by undesirable soil materials or clay soils.

F. After excavation to the required elevation or prior to placement of fill, the upper 6 inches of the excavated area shall be scarified and shall be compacted to the density required in Section 3.3. FILLING AND BACKFILLING.

3.2 BORROW

A. If sufficient suitable material is not available from the excavated areas at the job site, the Contractor shall provide additional suitable materials as required to complete backfills and to construct all fills to the typical sections, lines and grades shown on the drawings or established by the Engineer. The Contractor shall obtain the additional material from the owners of outside borrow areas. The Contractor shall be responsible for locating the sources of material and for obtaining the right to excavate and remove the material. All costs of providing the borrow material, including payment of royalties, developing the source of borrow, and excavating and hauling the material to the job site shall be paid by the Contractor at no cost to the Owner.

3.3 FILLING AND BACKFILLING

A. Filling and backfilling shall be performed as necessary to complete the preparation of ground surfaces to the typical sections and the lines and grades shown on the drawings or established by the Engineer.

3.4 MATERIALS

A. Fill and backfill material shall be free of any organic or deleterious substances and shall not contain cobbles or lumps over three inches in greatest dimension. It shall contain not more than TWENTY percent by dry weight of material passing a No. 200 sieve. The fill material shall show low shrinkage or swelling when subjected to changes in moisture content, and its plasticity index shall not exceed twelve.

B. Suitability of potential fill material shall be determined by grain size analysis and tests for liquid limit, plastic limit, and shrinkage performed in accordance with ASTM D 4318 and D 427, respectively.

C. Soils at the site will be considered suitable for use as engineered fill, provided all of the above criteria are met. Under no circumstances shall rubble material, frozen soil, or deposits of clay be used to compromise any part of the engineered fill. Undesirable materials encountered during excavation shall be wasted and disposed of at the Contractors expense. All excess excavation that cannot be reused as backfill shall be disposed of at the Contractors expense.

D. No frozen material shall be placed in fills or backfills, and no material shall be placed and compacted during periods when freshly placed material would become frozen.

3.5 CONSTRUCTION METHODS

A. The base of excavations shall be moistened and shall be compacted to a dry density which is not less than ninety five percent of maximum as determined by ASTM D-1557. Fill material shall be placed in lifts not to exceed eight inches (loose measure) in depth and then compacted. The moisture content of the material shall be uniform and within, plus or minus, two percent of optimum, as determined by ASTM D-1557. Water shall not be pooled or jetted onto the in-place fill, but should be distributed uniformly over its surface.

B. Compaction of fill material shall only be with approved types of pneumatic or tamping equipment. Self-propelled or heavy-duty vibratory compaction equipment shall not be used adjacent to previously completed buildings or structures. Each lift of fill material shall be compacted to a dry density which is not less than ninety five percent of maximum as determined by ASTM D-1557.

C. Control of filling operations shall consist of field inspection and testing to determine that each lift of fill has been compacted to the required density. Should any lift or portion of a lift not conform to density requirements, it shall be scarified, wetted and if necessary, re-compacted until the required density is obtained.

3.6 SUBGRADE

A. After completion of excavation or filling and backfilling, the surfaces of the excavated or filled areas shall be prepared as subgrade for pavement base course or for the construction of concrete items. The subgrade shall be the thickness shown on the drawings. Any clay encountered within two feet of the pavement surface shall be removed and replaced with engineered fill.

B. The subgrade shall be scarified, plowed or otherwise loosened; shall be wetted, shaped and rolled with approved rollers. The rolling shall be continued until a density of not less than 95 percent is obtained. The testing will be as outlined in ASTM D 1557; method to be selected by the Testing Laboratory and approved by the Engineer.

C. When the required compaction is achieved the subgrade shall be finished to the lines and grades as shown on the plans or as required by the Engineer. The subgrade shall be kept in good condition as required and shall be safe for traffic until such time as the base course or two-sack cement stabilized material placed. Periodic wetting of the subgrade will be required to maintain density and to keep down dust from traffic. The Contractor will ensure that the subgrade continues to maintain the same density as the day it passed, and remains finished to the lines and grades as shown on the plans and as required by the Engineer, and if not, all requirements will be re-established at no cost to the Owner. The above mentioned requirements pertaining to the subgrade, shall also apply to the Base Course upon commencement of the Paving (HMAC).

3.7 PAYMENT

A. Payment will be included as part of the unit price for installation of ipielines for all work covered in this section as shown in the Proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications. No separate payment will be made for compliance with this section.

END OF SECTION

SECTION 02223

FLOWABLE FILL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 DESCRIPTION

A. Flowable Fill construction shall consist of filling excavations or utility trench conduit and pipe zones with flowable fill, a flowable mixture of Portland cement, concrete aggregates, and water. A unique design mix number as defined by the supplier shall identify it. Flowable fill is defined as either a 1 sack or 2 sack Portland cement mix with coarse aggregate and water. Where 1 sack or 2 sack flowable fill is used will be determined by the governing jurisdiction or the Owner. Flowable fill shall be supplied by a commercially recognized supplier. On-site production of flowable fill utilizing native backfill material and or spoil shall not be allowed.

1.3 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 211.1	(1981; Rev. 1985) Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
ACI 305	(1977;Rev 1982) Hot Weather Concrete.
ACI 318	(1989) Building Code Requirements for Reinforced Concrete.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 31	(1988) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(1986) Concrete Aggregates.
ASTM C 94	(1986) Ready-Mixed Concrete.
ASTM C 109	(1993) Compressive Strength of Hydraulic Mortars (Using 2-inch or 50 mm Cube Specimens.)
ASTM C 136	(1993) Sieve Analysis of Fine and Coarse Aggregates.
ASTM C 143	(1978) Slump of Portland Cement Concrete.
ASTM C 150	(1986) Portland Cement.
ASTM C 172	(1982) Sampling Freshly Mixed Concrete.

ASTM C 192	(1988) making and Curing Concrete Test Specimens in the Laboratory.
ASTM C 618	(1991) Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
ASTM C 558	(1982;R 1990) Test Methods for Moisture Density Relations of Soil Cement Mixtures.
ASTM C 4832	19(88) Test Method for Preparation and Testing of Soil Cement Slurry Test Cylinders.

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA CPMB-100	(8th Rev 1986) Concrete Plant Standards.
NRMCA TMMB-01	(Jan. 1, 1982; 11th Rev) Truck Mixer and Agitator Standards.

1.4 SUBMITTALS

A. The following shall be submitted in accordance with Section 01300, Submittals.
   1. Mix design for 1-sack and 2-sack flowable fill.

1.5 GENERAL REQUIREMENTS

A. Cement Content: The Portland cement content shall be 188 lbs. per cubic yard ("two sack flowable fill" as referenced on the contract drawing) for areas shown on the contract drawings as requiring two sack flowable fill or as determined by the Engineer. The Portland cement content shall be 94 lbs. and 94 lbs. of Fly Ash per cubic yards ("one sack flowable fill as referenced on the contract drawings) or as directed by Engineer.

B. Slump: Slump shall be proportioned to provide a slump of not less than 7 and not greater than 9 inches. Flowable fill shall be a plastic flowable mix that will self consolidate and fill all voids without the use of mechanical consolidation methods.

1.6 PROPORTIONS OF MIX

A. Mixture Proportioning: The determination of the flowable fill mix design shall be the responsibility of the Contractor. Trial batches shall contain materials proposed to be used in the project. Trial mixtures having proportions, consistencies suitable for the work shall be made based on methodology described in ACI 211.1. Trial mixtures shall be designed for maximum permitted slump. The temperature, unit weight, slump, yield, moisture content, and mortar cube strength of the flowable fill shall be reported. They shall be tested at 7 and 28 days in accordance with ASTM D 558

B. Compressive Strength: Mortar cube specimens shall be tested in accordance with ASTM C 109.

C. Aggregates and Cement: An optimum moisture density relationship for the combined aggregates and cement, proportioned by weight as defined by the proposed blends of the aggregates and cement, shall be determined for the design mix in accordance with ASTM D 558.

1.7 STORAGE OF MATERIALS

A. Cement shall be stored in weather-tight buildings, bins, or silos, which will exclude moisture and contaminants. Aggregate stockpiles shall be arranged and used in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of aggregates.

PART 2 - PRODUCTS

2.1 ADMIXTURES

A. Water – reducing, air, or retarding admixtures may be used as submitted and approved by the Engineer.

2.2 CEMENTITIOUS MATERIALS

A. Cement: ASTM C 150, Type II, low alkali or Type V. Cementitious materials shall each be of one type and from one source.
B. Fly Ash: Type F

2.3 AGGREGATES

A. Aggregates shall conform to the following:
1. Aggregate: ASTM C 33.

2.4 WATER

A. Water for mixing shall be potable.

PART 3 - EXECUTION

3.1 PREPARATION OF SURFACES

A. Surfaces to receive flowable fill shall be clean and free from frost, ice, mud, and standing water.

3.2 BATCHING, MIXING AND TRANSPORTING CONCRETE

A. Flowable fill material shall be batched, mixed and transported in accordance with ASTM C 94, except as otherwise specified. Truck mixers, agitators, and nonagitating units shall comply with NRMCA TMMB-01, Ready-mix plant equipment and facilities shall be certified in accordance with NRMCA CPMB-100. Batch tickets shall be provided with each truck of flowable fill delivered to the job site. Batch tickets shall reflect all proportions of material and information relative to the mix design utilized, and shall be provided to the Resident Project Representative prior to placement of material.

3.3 SAMPLING AND TESTING

A. Sampling and Testing is the responsibility of the contractor and shall be performed by an approved testing agency.
B. Aggregates: Aggregate for flowable fill shall be sampled and tested in accordance with ASTM C 136. Gradation tests shall be performed on the first day and every other day thereafter during construction.
C. Sampling of Flowable Fill: Samples of flowable fill material shall be sampled in accordance with ASTM C 172. Sampling shall be at the discretion of the Engineer.

3.4 CONVEYING FLOWABLE FILL

A. Flowable Fill shall be conveyed from mixer as rapidly as possible and within the time interval specified in paragraph "FLOWABLE FILL PLACEMENT" by methods, which will prevent segregation or loss of ingredients.

3.5 FLOWABLE FILL PLACEMENT

Flowable fill shall be transported in truck mixers shall be discharged within 1-1/2 hours or before the drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregate or the introduction of the cement to the aggregates. When the flowable fill temperature exceeds 85 degrees F, the time shall be reduced to 45 minutes.

A. Placing Operation: Flowable fill shall be handled from mixer to the excavated trench in a continuous manner until the approved unit of operation is completed. There shall be no vertical drop greater than 4 feet. A tremie or other acceptable method shall be used for placement of depths greater than 4 feet. Depositing of the flowable fill shall be so regulated that it will be effectively consolidated in horizontal layers. All necessary precautions shall be taken to prevent pipe flotation. The flowable fill shall be placed from the top of the pipe bedding zone to the springline of the existing utility. Flowable fill shall be a plastic flowable mix that will self consolidate and fill all voids without use of mechanical consolidation methods. Flowable fill shall be allowed to cure for a minimum of 12 hours before backfilling. Flowable fill shall be protected from flooding for at least 12 hours after placement. Flowable fill shall be placed against native undisturbed soil to the limits shown on the drawings. Any necessary placement of flowable fill outside the specified limits shall be at the Contractor's expense.
B. Cold Weather Requirements: Special protection measures, approved by the Engineer, shall be used if freezing temperatures are anticipated before the expiration of the specified curing period. The ambient temperature of the air where flowable fill is to be placed and temperature of surfaces to receive flowable fill shall be not less than 40 degrees F. The temperature of the flowable fill when placed shall not be less than 50 degrees F. Heating of the mixing water or aggregates will be required to regulate the placing temperature. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals or other materials shall not be incorporated in the flowable fill to prevent freezing.
C. Warm Weather Requirements: Flowable fill shall be placed in accordance with ACI 305R

3.6 PAYMENT

A. Payment for all work covered in this section, will be included as part of the unit price for installation of pipelines as shown on the bid proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications.

END OF SECTION

SECTION 02230

BASE COURSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SCOPE

A. The work covered by this section of the specifications consists of constructing the flexible base course at cut and removed portions of existing roadways and new roadways. The Contractor shall furnish all materials, equipment, tools, labor, superintendence and incidentals for the complete construction of the base course in accordance with the drawings and these specifications.
B. Referenced herein is New Mexico Department of Transportation Standard Specifications for Highway & Bridge Construction, 2007 Edition, referred to as NM-DOT-Spec.

PART 2 - PRODUCT

2.1 FLEXIBLE BASE COURSE

A. The flexible base courses shall be constructed upon compacted subgrades specified in SECTION 02222 - EXCAVATING, BACKFILLING AND COMPACTING FOR PAVEMENT. The base courses shall provide foundation courses for Asphaltic Concrete Surface Courses and shall be constructed in one or more courses in conformity with the typical sections shown on the drawings and to the lines and grades established.
B. The base courses shall be constructed in the locations indicated on the drawings or as necessary to reconstruct or repair pavement damaged or removed during construction of the pipeline and its accessories and to construct new pavement.
C. Base course shall be installed and compacted to 98% density per ASTM D-1557.

2.2 MATERIAL

A. The material shall be crushed and shall consist of durable particles of stone mixed with approved binding material. The base material shall be screened or partially screened or otherwise manipulated, prior to crushing, in order that all soil, clay and other objectionable material will be removed. Samples for testing the material shall be taken prior to the compaction operations.
B. Material used to manufacturer base course material shall be crushed as to have a minimum of 65% of the particles retained on the #4 sieve with two or more mechanically induced crushed faces.

2.3 GRADING

A. When properly slaked and tested by standard AASHTO Methods, the flexible base course material shall meet the requirements 2007 New Mexico-Standard Specification, Section 304.2.1:1.

2.4 CONSTRUCTION METHODS

A. Construction methods shall be in accordance with NEW MEXICO-Standard Specification Construction Methods, Section 303.3.

2.5 RECYCLED ASPHALT PAVEMENT, GLASS, RECYCLED CONCRETE

A. No RAP, Glass, HMA or RC will be used.

PART 3 - EXECUTION

3.1 GENERAL

A. The cement treated base material shall be constructed upon compacted subgrades specified in Section 02222-Excavating, Backfilling and Compacting for Pavement. The cement treated base materials shall provide driving surfaces for pond maintenance ramps and shall be constructed in one or more courses in conformity with the typical sections shown on the drawings and to the lines and grades established.
B. The cement treated base materials shall be constructed in the locations indicated on the drawings or as necessary to reconstruct or repair ramps damaged or removed during construction of the pipeline and its accessories, and to construct new ramps.

3.2 MATERIAL

A. Materials for cement treated base shall conform to New Mexico Standard Specification 306 Materials. Flexible base material shall be in conformance with Part 2 of this section.

3.3 MIX DESIGN

A. Mix Design for cement treated base material shall conform to New Mexico Standard Specification 306 with minimum cement content of 6%.

3.4 INSTALLATION

A. Installation of cement treated base material shall conform to New Mexico Standard Specification 306.3.

3.5 MEASUREMENT AND PAYMENTS

A. Payment for all work in this Section will be subsidiary to pipe installation cost as shown in the Contractor's Bid Proposal. Such payment shall be complete compensation for the complete performance of the work including all subsidiary or incidental items necessary to complete the work in accordance with the drawings and specifications.
B. No separate payment will be made for compliance with this section.

END OF SECTION

SECTION 02510

ASPHALT PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SCOPE

A. The work covered by this section of the specification consists of constructing all new asphaltic concrete pavement shown on the plans. It includes reconstructing all existing asphaltic concrete pavement damaged or otherwise made necessary by the construction of the pipeline and its accessories. The Contractor shall furnish all materials, labor, superintendence, tools, equipment and incidentals necessary for the complete construction of this work in accordance with the drawings and these specifications.

B. Referenced within this section is the New Mexico Department of Transportation (NMDOT) Standard Specifications for Highway and Bridge Construction **(2000).**

1.3 GENERAL

A. The Contractor shall chaulk line the pavement for saw cutting and shall maintain the pavement edges until new pavement is installed. All small cutout section will be squared off and no more than 2 repair sections within 20 feet of one another. If 2 or more repair sections are within 20 feet of one another, all sections will be combined into one neat repaired area. All pavement replacement shall be the width of the trench plus 2 feet for allowance of the neat line. Al discrepancies will be handled by the Engineer's on-site representative. All pavement considered outside of these areas shall be replaced at the Contractor's expense.

1.4 MATERIALS TEST

A. Preconstruction Tests: Test certificates from an approved commercial laboratory or other approved source shall be furnished on all materials proposed for use in this work. All tests will be performed in accordance with the methods specified herein and shall cover all items specified. Such tests shall not be made more than 30 days prior to beginning of operation and the approval shall be secured before the materials are ordered to be shipped.

1. Preconstruction tests of materials shall be required on all of the items specified under Hot Mix Asphaltic Concrete Surfacing including aggregate sieve analysis and soil constants. In addition to the materials tests, the Contractor shall furnish a mix design form an approved commercial laboratory or other approved source for the Hot Mix Asphaltic Concrete. The same 30-day requirement for tests shall apply for the mix design.
2. The costs of all preconstruction tests shall be borne by the Contractor. Additional test certificates shall be furnished on all materials and mix design if the material source is change or if construction tests indicate marked variations from the original tests.

B. Construction Tests: Tests of all of the materials will be made during construction to determine conformity with the specifications. Such tests shall include field densities on hot-mix; asphalt extraction, gradation and stability of hot-mix. The frequency and type of testing will be per the testing requirements as stated in Section 1410 or as may otherwise be determined by the Engineer.

C. **Contact Lincoln County, Mr. Earl Palmer at 575-808-1390 prior to starting any construction or testing within street ROW.**

1.5 PLANT MIX BITUMINOUS PAVEMENTS

A. Description: This item shall consist of a surface course composed of mineral aggregate and bituminous material mixed in a central mixing plant and placed on a prepared course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross sections shown on the plans.

B. Each course shall be constructed to the depth, typical section, or elevation required by the plans and shall be rolled, finished and approved before the placement of the next course.

PART 2 - MATERIALS

2.1 AGGREGATE

A. Aggregates shall consist of crushed stone or crushed gravel with or without sand or other inert finely divided mineral aggregate. The portion of materials retained on the No.8 sieve shall be known as coarse aggregate, the portion passing the No. 8 sieve and retained on the No. 200 sieve as fine aggregate, and the portion passing the No. 200 sieve a mineral filler.

B. Coarse Aggregate: Coarse aggregate shall consist of sound, tough, durable particles, free from adherent films of matter that would prevent thorough coating with the bituminous material. The percentage of wear shall not be greater than 40 percent when tested in accordance with ASTM C131. The sodium sulfate soundness loss shall not exceed 9 percent, after five cycles, when tested in accordance with ASTM C88.

1. Aggregate shall contain at least 60 percent by weight of crushed pieces having two or more fractured faces and 75 percent having at least one fractured face. The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces. Fractured faces shall be obtained by artificial crushing.
2. The aggregate shall not contain more than 8%, by weight, of flat or elongated pieces. A flat particle is one having a ratio of width to thickness greater than five; an elongated particle is one having a ratio of length to width greater than five.

C. Fine Aggregate: Fine aggregate shall consist of clean, sound, durable, angular particles produced by crushing stone or gravel that meets the requirements for wear and soundness specified for coarse aggregate. The aggregate particles shall be free from coatings of clay, silt, or other objectionable matter and shall contain no clay balls. The fine aggregate, including any blended filler, shall have a plasticity index of not more than six when tested in accordance with ASTM D424 and a liquid limit of not more than 25 when tested in accordance with ASTM D423 or shall have a sand equivalent value not less than 45 in accordance with ASTM D2419.

1. Natural sand may be used to obtain the gradation of the aggregate blend or to improve the workability of the mix. The amount of sand to be added will be adjusted to produce mixtures conforming to requirements of this specification.

2.2 SAMPLING AND TESTING

A. ASTM D75 shall be used in sampling coarse and fine aggregate, and ASTM C183 shall be used in sampling mineral filler. The Contractor shall furnish documentation to the Engineer confirming that the aggregates meet specification requirements.

2.3 SOURCES OF AGGREGATES

A. Sources of aggregates shall be selected well in advance of the time the materials are required in the work. When the aggregates are obtained from a previously approved source or an existing source producing aggregates that has a satisfactory service record in bituminous pavement construction for at least five years, samples shall be submitted 14 days prior to start of production. An inspection of the producer's operation will be made by the Engineer or his designated representative. When new sources are to be developed, the Contractor shall indicate the sources and shall submit a plan for operation 30 days in advance of starting production. Samples from test pits, borings, and other excavations shall be submitted at the same time. Approval of the source of aggregate does not relieve the Contractor in any way of the responsibility for delivery at the job site of aggregates that meet the requirements specified herein.

2.4 SAMPLES OF AGGREGATES

A. Samples of aggregates shall be furnished by the Contractor at the start of production or at every 500 tons with a minimum of two per project. The sampling points will be designated by the Engineer or his designated representative. The samples will be the basis of approval of specific lots of aggregates from the standpoint of the quality requirements of this section.

2.5 FILLER

A. If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D242.

2.6 BITUMINOUS MATERIAL

A. Bituminous material shall conform to the following requirements: [AC-20 In accordance with ASTM D3381].

B. The Contractor shall furnish vendor's certified test reports for each tank load of bitumen shipped to the project. The report shall be delivered to the Engineer before permission is granted for use of the material. The furnishing of the vendor's certified test report for the bituminous material shall be the basis for final acceptance.

2.7 COMPOSITION OF MIXTURE

A. The bituminous plant mix shall be composed of a mixture of aggregate, filler if required and bituminous material. The several aggregate fractions shall be sized, uniformly graded combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula.

2.8 JOB MIX FORMULA (JMF)

A. No bituminous mixture for pavement shall be produced until a job mix formula has been approved by the Engineer or his designated representative. The formula shall be submitted in writing by the Contractor to the Engineer or his designated representative at least 10 days prior to the start of paving operations and shall indicate the definite percentage of each sieve fraction of aggregate, the percentage of bitumen, and the temperature of the completed mixture when discharged from the mixer. All test data used to develop the job mix formula shall also be submitted. The job mix formula for each mixture shall be in effect until modified in writing by the Engineer or his designated representative. Should a change in sources of materials be made; a new job mix formula must be established before the new material is used.

B. JMF shall comply with all aggregate gradation requirements and shall result in a mix that meets all specified mix design requirements. The result of the laboratory mix design developed in accordance with subsection 420.28 is designated as JMF-1 and shall meet the requirements shown in Tables 2 & 3.

TABLE 2. MINIMUM PERCENT VOIDS IN MINERAL AGGREGATE

Maximum Particle Size		Minimum Voids in Mineral Aggregate
in.	mm	Percent
3/4	19.0	15
1	25.0	14
1 1/4	31.25	13

C. The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory screens, will conform to the gradation or gradations specified in Table 3 when tested in accordance with ASTM Standard C136 d (dry sieve). The percentage by weight for the bituminous material shall be within the limits specified.

D. The gradations in Table 3 represent the limits which shall determine the suitability of aggregate for use from the sources of supply. The aggregate, as finally selected, shall have a gradation within the limits designated in Table 3 and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa, but shall be uniformly graded from coarse to fine.

E. The mixture when designed and tested in accordance with these specifications and methods outlined shall have the following laboratory density and stability:

DENISITY, PERCENT			**STABILITY, PERCENT**
Min.	Max.	Optimum	Not less than 30, unless otherwise shown on the plans
95	99	97	

TABLE 3. AGGREGATE - BITUMINOUS PAVEMENT SPECIFICATION GRADATION BAND

Sieve	Percentage by Weight Passing Sieves
	New Mexico TYPE B
Size:	1/2" max
1¼ in.	---
1 in.	---
3/4 in.	100
1/2 in	80-98
3/8 in.	70-90
No.4	50-65
No.10	32-45
No.40	10-22
No.200	3-8
Bitumen Percent	
Stone	4.5 - 7.0
Gravel	5.0 - 9.0

F. The job mix tolerances shown in Table 4 shall be applied to the job mix formula to establish a job control grading band. The full tolerances still will apply if application of the job mix tolerances results in a job control grading band outside the master grading band.

TABLE 4. JOB MIX FORMULA TOLERANCES
(Based on a Single Test)

Material	Tolerance Plus or Minus
Aggregate Passing No. 4 Sieve or Larger	7 %
Aggregate Passing No. 19 sieve	6 %
Aggregate Passing No. 40 sieve	5 %
Aggregate Passing No 200 sieve	3 %
Bitumen	0.45 %
Temperature of Mix	20°F (11°C)

G. Deviation from the final approved design for bitumen content and gradation of aggregates shall not be greater than the tolerances permitted and shall be based on daily plant extraction. Extraction tests for bitumen content and aggregate gradation will be made at least twice daily. The mixture will be tested for bitumen content in accordance with AASHTO T30.

H. The completed mixture shall be sampled at the plant to retain job control. One sample shall be taken from each sub-lot on a random basis, in accordance with procedures contained in ASTM D3665. The lot size shall be consistent with that specified in paragraph 4.12 (a). Testing shall be in accordance with the Marshall method procedures contained in Chapter III of the Asphalt Institute Manual Series No.2 (MS-2), current edition, except the temperature of the mix prior to compaction shall be 250°F ± 5°F (121°C ± 2°C). If any two

consecutive Marshall test results of any property do not conform to the requirements shown in Tables 1 and 2, the Contractor shall take immediate corrective action. In no instance shall the percent air voids exceed ± 1% of the job mix formula value.

I. The Engineer or his designated representative may halt production if the Marshall test criteria are not met and not allow it to resume until the problem is corrected.

J. If the index of retained strength of the specimens of composite mixture, as determined by ASTM D1075, is less than 75, the aggregates shall be rejected or the asphalt shall be treated with an anti-stripping agent. The amount of anti-stripping agent added to the asphalt shall be sufficient to produce an index of retained strength of not less than 75.

2.9 TEST SECTION

A. Prior to full production, the Contractor shall prepare a quantity of bituminous mixture according to the job mix formula. The amount of mixture should be sufficient to construct a test section 50 feet long and 12 feet wide placed in two sections and shall be of the same depth specified for the construction of the course which it represents. The underlying grade or pavement structure upon which the test section is to be constructed shall be the same as the remainder of the course represented by the test section. The equipment used in construction of the test section shall be the same type and weight to be used on the remainder of the course represented by the test section.

B. If the test section should prove to be unsatisfactory, the necessary adjustments to the mix design, plant operation, and/or rolling procedures shall be made. Additional test sections, as required, shall be constructed and evaluated for conformance to the specifications. When test sections do not conform to specification requirements, the pavement shall be removed and replaced at the Contractor's expense. A marginal quality test section that has been placed in an area of little or no traffic may be left in place. If a second test section also does not meet specification requirements both sections shall be removed at the Contractor's expense. Full production shall not begin without the Engineer or his designated representative's approval.

2.10 TESTING LABORATORY

A. The testing laboratory used to develop the job mix formula and to perform the tests required by this specification shall meet the requirements of ASTM D 3666. A certification that the laboratory meets these requirements shall be submitted to the Engineer.

2.11 WEATHER LIMITATIONS

A. The bituminous mixture shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 5.

TABLE 5. BASE TEMPERATURE LIMITATIONS

Mat Thickness (Minimum)	Base Temperature	
3 in. (7.5 cm) or Greater	40°F	4°C
Greater than 1 in. (2.5 cm) but Less than 3 in. (7.5 cm)	45°F	7°C
1 in. (2.5 cm) or Less	50°F	10°C

2.12 BITUMINOUS MIXING PLANT

A. Plants used for the preparation of bituminous mixtures shall conform to the requirements of ASTM D995 with the following changes:

2.13 REQUIREMENTS FOR ALL PLANTS

A. Truck scales: The bituminous mixture shall be weighed on approved scales furnished by the producer, or on public scales at the producer's expense. Such scales shall be inspected and sealed as often as the Engineer or his designated representative deems necessary to assure their accuracy.

B. Testing laboratory: The Contractor or producer shall provide laboratory facilities for control and acceptance testing functions during periods of mix production, sampling, and testing and whenever materials subject to the provisions of these specifications are being supplied or tested. The laboratory shall provide adequate equipment, space, and utilities as required for the performance of the specified tests.

C. Inspection of plant: The Engineer or his designated representative shall have access, at all times, to all parts of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and character of materials; and checking the temperatures maintained in the preparation of the mixtures.

D. Storage bins and surge bins: Paragraph 3.9 of ASTM D995 is deleted. Instead, the following applies. Use of surge bins or storage bins for temporary storage of hot bituminous mixtures will be permitted as follows:

1. The bituminous mixture may be stored in surge bins for period of time not to exceed 3 hours, provided all specifications, temperature and segregation, requirements are fully met.
2. The bituminous mixture may be stored in insulated storage bins provided an inert gas atmosphere or oxygen proof hot oil seal is maintained in the bin during the storage period.
3. The bins shall be such that mix drawn from them meets the same requirements as mix loaded directly into trucks.
4. If the Engineer or his designated representative determines that there is an excessive amount of heat loss, segregation or oxidation of the mixture due to temporary storage, no storage will be allowed.

2.14 HAULING EQUIPMENT

A. Trucks used for hauling bituminous mixtures shall have tight, clean, and smooth metal beds. To prevent the mixture from adhering to them, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other approved material. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated and covers shall be securely fastened.

2.15 BITUMINOUS PAVERS

A. Bituminous pavers shall be self contained, power propelled units with an activated vibrating screed (see K3305-10) or strike off assembly, heated if necessary, and shall be capable of spreading and finishing courses of bituminous plant mix material which will meet the specified thickness, smoothness, and grade. Pavers used for shoulders and similar construction shall be capable of spreading and finishing courses of bituminous plant mix material in widths shown on the plans.

B. The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed. The screed or strike off assembly shall effectively produce a finished surface of the required evenness and texture without rearing, shoving, or gouging the mixture.

C. The paver shall be capable of operating at forward speeds consistent with satisfactory laying of the mixture.

D. The paver shall be equipped with a control system capable of automatically maintaining the specified screed elevation. The control system shall be automatically actuated from either a reference line or surface through a system of mechanical sensors or sensor directed mechanisms or devices which will maintain the paver screed at a predetermined transverse slope and at the proper elevation to obtain the required surface. The transverse slope controller shall be capable of maintaining the screed at the desired slope within plus or minus 0.1 percent.

E. The controls shall be capable of working in conjunction with any of the following attachments:
   1. Ski type device of not less than 30 feet (9.14 m) in length or as directed by the Engineer or his designated representative.
   2. Taut stringline (wire) set to grade.
   3. Short ski or shoe.

2.16 ROLLERS

A. Rollers of the steel wheel (Minimum 15 tons), and pneumatic tired type (Minimum 20 tons) shall be used. Vibratory rollers may be used subject to approval, in writing, of the Engineer or his designated representative. The number, type, and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable condition. The use of equipment which causes excessive crushing of the aggregate will not be permitted.

2.17 PREPARATION OF BITUMINOUS MATERIAL.

A. The bituminous material shall be heated in a manner that will avoid local overheating and provide a continuous supply of the bituminous material to the mixer at a uniform

temperature. The temperature of the bituminous material delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles but shall not exceed 325°F (160°C).

2.18 PREPARATION OF MINERAL AGGREGATE

A. The aggregate for the mixture shall be dried and heated to the temperature designated by the job formula within the job tolerance specified. The maximum temperature and rate of heating shall be such that no permanent damage occurs to the aggregates. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

2.19 PREPARATION OF BITUMINOUS MIXTURE

A. The aggregates and the bituminous material shall be weighed or metered and introduced into the mixer in the amount specified by the job mix formula.

B. The combined materials shall be mixed until the aggregate obtains a uniform coating of bitumen and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture. It shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, and approved by the Engineer or his designated representative for each individual plant and for each type of aggregate used. The minimum mixing time shall be 25 seconds. The mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of the mix shall not exceed 1.0 percent.

2.20 TRANSPORTING, SPREADING, AND FINISHING

A. The mixture shall be transported from the mixing plant to the point of use in vehicles conforming to the requirements of Paragraph 4.3 of this Section. Deliveries shall be scheduled so that spreading and rolling of all mixture prepared for one day's run can be completed during daylight, unless adequate artificial lighting is provided. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to atmospheric temperature.

B. Immediately before placing the bituminous mixture, the underlying course shall be cleared of all debris with power blowers, power brooms, or hand brooms as directed.

C. The mix shall be placed at a temperature of not less than 250°F (107°C) when asphalt cement is used and not less than 150°F (65°C) when tar is used.

D. Upon arrival, the mixture shall be spread to the full width by an approved bituminous paver. It shall be struck off in a uniform layer of such depth that, when the work is completed, it shall have the required thickness and conform to the grade and contour indicated. The speed of the paver shall be regulated to eliminate pulling and tearing of the bituminous mat. Unless otherwise directed, placement of the mixture shall begin along the centerline of a crowned section or on the high side of areas with a one way slope. On streets with inverted crown, no joint will be placed at invert of street. The mixture shall be placed in consecutive adjacent strips having a minimum width of [**12 feet] except where edge lanes require less width to complete the area.

E. In a two layer operation the longitudinal joint in one layer shall offset that in the layer immediately below by at least 1 foot (30 cm); however, the joint in the top layer shall be at the centerline of the pavement. Except on streets with inverted crowns, where the invert is at the center line of the street.

F. Transverse joints in one layer shall be offset by at least 2 feet (60 cm) from transverse joints in the previous layer. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet (3 m).

G. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture may be spread, raked, and luted by hand tools.

2.21 COMPACTION OF MIXTURE

A. After spreading, the mixture shall be thoroughly and uniformly compacted by rolling. The surface shall be rolled when the mixture has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. **No vibratory roller or any other type of vibratory machine shall be permitted without the written authorization from the Engineer or his designated representative.** The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor with approval from Engineer or his designated representative.

B. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture. Any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected at once.

C. Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until all roller marks are eliminated, the surface is of smooth uniform texture, free of segregation and voids and true to grade and cross section, and the required field density is obtained. No exposed aggregate will be accepted, failure to comply with this requirement, will result in complete removal and replacement of pavement.

D. To prevent adhesion of the mixture to the roller, the wheels shall be kept properly moistened, but excessive water will not be permitted.

E. In areas not accessible to the roller, the mixture shall be thoroughly compacted with hot hand tampers.

F. Any mixture that becomes loose and broken, mixed with dirt, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

G. The minimum prime coat coverage (CSSIH) of 0.25 gallons per square yard shall be placed on all new asphaltic pavement surfaces, as per Paragraph 3.11 of Section 3019.

2.22 JOINTS

A. The formation of all joints shall be made in such a manner as to ensure a continuous bond between old and new sections of the course. All joints shall have the same texture, density, and smoothness as other sections of the course.

B. The roller shall not pass over the end of the freshly laid mixture except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course, in which case the edge shall be cut back to its full depth and width on a straight line to expose a vertical face. In both methods all contact surfaces shall be given a tack coat of bituminous material before placing any fresh mixture against the joint.

C. Longitudinal joints which are irregular, damaged, or otherwise defective shall be cut back to expose a clean, sound surface for the full depth of the course. All contact surfaces shall be given a tack coat of bituminous material prior to placing any fresh mixture against the joint.

2.23 ACCEPTANCE SAMPLING AND TESTING OF BITUMINOUS MIXTURE (DENSITY)

A. Pavement density will be determined by comparing the density of cores or nuclear density machine taken from the compacted pavement to the density of laboratory compacted specimens.
   1. Lot sizes. The pavement will be accepted for density on a lot basis. A lot will consist of:
      a. One day's production where it is not expected to exceed 500 tons. A minimum of one density test will be required.
      b. A half day's production where a days production is expected to consist of between 300 and 1,000 tons. A minimum of two (2) density tests will be required per day.
      c. Similar subdivisions for quantities greater than 1,000 tons.
   2. Laboratory Density. Bituminous mixture for laboratory compacted specimens shall be sampled as per paragraph 4.12.

B. The specimens shall be compacted in accordance with ASTM D1559, Section 3.5, except that the temperature immediately prior to compaction shall be 250°F ± 5° (120°C ± 3°).

C. The sample of bituminous mixture can be placed in an oven for not more than 30 minutes to maintain the heat, but it shall not be reheated if it cools below 250°F (120°C) before use. The density of each specimen shall be determined in accordance with ASTM D2726 or D1188, whichever is applicable.
   1. Core Density or Nuclear Density Machine. Cores or nuclear density machine for determining the density of the compacted pavement shall be taken as indicated in paragraph 4.12. The cores shall be taken in accordance with the requirements of paragraph 4.14 The density of each core shall be determined in accordance with ASTM D 2726 or D1188, whichever is applicable.
   2. Pavement Density. The target density (percent compaction) of each lot of in-place pavement shall be 98%.

D. Based on acceptance of each lot Quantity of bituminous pavement based on density will be made using the minimum density requirement of 96.7% as the lower specification limit. Any pavement density failing to meet minimum density requirement of 96.7% shall be removed and replaced by Contractor at no additional cost to the Owner.

2.24 SURFACE TESTS

A. Tests for conformity with the specified crown and grade shall be made by the Contractor immediately after initial compaction. Any variation shall be corrected by the removal or addition of materials and by continuous rolling.

B. The finished surface shall not vary more than [1/4 inches] for the surface course when tested with a 16-foor (4.8 m) straightedge applied parallel with, or at right angles to, the centerline.

C. After the completion of final rolling, the smoothness of the course shall be inspected by the Engineer. Humps or depressions exceeding the specified tolerances shall be immediately corrected by removing the defective work and replacing with new material, as required Engineer. This shall be done at the Contractor's expense.

D. The finished surfaces of bituminous courses shall not vary from the grade line, elevations, and cross sections shown on the contract drawings by more than ½ inch (12.70 mm). The Contractor shall correct pavement areas varying in excess of this amount by removing and replacing the defective work. Skin patching will not be permitted.

2.25 SAMPLING PAVEMENT

A. Testing of completed pavement shall be at 150-foot intervals. The number and location of the tests will be at the discretion of the Engineer. All tests necessary to determine conformance with requirements specified in this specification shall be performed by the testing lab and witnessed by the Engineer. Failures shall be paid for by the Contractor. All test results to be sent to the Engineer.

2.26 THICKNESS

A. The thickness of the pavement course shall be determined by cores taken at every 500 square yards or at every 125 linear feet of street. All tests necessary to determine conformance with requirements specified herein shall be performed by the testing lab and witnessed by the Engineer. Failures shall be paid for by the Contractor.

2.27 TESTING REQUIREMENTS

ASTM C29	Unit Weight Aggregate
ASTM C88	Soundness of Aggregates by Use of Magnesium Sulfate
ASTM C131	Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angles Machine
ASTM C136	Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C183	Sampling Hydraulic Cement
ASTM D75	Sampling Aggregates
ASTM D423	Liquid Limit of Soils
ASTM D424	Plastic Limit and Plasticity Index of Soils
ASTM D995	Requirements for Mixing Plants for Hot Mixed, Hot Laid Bituminous Paving Mixtures
ASTM D1075	Effect of Water on Cohesion of Compacted Bituminous Mixtures
ASTM D1188	Bulk Specific Gravity of Compacted Bituminous Mixtures Using Paraffin Coated Specimens
ASTM D1461	Moisture of Volatile Distillates in Bituminous Paving Mixtures
ASTM D1559	Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
ASTM D2172	Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D2419	Sand Equivalent Value of Soil and Fine Aggregate
ASTM D2489	Degree of Particle Coating of Bituminous Aggregate Mixtures
ASTM D2726	Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface Dry Specimens
ASTM D3665	Random Sampling of Paving Materials
ASTM D3666	Inspection and Testing Agencies for Bituminous Paving Materials
AASHTO T30	Mechanical Analysis of Extracted Aggregate

The Asphalt Institute's Series (SS-1)	Model Construction Specifications for Asphalt Concrete and Other Plant Type Mixes-
The Asphalt Institute's Manual No. 2 (MS-2)	Mix Design Methods for Asphalt Concrete

2.28 Material Requirements

ASTM D242	Mineral Filler for Bituminous Paving Mixtures
ASTM D490	Tar
ASTM D946	Asphalt Cement for Use in Pavement Construction
ASTM D3381	Viscosity Graded Asphalt Cement for Use in Pavement Construction
AASHTO M226	Viscosity Graded Asphalt Cement

PART 3 - EXECUTION

3.1 PAVEMENT MARKING

A. The Contractor shall be responsible for restoring any pavement markings destroyed or damaged by the construction. Pavement marking shall consist of centerline stripes, parking space limits, pedestrian crosswalks, railroad crossings warnings, no passing zones edge striping and other information described in the plans on the new or existing asphaltic concrete pavement in accordance with the details shown on the drawings and as specified herein.

3.2 CONSTRUCTION METHODS

A. The Contractor shall use a crew experienced in the work of installing pavement markings and shall supply all the equipment, personnel, traffic control, and materials necessary for the placement of the pavement markings as shown in the plans or as directed by the Engineer. All work shall be in conformance with the current edition of the New Mexico State Highway and Transportation Department 2000 Edition.

B. The pavement surface to receive the pavement markings shall be thoroughly cleaned of all dirt, organic growth, or other material that will prevent adhesion of the paint to the pavement surface.

C. The pavement markings shall be placed in the proper alignment with suitable guides. Deviation from the alignment established shall not exceed two inches, and, in addition, the deviation in alignment of the centerline marking being placed shall not exceed one inch per 200 feet of roadway nor shall any deviation be abrupt.

D. When deemed necessary by the Engineer, the Contractor, at his expense, shall place any additional pilot marking in the alignment specified. Any and all additional markings paled on the roadway for alignment purposes shall be temporary in nature and shall not establish a permanent marking on the roadway. Materials used for pilot markings and equipment used to place such markings shall be approved by the Engineer.

E. Markings on the roadway that are not in alignment or sequence, as shown on the plans or as stated in this specification, shall be totally and completely removed by any effective method approved by the Engineer. Grinding will not be allowed.

3.3 PAYMENT

A. Payment for all work in this Section will be included in the unit bid price for HMAC Overlay as shown in the Contractor's Bid Proposal. Such payment shall be complete compensation for the complete performance of the work including all subsidiary or incidental items necessary to complete the work in accordance with the drawings and specifications. No separate payment will be made for compliance with this section.

END OF SECTION

SECTION 02521

CONCRETE CURBS, SIDEWALKS AND DRIVEWAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SCOPE

A. The work covered by this section of the specifications consists of constructing all concrete curbs, curbs and gutters, headers, sidewalks, concrete slabs for protection of pipelines, and driveways shown on the drawings and of reconstructing or repairing any of those features removed or damaged during construction of the pipeline.
B. The Contractor shall furnish all material, equipment, tools, labor, superintendence and incidentals necessary for the complete construction of this work in accordance with the drawings and these specifications.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 SIDEWALKS

A. The concrete for sidewalks shall be as specified in Section 03300 - Cast in Place Concrete.
B. The sidewalk sections shall be constructed accurately to the grade and section shown on the plans. The slabs shall be screeded and floated to a uniform surface; then when the concrete has set sufficiently to support knee boards, the surface shall be given a steel trowel finish and then brushed lightly with a soft-bristled brush. The brush shall be moistened with water and shall be kept reasonably clean at all times. Brushing shall be limited to that necessary to remove the glaze and produce a non-slip surface. Edges shall be round to a 1/8 inch radius with an edging tool.
C. Concrete sidewalks shall be constructed with an expansion joint at intervals of not more than twenty (20) feet. A construction or contraction joint shall be at intervals equal to the sidewalk width.

3.2 DRIVEWAYS

A. The concrete and the reinforcement for driveways shall be as specified in Section 03300 - Cast in Place Concrete.
B. The driveway sections shall be constructed accurately to the grade and section shown on the plans and to the lines and grades shown on the plans or established by the Engineer. The concrete shall be reinforced with steel bars or welded wire fabric as shown on the

drawings. The slabs shall be screeded and floated to a uniform surface; then when the concrete has set sufficiently to support knee boards, the surface shall be given a steel trowel finish then brushed lightly with a soft-bristled brush. The brush shall be moistened with water and shall be kept reasonably clean at all times. Brushing shall be limited to that necessary to remove the glaze and produce a non-slip surface. Edges shall be rounded to a 1/8 inch radius with an edging tool.

C. Concrete driveways shall be constructed with an expansion joint at intervals of not more than twenty (20) feet. A construction or contraction joint shall be at intervals equal to the driveway width.

3.3 EXPANSION JOINT MATERIAL

A. Expansion joint material shall be an approved preformed bituminous impregnated non-extruding type jointing material, 1/2" thick, and shaped to the section of the concrete header or sidewalk.

3.4 CONCRETE SLABS FOR PROTECTION OF PIPE

A. Slabs called-out on the drawings for protection of pipelines shall be constructed to the lines and grades shown on the plans or established by the Engineer. The concrete shall be reinforced with steel bars or welded wire fabric as shown on the drawings. The slabs shall be screeded and floated to a uniform surface. Slabs shall be allowed to set-up before backfilling.

3.5 CURING

A. All concrete shall be cured as specified in Section 03300 - Cast in Place Concrete.

3.6 DEFECTIVE WORK

A. Any defective work disclosed after the forms have been removed shall be immediately removed and replaced. If any dimensions are deficient, or if any section is not constructed to the proper grade, or if the surface of the concrete is bulged, uneven, or shows honeycomb, which in the opinion of the Engineer cannot be repaired satisfactorily, the entire section shall be removed and replaced at the expense of the Contractor.

3.7 BACKFILLING

A. Backfilling behind and adjacent to all concrete work shall be made from good quality topsoil. This material shall be free from organic material such as leaves, grass, roots and other unsuitable materials and free of rocks or stones. The Contractor shall provide a smooth, even slope between the property line and the edge of concrete headers or the top of other concrete structures.

B. Care shall be taken during the backfill and cleanup process not to scrape, chip, crack or otherwise damage the concrete including tire marks from equipment or trucks. Any damaged concrete will be removed and replaced at the expense of the Contractor.

3.8 PAYMENT

A. Payment shall be subsidiary to work items to which it relates, as either Lump Sum or unit price, as shown on the proposal. Either such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications.

END OF SECTION

SECTION 02600

SCHEDULE OF PIPE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 PIPE

A. Approved pipe shall be used in construction of all pipelines and connections. The only types of pipe which will be considered for use are those listed in this section. All pipes of like sizes shall be of the same type and class. Acceptable types and classes of pipe which may be approved for the various items of work are shown in the schedule below. See SECTION 02610 - PIPE, VALVES, AND FITTING MATERIALS of these specifications for other requirements.

PART 2 - PRODUCT

2.1 WATER

Size and Use	**Type and Class**
6" Water Lines	PVC, AWWA C-900, DR 25
6" Irrigation Water Line	PVC, AWWA C-900, DR 14
¾" Service Lines	Polyethylene PE 4710 DR 11 (CTS)
4" & 6" PRV & Pump Station Piping	DIP AWWA C151 PC350
1 ¼ " PRV Piping	SCH 80 PVC

PART 3 - EXECUTION

3.1 PAYMENT

A. Payment will be made for all work covered in this section at the contract unit price per unit or will be included in the lump sum price per job for items, as shown on the proposal. Either such payment shall be complete compensation for the complete performance of the

work in accordance with the drawings and the provisions of these specifications. No separate payment will be made for compliance with this section.

END OF SECTION

SECTION 02610

PIPE, VALVES AND FITTING MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SCOPE

A. The work covered by this section of the specifications consists of the materials for all piping, valves and fittings required for this project.

B. The Contractor shall furnish all materials, equipment, tools labor, superintendence and incidentals required for the complete construction of the work as shown on the drawings and as specified herein. All pipe and fittings used for this project are to be new. PVC and ductile iron pipe shall be properly restrained.

1.3 SUBMITTALS

A. Before beginning fabrication of the pipe, the Contractor shall furnish the Engineer with submittals which shall include a laying plan and details of a standard pipe section, special fittings, and bends for all pipe materials. Dimensions indicating wall thickness standard laying lengths as well as dimensions for all specials shall be included. Where applicable, information pertaining to special linings, coatings and joint bonding shall include the type of material being used, its application, method of installation and other information which relates to the manner in which it will be used. The laying plan shall show the location of each pipe section and each special length with each piece numbered or otherwise designated in sequence. All special fittings, bends, etc. shall be made up into special lengths so that, when installed, they will be located as indicated. Each pipe and fitting shall be marked on the outside to indicate the class of pipe and the location number on the laying plan. Pipe shall be furnished and installed in accordance with the approved laying plan. Where two or more classes or lengths of pipe of the same diameter are to be furnished, clearly mark each pipe section. All markings will be coded to the shop drawings. The drawings shall be furnished in conformance with requirements of the General Conditions. Review of the drawings by the Engineer shall not relieve the Contractor of the responsibility for complying with all requirements of the Contract Documents.

1.4 CERTIFICATION

A. Certifications properly executed by the manufacturer shall be furnished to the Engineer showing compliance with the required specifications. All pipe and fittings must conform to ANSI/NSF standard 61 and must be certified by an organization accredited by ANSI. Data resulting from tests performed shall be provided by the Contractor as requested by the Engineer.

1.5 INSPECTION

A. The Engineer and his representatives shall have access to all phases of the work. The manufacturer and Contractor shall provide proper facilities for access and inspection. Materials, fabricated parts, and pipe which are discovered to be defective, or which do not conform to the requirements of this Specification, will be subject to rejection at any time prior to final acceptance of the pipe.

PART 2 - PRODUCTS

2.1 PIPE MATERIALS

A. The Contractor shall supply all pipe required for the project. Refer to Section 02600 - SCHEDULE OF PIPE for minimum pressure class and wall thickness to be provided for the various types of pipe materials acceptable. For design purposes all pipe for this project shall be of the sizes shown on the drawings, and shall be designed for the pressures shown in Table 1.

Table 1 – Pipeline Design Pressure

Pipeline	From Station	To Station	Working Pressure (psi)	Surge Pressure (psi)	Total Design Pressure (psi)	Test Pressure (psi)
Deer Valley Drive, 6-inch Irrigation Line (Discharge Line of relocated pump station)	1+00	10+31	250	50	300	300
Deer Valley Drive, 6-inch Irrigation Line (Suction Line of relocated pump station	10+31	20+51	100	50	150	150
Deer Valley Drive, 6-inch Distribution Line	1+100	20+51	100	50	150	150
All other piping	N/A	N/A	100	50	150	150

B. The water main pipe shall also be designed for the earth loads based upon a soil unit weight of 125 pounds per cubic foot and the depths of cover as indicated on the drawings. In addition, 16,000-lb. wheel load and a 1.5 impact factor, using a Type 5 laying condition as defined by AWWA C151 shall be used. Bedding constant shall be 0.1 and the deflection lag factor shall be 1.1. The modulus of soil reaction (E') for design purposes shall be 700 psi. Design calculations shall be submitted to the Engineer for approval prior to the fabrication of any pipe.

2.2 PVC PRESSURE PIPE

A. PVC pressure pipe shall be unplasticized polyvinyl chloride plastic water pipe, blue in color, with integral bell and spigot joints. Pipe 12-inches in diameter and smaller shall meet the requirements of AWWA C900, "Polyvinyl Chloride (PVC) Pressure Pipe",

Pressure Class 165 (DR25) and pressure Class 305 (DR14). Pipe greater then 12- inches in diameter shall meet the requirements of AWWA C905, "Polyvinyl Chloride (PVC) Water Transmission Pipe", Pressure Rating 165(DR25). Provisions must be made for expansion and contraction at each joint with an elastomeric ring. The bell shall consist of an integral wall section with a locked in, solid cross section elastomeric ring, which meets the requirements of ASTM F477. The bell section shall be designed to be at least as hydrostatically strong as the pipe to meet AWWA C900/C905.

B. The pipe shall withstand a minimum quick burst pressure of 755 psi when tested in accordance with ASTM C1599. The pipe shall withstand, with no visible evidence of shattering or splitting, when subjected to the drop impact test, an impact of 120 ft./lbs. in accordance with ASTM D2444.

C. The PVC pressure pipe used to replace sanitary sewer lines shall meet the requirements of ANSI/AWWA C900-89 and shall be Class 150 (DR 18), and it shall be connected to existing sewer pipe at each end with adapter couplings having stainless steel hardware.

D. The PVC pressure pipe used to relocate and/or replace existing water lines shall be rated for minimum working pressure of 150 psi and shall meet the requirements of either ANSI/AWWA C900-89, minimum DR 18, blue in color, or ANSI/AWWA C905-88, minimum DR 18, blue in color, with cast iron pipe O.D.

E. The minimum length of restrained joints shall be as indicated in TABLE 1 at the end of these specifications. The procedure and materials used for restraining the joints shall be as recommended by the pipe manufacturer. The Contractor shall submit the recommended procedure with details to the Engineer for field inspection purposes.

PART 3 - EXECUTION

3.1 POLYVINYL CHLORIDE PRESSURE (PVC) FITTINGS

A. The fittings for AWWA C900 and AWWA C905 PVC pipe shall be ductile or cast iron conforming to the requirements of ANSI/AWWA C110/A21.10-87, and shall be suitable for use with the specified PVC pipe with which they are used. For other classes and schedules of PVC pipe, the fittings shall have the same, or greater, respective class/schedule as that of the pipe with which they will be used. Fittings shall have elastomeric rings for sealing. Solvent welding will not to be acceptable. Where necessary, VINYL-iron PVC pipe to A/C pipe coupling adapter will be used for connecting to exiting A/C pipe.

1. Restrained Joints for PVC Pipe: Restrained joint devices for all PVC pipe shall incorporate a series of machined serrations (not "as cast") on the inside diameter to provide positive restraint, exact fit and 360 degree contact and support of the pipe wall. The solid back-up ring shall have a beveled leading edge to assure an exact fit behind the pipe bell. Restraint devices shall be of ductile iron, ASTM A536, Grade 65-45-12. Connecting bolts shall be of high strength, low alloy material in accordance with ANSI/AWWA C111/A21.11.
2. All restraint devices for PVC pipe shall have a working pressure rating equivalent to the full rated pressure of the PVC pipe on which they are installed, with a minimum 2:1 safety factor in any nominal pipe size. In addition, they shall meet or exceed the requirements of UNI-B-13-94. Notarized certification from the manufacturer of the joint restraint device shall be submitted. Restraint devices shall be Uni-Flange Block Buster Series 1300 manufactured by Ford or an Engineer approved equal.

3.2 DUCTILE IRON FITTINGS

A. Fittings for ductile iron pipe shall be cast iron or ductile iron and shall be end grooved, mechanical joint, flanged, or a combination as shown or required and shall conform to AWWA C110. In general, flange fittings shall be used on all exposed piping and all other fittings shall be mechanical joints. End grooved fittings shall only be used where shown on the drawings. All fittings or restrained joints shall be designed for pressures indicated in Table 1 Section 2.1.A.

B. All ductile iron fittings shall be cast from the same quality of metal used in casting ductile iron pipe and shall be subjected to the same test requirements. Marking and weighing shall be as required for the ductile iron pipe. Coatings shall be the same as ductile iron pipe.

C. All flanged fittings shall be faced and drilled in accordance with the standard drilling for ANSI B16.1 Class 125 and Class 250 flanges.

D. Bolts shall be of the length and diameter required by the ANSI specification for Class 125 and 250 flanges. Bolts and nuts shall be of best quality mild steel and shall be provided with hexagonal heads, except where other types of bolts are specified. Ring gaskets shall be used in all flanged joints and shall be rubber composition sheet packing, Rainbow, Durable Barlock or equal.

E. Fittings shall be wrapped with one 10 mil polyethylene wrap per AWWA C105.

3.3 VALVES

A. All valves shall be of the type shown or specified on the drawings and as specified herein. All valves shall either be flanged, or as shown on the drawings. All valves shall be complete with the required devices and appurtenances required for operation, and extension stems, as shown on the plans or as specified herein. All valves shall be for buried service operation.

3.4 GATE VALVES

A. General: gate valves shall be of the resilient wedge, tapered seat, iron body, bronze mounted type and shall comply with AWWA C-509. Gate valves shall be installed where shown on the plans. Gate valves shall be rated for a minimum of 200 psi working pressure, seat test of 400 psi. Gate valves shall be Kennedy C509 or approved equal.
Records of tests shall be furnished as specified in AWWA C509. Records of tests shall be submitted prior to approval of the valves.

B. Body: The valves shall have a ductile iron body, bonnet and O-ring plate.
Stems: Valves shall be non-rising stem, opening by turning in a counter clockwise direction. The stems shall be bronze or copper alloy with integral collars. Stainless steel stems or stem nuts are not acceptable. Stems shall be sealed by three O-rings. Two O-rings shall be located above the collar and one O-ring below. The top two O-rings shall be replaceable with the valve fully open. All gaskets shall be O-ring seals. Flat gaskets shall not be allowed.

C. Wedge: The wedge shall be ductile iron, completely encapsulated with rubber. The wedge shall be symmetrical and seal equally well with flow in either direction.

D. Coating: Interior and Exterior ferrous metal surfaces shall be epoxy coated to comply with AWWA C550 standard.

E. Affidavit of Compliance: An affidavit of compliance as specified in AWWA C509 shall be furnished during the submittal phase prior to approval of the valves. Certified drawings and

material specifications shall be furnished by the manufacturer through the Contractor covering all items included in AWWA C509. Manufacture of valves to the furnished shall commence only after the certified drawings have been accepted by the Engineer.

3.5 FIRE HYDRANTS

A. General: fire hydrants shall manufactured in accordance with AWWA C502 and be of break flange traffic model. Hydrant shall be rated for a minimum of 150 psi working pressure.

B. The hydrant shall be of dry top center stem construction with main valve opening against pressure.
Operating nut and thrust nut shall be bronze. Bearings shall be located both above and below thrust collar. A stop nut shall be provided to prevent over travel and compression of the stem. The main valve seat ring shall be bronze and screw into the bronze drain ring.

C. Split break away flange and stainless steel snap on ring shall allow 360 degree rotation of stand pipe.

D. Hydrant shall have a minimum valve opening of 5 ¼".

E. Inlet connection shall be a 6" mechanical joint.

F. All hydrants shall conform to; AWWA standard, and the standards established by the Lincoln County Emergency Service District. Hydrant shall have two 2 ½" hose nozzles and one 4 ½" pumper nozzle. Nozzle thread shall be National Standard. Operating nuts shall be National Standard. The Fire hydrant shall be a Mueller Super Centurion 250 3-way A-423 or equal.

3.6 PRESSURE REDUCING VALVE (1 ¼ " & 4")

A. MAIN VALVE: The valve shall be hydraulically operated, single diaphragm-actuated, globe or angle pattern. The valve shall consist of three major components; the body, with seat installed; the cover, with bearings installed; and the diaphragm assembly. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure.

B. BODY: No separate chambers shall be allowed between the main valve cover and body. Valve body and cover shall be of cast material. Ductile Iron is standard and other materials shall be available. No fabrication or welding shall be used in the manufacturing process.

C. The valve shall contain a resilient, synthetic rubber disc, with a rectangular cross-section contained on three and one half sides by a disc retainer and forming a tight seal against a single removable seat insert. No O-ring type discs (circular, square, or quad type) shall be permitted as the seating surface.

D. The diaphragm assembly containing a non-magnetic 303 stainless steel stem with sufficient diameter to withstand high hydraulic pressures shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. No center guides shall be permitted. The stem shall be drilled and tapped in the cover end to receive and affix such accessories as may be deemed necessary. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from the line pressure.

E. The flexible, non-wicking, FDA approved diaphragm shall consist of nylon fabric bonded with synthetic rubber compatible with the operating fluid. The center hole for the main valve stem must be sealed by the vulcanized process or a rubber grommet sealing the center stem hole from the operating pressure.

F. The main valve seat and the stem bearing in the valve cover shall be removable. The cover bearing and seat in 6" and smaller size valves shall be threaded into the cover and body. The lower bearing of the valve stem shall be contained concentrically within the seat and shall be exposed to the flow on all sides to avoid deposits. To insure proper alignment of the valve stem, the valve body and cover shall be machined with a locating lip. No "pinned" covers to the valve body shall be permitted. Cover bearing, disc retainer and seat shall be made of the same material. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline.

G. The valve manufacturer shall warrant the valve to be free of defects in material and workmanship for a period of three years from date of shipment, provided the valve is installed and used in accordance with all applicable instruction. Electrical components shall have a one year warranty.

H. Valve shall have the following:

- 150# Flange, Ductile Iron Body, Bronze Trim, Stainless Steel Valve Stem, Copper Tubing/Fittings
- Isolation Valves — Option (B)
- Opening Speed Control — Option (S)
- X43 Y Strainer — Option (Y)
- Epoxy Coating — Option (KC)
- Adder for — Option (P) X143 Inlet & Outlet Pressure Gauges
- Adder for — X101 Valve Position Indicator
- Globe Pattern — #1 Basic Components
- X58C Restriction Fitting — #2 Basic Components (installed in Y Strainer)
- CLA VA 30-300 CRD — ## Basic Components

I. PILOT CONTROL SYSTEM

1. The pressure reducing pilot control shall be a direct-acting, adjustable, spring-loaded, normally open, diaphragm valve designed to permit flow when controlled pressure is less than the spring setting. The pilot control system shall include a fixed orifice. No variable shall be permitted.
2. The pilot control shall have a second downstream sensing port which can be utilized to install a pressure gauge.
3. A full range of spring settings shall be available in ranges of 0 to 450 psi.
4. A direct factory representative shall be made available for start-up service, inspection and necessary adjustments.
5. This valve shall be a CLA-Val Co. Model No. 90-01 Pressure Reducing Valve. As manufactured by CLA-Val Co. Newport Beach, CA 92659-0325 or M115 Series as manufactured by Watts, Houston, Texas 77075.

J. Training: Contractor is to coordinate 8 hours of training with the owner on the PRV's. Training shall consist at a minimum: operation, adjustments, part replacement and maintenance.

3.7 COMBINATION AIR VALVES

A. General Combination air valves shall be of the single housing style that combines the operating features of both air/vacuum and air release valves. The air/vacuum portion shall automatically exhaust large quantities of air during the filling of a line and allow air to re-

enter when the internal pressure of the pipeline nears a vacuum. The air release mechanism shall automatically release small quantities

3.8 CORPORATION STOPS

A. Corporation stops shall be rated for a working pressure of a minimum of **150 psi** with a surge pressure of **50 psi**. Corporation stops shall be of sizes and connections as shown on the drawings. Corporation stops shall be Mueller or approved equal.

B. The use of pipes and pipe fittings that contain more that 8.0% lead or solders and flux that contains more that 0.2% lead is prohibited in the following circumstances:
   1. for installation or repair of any public water supply; and
   2. for installation or repair of any pluming in a residential or nonresidential facility providing water for human consumption and connected to a public drinking water supply system.

3.9 METERS

A. Contractor to tie into existing meters.

3.10 VALVE BOXES

A. All Valves installed underground that are 16-inch diameter and less shall be provided with a valve box accurately set over the operating nut. Valve boxes shall be of cast iron, complete with cover, and shall be of the extension type with screw-or-slide-type adjustment and flared base suitable for the particular valve on which it is installed. **Boxes shall be similar to Clow-National No. F-24.50**.

3.11 METER BOXES

A. All newly placed meter boxes shall be Sigma MBP61

3.12 THRUST RESTRAINT

A. All underground pressure piping 12” diameter and less shall be provided with both mechanically restrained joints and concrete thrust blocking at all changes in direction and at the locations of valves, fittings, service stub-outs, and dead-ends in accordance with Table 2 below. All piping for the pump station shall be restrained as shown on the drawings. All pressure pipelines installed within casings shall have restrained joints throughout the entire length of casing plus a minimum of one additional joint length on both sides of casing. For specially fabricated pipe such as steel pipe, restrained length calculations from the manufacturer shall be submitted to the Engineer for review and approval, prior to pipe fabrication. Restrained lengths shall be designed to withstand 1.5 x (rated working pressure of the pipeline); and shall be designed for the configuration and earth loads indicated on the drawings. The restrained lengths indicated in TABLE 2 are the minimum required to be provided and are considered to be in addition to what the pipe manufacturer recommends. The most conservative restrained lengths shall be used for this project, whether they are what are indicated in the plans or what the pipe manufacturer calculates.

Table 2 Minimum Restrained Horizontal Length For 6 Inch Pipe in Feet

Fitting	For Test Pressure 150 psi	For Test Pressure 300 psi
	Restrained Length (ft)	Restrained Length (ft)
11 ¼	2	6
22 ½	4	11
45	9	22
90	20	52
Dead End	36	94
Tee	10	20
Reducer	19	40

Contractor can deflect pipe to 50% of Manufacturer's Recommendation.

3.13 SERVICE SADDLES

A. The service saddle shall have a ductile iron body per ASTM A536. The saddle shall have an outlet for the service connection that will allow an NPT or AWWA thread to be tapped into it.

B. The saddle shall have two (313) carbon steel bales per ASTM A108 C1018) and be electro-galvanized with dichromate seal per ASTM B633.

C. The nuts shall be cold formed semi-finished heavy hex steel A563 with an electro-galvanized with di-chromate seal per ASTM B633. The washers shall be carbon steel per ASTM A108 and electro-galvanized with dichromate seal per ASTM B633.

D. The gasket shall be a TaperSeal outlet gasket that has a hydro-mechanical lip that seals better on the pipe surface as the line content pressure increases.

E. The gasket shall be made of Nitrile (Buna N) and NSF 61 listed. The gasket shall be compounded to resist: water, oil acids, alkalies, most (aliphatic) hydrocarbon fluids and many other chemicals. The gasket shall have a temperature range of -20˚F to +180˚F. The gasket shall be fully cemented into a cavity to hold it in place around the outlet during installation.

3.14 PAYMENT

A. For all work covered in this section will be included in the appropriated bid unit price per unit as shown in the proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications.

END OF SECTION

SECTION 02730

PIPE INSTALLATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 PIPE

A. The pipe, fittings, and accessories shall be inspected upon delivery and during the progress of the work. Any material found to be defective will be rejected by the Engineer and the Contractor shall remove such defective material from the site of the work.
B. The Contractor shall be responsible for all material furnished by him and he shall replace at his own expense all such material found to be defective in manufacture or damaged after delivery.
C. All pipe, fittings, and other accessories shall, unless otherwise authorized, be unloaded at the point of delivery, hauled to and distributed at the site of the work by the Contractor. In loading and unloading, the materials shall be lifted by hoists with slings using two-point pickup. Pipe shall not be slid, or rolled on skidways, to avoid shock or damage to the materials. Under no circumstances shall the materials be dropped, or skidded or rolled against pipe already on the ground.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 PIPE BEDDING

A. Pipe bedding and classes of bedding conditions shall be as indicated on the plans and as specified herein
B. Pipe bedding shall be Class B crushed aggregate (crusher fines). Bedding material shall be granular and conform to the following physical characteristics.

Sieve Size (Square Openings)	Percent Passing by Weight
3/8 inch	100
No. 4	90-100
No. 8	55-80
No. 16	40-70
No. 30	25-50`
No. 300	6-15

C. Placement-Refer to this Section 3.2

3.2 CRUSHER FINES PLACEMENT

A. The granular bedding material shall be non-plastic as determined in accordance with ASTM D 4318. The material shall be free from roots, grass, other vegetable matter, clay lumps, or other deleterious materials. Bedding material shall be placed from 3" below the pipe or as shown in the plans to 12" above the pipe in 8" lifts and compacted to 90% ASTM D-1557 with appropriate compaction equipment. No water flooding will be allowed. No backfill material larger than 3/8 - inch shall be allowed from bottom of trench to 12" above the pipe.

3.3 PIPE INSTALLATION IN TRENCH

A. After the trench has been excavated and the pipe bed properly fine graded, the pipe shall be laid in accordance with manufacturer's recommendations and the following specifications. Each length of pipe shall be inspected for defects immediately before it is laid. Any defective pipe which has been damaged by mishandling or any other cause shall be replaced with satisfactory pipe by the Contractor at his expense.

B. Pipe shall be laid true to line and to a uniform grade in a dry trench with no sharp changes in grade. Pipe shall rest uniformly on the bottom of the trench or upon the prepared bedding throughout the length of the pipe and bell holes shall be provided, where required, to assure this. Pipe shall be laid true to the lines and depths shown on the plans. Pipe which is not in true alignment or shows any undue settlement after laying, shall be taken up and re-laid at the Contractor's expense.

C. Pipes shall be clean inside before they are joined and shall be maintained free of water, soil, and all other foreign matter. All openings to the pipe shall be closed by suitable means at all times except as the actual progress of the work may require the pipe to be open.

D. The work shall be watertight at all joints and any leaks or defects shall be immediately repaired. Any pipe which has been disturbed for any cause after being laid in its final position shall be taken up, the joint cleaned and the pipe properly re-laid.

E. The Contractor shall furnish watertight plugs for the pipe ends and/or other openings as may be required. These plugs shall be installed and maintained by the Contractor; during non-work hours, nighttime, weekends, and non-pipe laying operations, at each location where the pipe is being installed. The Contractor shall provide the temporary plugs for all pipe openings that would normally be left open during construction. The information on the proposed plugs to be furnished for use on the project shall be included as part of the information submitted for the pipe to be furnished on the project. At the completion of the work, the Contractor shall turn the plugs over to the Owner. Pipe plug information shall be included in the pipe manufacture's submittal to the Contractor. Pipe plugs shall be onsite prior to start of pipe installation.

3.4 UTILITY RELOCATIONS

A. WATER AND SEWER

1. Existing water and sewer lines shall remain in service at all times during construction, unless otherwise noted on the plans. Existing utilities that will be

exposed during construction shall be shored or otherwise supported so that no damage occurs to the exposed lines. If leaks develop in any existing, exposed, water or sewer lines, those leaks shall be repaired immediately by the Contractor at no additional expense to the Owner. The Contractor shall not interrupt the service or function or disturb the support of any utility without written authority from the particular utility owner. Where protection is required to ensure support of utilities, the Contractor shall place and provide the necessary protection and all cost associated with such shall be included in the unit price bid for the various work items, unless a specific bid item is stated. Any existing lines, which will require relocation by the Contractor, shall be relocated in accordance with these specifications.

2. All temporary or permanent relocation, and alteration of utilities requested by the Contractor for his convenience shall be his responsibility and the Contractor shall make all arrangements and bear all associated costs.

3.5 SUBMITTAL OF BY-PASS PLANS

A. A by-pass plan for any and all utilities shall be submitted to the Engineer for review and approval 21 calendar days prior to the planned by-pass. Submittal shall include: the time the by-pass is planned; how it will be accomplished; materials to be used; contractor support personnel and equipment to be used for the by-pass; Contractor contact during by-pass; time required for the by-pass; time of day the by-pass will be conducted; interruption time (if any); by-pass close down procedures; testing of bypass and disinfection procedures for water lines if applicable.

3.6 SUBMITTAL OF TIE-IN PLANS (PUMP STATION)

A. Plans for tie-ins of the pump station shall be submitted to the Engineer for review and approval 21 calendar days prior to the planned work. The plans shall include the time when the work will be performed; the methods and materials to be used; any interruption of service time required; and the testing and disinfection procedures to be followed, where applicable.

3.7 SUBMITTAL OF RESIDENTIAL WATER SHUT DOWN PLAN

A. Plans for the shutting off of water to the residents shall be submitted to the Engineer for review and approval 21 calendar days prior to the planned work. Contractor will distribute notices to the residents 72 hours prior to any shutdown. Contractor shall coordinate the day and time with the Owner. Time will be limited to 4 hours for each occurrence.

B. The procedure will be for work associated with any tie-ins, gate valve replacement or fire hydrant installation.

3.8 SEWER AND POTABLE WATER SEPARATION

A. When installed parallel to existing potable water lines, sewer lines shall be separated from the potable water lines by a distance of at least nine (9) feet. Where the nine foot separation distance cannot be achieved the following separation requirements shall be observed:

1. When installed parallel to an existing potable water line, the sewer piping shall be located lower than the potable water line with at least two (2) feet between outside diameters vertically, and at least four (4) feet between outside diameters horizontally.
2. When crossing an existing potable water line, a separation of six (6) inches between outside diameters of potable and sewer lines shall be achieved. Additionally, one length of sewer pipe shall be centered on the potable water line.

3.9 WATER AND SEWER SEPARATION

A. Where water and sewer lines are parallel, a minimum separation (outside-to-outside) of 9 feet shall be maintained in all directions. Sewers that parallel water lines must be installed in separate trenches. Where the nine foot separation distance cannot be achieved, the following guidelines will apply:
   1. The sewer need not be disturbed where a new waterline is to be installed parallel to an existing sewer that shows no evidence of leakage and the waterline is installed above the sewer a minimum of two feet vertically and four feet horizontally. Should excavation for the waterline produce evidence that the sewer is leaking, the sewer must be repaired or replaced as described in part (3).
   2. The sewer need not be disturbed where a new waterline is to cross over (by two feet or more) existing sewer showing no evidence of leakage. Should excavation for the waterline produce evidence that the sewer is leaking, then the sewer must be repaired or replaced as described in parts (4) OR (5).
   3. Where a sanitary sewer parallels a water line, the sewer shall be constructed of PVC meeting ASTM specifications with a pressure rating for both the pipe and joints of 150 psi. The vertical separation shall be a minimum of two feet between outside diameters and the horizontal separation shall be a minimum of four feet between outside diameters. The sewer shall be located below the water line.
   4. Where a sewer crosses under a water line and the sewer is constructed of ABS truss pipe, similar semi-rigid plastic composite pipe, clay pipe or concrete pipe with gasketed joints, a minimum two foot separation distance shall be maintained. The initial backfill shall be cement stabilized sand (two or more bags of cement per cubic yard of sand) for all sections of sewer within nine feet of the water line. This initial backfill shall be from one quarter diameter below the centerline of the pipe to one pipe diameter (but not less than 12 inches) above the top of the pipe.
   5. Where a sewer crosses over a water line all portions of the sewer within nine feet of the water line shall be constructed of PVC pipe with a pressure rating of at least 150 psi using appropriate adapters. In lieu of this procedure the new conveyance may be encased in a joint of 150 psi pressure class pipe at least 18 feet long and two nominal sizes larger than the new conveyance. The space around the carrier pipe shall be supported at 5 feet intervals with spacers or be filled to the spring line with washed sand. The encasement pipe should be centered on the crossing and both ends sealed with cement grout or manufactured seal.

B. Where a sanitary sewer crosses a water line and the sewer is constructed of ductile iron or PVC with a minimum pressure rating of 150 psi, an absolute minimum distance of 6 inches between outside diameters shall be maintained. In addition, the sewer shall be located below the water line where possible and one length of the sewer pipe must be centered transversely on the water line.

3.10 WATERLINE/MANHOLE SEPARATION

A. Unless sanitary sewer manholes and the connecting sewer can be made watertight and tested for no leakage, they must be installed so as to provide a minimum of nine feet of horizontal clearance from an existing or proposed water line. Where the nine foot separation distance cannot be achieved, a carrier pipe as described previously in this section may be used where appropriate.

3.11 OTHER UTILITIES

A. The facilities of utility companies, such as telephone, cable television, electric power, gas, etc., have been indicated as nearly as possible on the drawings. It shall be the responsibility of the Contractor, however, to determine the locations of those, or any other facilities at the job site, and to arrange with the respective utility owners for any necessary relocation of conflicting facilities. All utility owners shall be contacted by the Contractor so that the respective utilities can be located prior to any excavation by the Contractor. It shall be the Contractor's responsibility to coordinate all locating efforts with the utility owners and to reflect such efforts in the construction schedule.
   1. Water or By-Pass
      a. All water or by-pass work shall be coordinated with the owner of the particular line being relocated or by-passed and per the requirements of the contract specifications. The design of relocated lines and by-pass lines shall be subject to the specific conditions of each location, and approval by the Engineer and the owner of the respective line.
      b. If by-pass work is needed, the contractor will inform Engineer prior to any work being performed. Contractor will submit a detail of proposed by-pass to the Engineer for review.

3.12 MARKING TAPE

A. Any new or relocated sewer, potable water, natural gas, buried phone, or other utility shall be marked by installing the appropriate marking tape in the trench. Marking tape for water and sewer shall be metallic. All other marking tape shall consist of a minimum of 4.0 mil inert polyethylene plastic. The tape shall be imprinted continuously over its entire length in permanent black ink to identify the type of line. The tape shall be 6 inches in width and colored High Visibility Safety Yellow for gas lines, High Visibility Blue for water lines, High Visibility Brown for sewer lines.

B. New force mains shall be marked by installing the appropriate marking tape in the trench during pipeline installation. The marking tape shall be as manufactured by Alarm-Tapes, Inc., or equal. Installation in the trench shall be as recommended by the manufacturer and as shown on the drawing details.

3.13 TESTING

A. Water Lines: All water lines shall be cleaned, sterilized and pressure tested. This work shall be performed by the Contractor on completed sections of lines in accordance with the procedures set forth herein.

The Contractor shall provide all means and methods necessary to safely and efficiently flush the new 6” and 8” pipeline at all low points in the line or at the most appropriate locations.

This includes but is not limited to temporary ports, valves and discharge lines, as well as signage and barricades that may be needed to accomplish this work.

B. Water for Testing: All water within reason, which is needed for filling, flushing and testing water lines will be furnished by the Owner in accordance with Section 01500-Construction Facilities and Temporary Controls; to the Contractor at such points along the pipeline as water is available from existing distribution or supply systems. Wasting of water will not be condoned and such actions may require the Owner to withdraw use of such water.

The Contractor shall make provisions to provide the potable water, by tank truck or other means, to the points necessary to produce specified test pressure.

The Contractor shall take special care to keep the interior of all pipe clean during storing, handling, and laying operations in order to reduce the need for flushing to an absolute minimum. In addition, all open ends shall be tightly covered whenever unattended to prevent small animals and dirt from entering the pipeline after it is in place.

C. Disinfection: Before acceptance for operation, each unit of completed water system shall be sterilized as specified below or as prescribed by AWWA Standard C651. The unit to be sterilized shall be thoroughly flushed with water until all entrained dirt and mud have been removed before introducing the chlorinating material. The chlorinating material shall be either liquid chlorine conforming to AWWA B-301 or hypochlorite conforming to AWWA B-300. The chlorinating material shall provide a dosage of not less than 50 parts per million and shall be introduced into the water line in an approved manner. The treated water shall be retained in the pipe long enough to destroy all non-spore-forming bacteria. Except where a shorter period is approved, the retention time shall be at least 24 hours and shall produce not less than 10 p.p.m. of chlorine at the extreme end of the line at the end of the retention period. All valves on the lines being sterilized shall be opened and closed several times during the contact period.

After sterilization, water mains shall be drained or flushed and before being put into service shall be sampled twice (BY CONTRACTOR) for bacteriological analysis in accordance with AWWA C651 and Department of Health Standards. Second test shall be at least 24 hours after the first test. Both tests must pass for acceptance. If the pipeline does not pass the bacteriological analysis Contractor shall be required to re-sterilize and re-test until it does pass, at no additional cost to the Owner. The Contractor shall provide the necessary means for draining and for disposing of the water, at Contractor's expense. Disposing of water shall be done in a manner and at a time not to inconvenience the public. The Contractor must obtain and pay for a discharge permit from Municipal Services prior to discharging or flushing testing water into drainage structures or street ROW.

D. De-chlorination: Prior to discharging any chlorinated water onto City streets, ditches, ROW’s or other areas, contractor shall apply a neutralizing chemical to chlorinate water to neutralize any chlorine residual remaining in the water.

All required testing will be borne by the Contractor. All laboratory results shall be submitted directly to the Engineer from the test laboratory.

Contractor shall not connect to existing system until all testing, disinfection and de-chlorination has been completed and has received permission from the Engineer to proceed.

E. Hydrostatic Pressure Testing: All valves shall be checked for proper operation, and the completed section of pipeline shall be subjected to a hydrostatic pressure and leakage test. After completion of each valved section and following the filling and disinfection of the section, the system shall be subjected to this test. The meter, pressure gauges, pump, small piping and hose connections, and all labor necessary for conducting the test, shall be furnished by the Contractor. The test procedure shall be as follows:

After the section of pipeline has been filled water shall be pumped into the section and the pressure raised to the test pressure indicated in Table 1 below.

Table 1 – Pipeline Design Pressure

Pipeline	From Station	To Station	Working Pressure (psi)	Surge Pressure (psi)	Total Design Pressure (psi)	Test Pressure (psi)
Deer Valley Drive, 6-inch Irrigation Line (Discharge Line of relocated pump station)	1+00	10+31	250	50	300	300
Deer Valley Drive, 6-inch Irrigation Line (Suction Line of relocated pump station	10+31	20+51	100	50	150	150
Deer Valley Drive, 6-inch Distribution Line	1+100	20+51	100	50	150	150
All other piping	N/A	N/A	100	50	150	150

This test pressure shall be maintained for a period of at least two (2) hours. The water required to maintain this pressure shall be delivered into the pipe through a water meter. The total leakage is defined as the amount of water registered on the meter at the end of the two-hour test period. The test pressure shall not vary plus or minus 5 psi for the duration of the test, if it does the test shall be repeated until this criteria is met. Should this leakage exceed the allowable amount, as specified herein, the Contractor shall make such repairs as may be required until the actual leakage, as determined by succeeding tests, is not greater than the allowable as determined by the formula:

$$L = \frac{S\,D\,\sqrt{P}}{148{,}000}$$

in which:

L = Allowable Leakage in gallons/hour.
S = Length of pipe.
D = Inside diameter of pipe in inches.
P = Average test pressure during the test, in pounds per square inch, gage; determined by computing the weighted average of actual pressures on various portions of the section.

After all sections of the pipeline have been pressure tested, as described above, all valves shall be closed and the line left full of the water for disinfection and testing. All testing of

all lines, is to be done in the presence of the Engineer. The Contractor shall provide a log outlining the stationing, date and time of pressure test and above criteria for submittal to the Owner through the Engineer.

3.14 PAYMENT

A. Payment will be made for all work covered in this section at the contract unit bid price per unit of the water line items or will be included in the lump sum price per job for items shown in the proposal. Either such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SECTION INCLUDES

A. This section of the specifications covers all of the work required for constructing concrete curbs, headers, sidewalks, driveways, manhole bases, splash boxes, channels, cast-in-place manholes, thrust collars and other miscellaneous work.
B. Concrete for this project shall conform to the requirements of this section. The Contractor shall furnish all materials, equipment, tools, labor, superintendence, and incidentals necessary to perform the work in accordance with the drawings and these specifications.

1.3 GOVERNING REFERENCE SPECIFICATIONS

A. The latest editions of the following specifications and references govern work of this section and constitute minimum requirements. Where specific requirements in this section of the Specifications are more stringent, they shall supersede the corresponding requirements of these Referenced Specifications.

1.4 AMERICAN CONCRETE INSTITUTE (ACI)

A. ACI 301 Specifications for Structural Concrete Buildings
B. ACI 301 Manual of Standard Practice for Detailing Reinforced Concrete Structures
C. ACI 318 Building Code Requirements for Reinforced Concrete
D. ACI 347 Recommended Practice for Concrete Formwork
E. ACI 613 Recommended Practice for Concrete Formwork
F. ACI 614 Recommended, Practice for Measuring, Mixing, and Placing Concrete
G. ACI 621 Comm.Selection and Use of Aggregates for Concrete
H. SP-7 ACI Manual of Concrete Inspection

1.5 AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)

A. ASTM A-82 Cold Drawn Steel Wire for Concrete Reinforcement
B. ASTM A-615 Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
C. ASTM A-616 Rail-Steel Deformed and Plain Bars for Concrete Reinforcement
D. ASTM A-706 Low-Alloy Steel Deformed Bars for Concrete Reinforcement
E. ASTM C-31 Making & Curing Concrete Compression and Flexure Test Specimens in the Field.
F. ASTM C-33 Concrete Aggregates

G.	ASTM C-39	Compressive Strength of Molded Concrete Cylinders
H.	ASTM C-40	Organic Impurities In Fine Aggregates for Concrete
I.	ASTM C-42	Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
J.	ASTM C-94	Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
K.	ASTM C-136	Standard Method of Test for Sieve or Screen Analysis of Fine and Coarse Aggregate
L.	ASTM C-138	Standard Method of Test for Weight per Cubic Foot,Yield and Air Content (Gravimetric) of Concrete
M.	ASTM C-143	Standard Method of Test for Slump of Portland Cement Concrete
N.	ASTM C-150	Standard Specification for Portland Cement
O.	ASTM C-171	Sheet Material for Concrete Curing
P.	ASTM C-172	Standard Method of Sampling Fresh Concrete
Q.	ASTM C-173	Air Content of Freshly Mixed Concrete by the Volumetric Method
R.	ASTM C-192	Standard Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Laboratory
S.	ASTM C-231	Standard Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method
T.	ASTM C-260	Air-Entraining Admixture for Concrete
U.	ASTM C-309	Liquid Membrane-Forming Compounds for Curing Concrete
V.	ASTM C-494	Chemical Admixtures for Concrete
W.	ASTM C-618	Fly Ash and Raw od Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete

1.6 PORTLAND CEMENT ASSOCIATION (PCA)

A. Design and Control for Concrete Mixtures

1.7 AMERICAN WELDING SOCIETY (AWS)

A. AWS D12.1 Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction

1.8 U.S. ARMY CORPS OF ENGINEERS

A. CRD C-572 Specification of Water Stops

1.9 NEW MEXICO DEPARTMENT OF TRANSPORTATION

A. Standard Specifications for Highways and Bridge Construction

1.10 LATEST EDITION OF EACH OF THE ABOVE GOVERNING STANDARDS SHALL APPLY

1.11 EXCAVATION AND GRADING

A. Excavation or filling for concrete structures and other miscellaneous concrete work shall conform to the lines and grades as shown on the plans or as established in the field and

shall be as specified in Section 02222 - Excavating, Backfilling and Compacting for Pavement.

PART 2 - PRODUCTS

2.1 CEMENT

A. Portland cement shall conform to the latest revisions of A.S.T.M. Designation C-150, Type II, and shall be of an approved brand. Only one brand of cement will be permitted in any one structure. Plant tests and certificates of conformity with the specification shall be furnished with each carload of cement.

2.2 FINE AGGREGATE

A. Fine aggregate shall consist of hard, strong, durable and uncoated particles of natural sand, washed and screened. The aggregate shall be free from injurious amounts of clay, soft or flaky materials, loam or organic impurities and the grading shall conform to the following:

Percentage Passing Square Openings

No. 4	No. 16	No. 50	No. 100	No. 200
95-100	45-70	15-30	3-8	0-3

B. Fineness modulus shall not vary more than plus or minus 0.20 from that of approved sample, which shall be between 2.20 and 2.90.

2.3 COARSE AGGREGATE

A. Coarse aggregate shall consist of hard, tough, durable and uncoated particles of washed and screened gravel or crushed stone. It shall be free of vegetation, soft, friable, thin, or elongated particles.

B. Maximum size of coarse aggregate shall be governed by the conditions of placement of the concrete and shall not be greater than 3/4 of the distance between reinforcing bars. In no case shall the maximum size be greater than 2 inches. All aggregates shall be approved before use.

2.4 WATER

A. Water shall be clean, clear, free from oil, acid or organic matter and free from injurious amounts of alkali, salts, or other chemicals.

2.5 SHOP DRAWINGS

A. Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 showing bar schedules, stirrup spacing, diagrams of bent bars and arrangement of concrete reinforcement. Include special reinforcement required at the openings through structures. Provide full wall and beam elevations of concrete and walls showing all embedments, vertical and horizontal reinforcing and all special reinforcement. Fabrication, bar bending, cutting, etc., shall be in accordance with the requirements as specified herein.

B. Submit manufacturers product data with application and installation instructions for proprietary materials and items including reinforcement and forming accessories, admixtures, patching compounds, joint systems, bituminous damp-proofing, curing compounds and others as requested by the Engineer. Submit manufacture's certificate of conformance with these Specifications for all proprietary materials and products.

2.6 FORMS

A. The forms shall be of wood or metal and shall be of sufficient strength to support the concrete without bulging between supports and sufficiently water tight to hold the concrete mortar. The forms shall be constructed such that the finished concrete shall be of the form and dimensions shown on the plans. All form work for exposed surfaces shall be of such material and so constructed as to produce a smooth, even surface when the concrete is placed. All forms shall be oiled before use. In general, wall forms may be removed after the concrete has been in place for 24 hours. All exposed edges shall have a 3/4-inch chamfer whether or not shown on the details. Immediately upon removal of the forms, any honeycombed sections shall be repaired as directed.

2.7 CONCRETE MIX

A. Class "A" concrete shall contain not less than 5.5 sacks of cement per cubic yard. No more water shall be used than is required to produce a workable mix and in no case will the water content exceed 6.5 gallons per sack of cement. The proportioning of the constituents of the concrete shall be such as to produce a dense and workable mixture, and the mix shall be approved before any concrete is placed.

B. The minimum 28 day compressive strength for Class A concrete shall be 4000 psi.

C. Cement Stabilized Backfill for backfill stabilization shall contain a minimum 2 sacks of cement per cubic yard. No more water than 10 gallons per sack of cement shall be used.

PART 3 - EXECUTION

3.1 MIXING

A. All aggregates shall be accurately weighed or measured by volume. The concrete shall be mixed in an approved batch mixer equipped with an accurate water measuring tank, and shall be mixed for one and one half minutes after all materials are in the mixer. "Ready Mixed" or "Transit Mix" concrete may be used. If used, it shall conform to these specifications and the "Standard Specifications for Ready Mixed Concrete", A.S.T.M. Serial Designation C 94.

B. Each mixer and agitator shall have attached thereto in a prominent place, a metal plate or plates on which are plainly marked, for the various uses for which the equipment is designed, the capacity of the drum or container in terms of the volume of mixed concrete and the speed of rotation of the mixing drum, blades or paddles. Stationary mixers shall be equipped with an acceptable timing device that will not permit the batch to be dispatched until the specified mixing time is elapsed. Truck mixers, shall be equipped with means by which the number of revolutions of the drum blades, or paddles may be readily verified.

C. The mixer, when loaded to capacity, shall be capable of combining the ingredients of the concrete within the specified time into a thoroughly mixed and uniform mass and of discharging the concrete with a satisfactorily degree of uniformity. No mixer or agititator shall be used if the results of slump tests of individual samples taken at approximately the one quarter, and the three quarter points of the placement differ by more than 2-inches. Mixers and agitators shall be inspected frequently for changes in condition due to accumulations of hardened concrete or mortar, or to wear of blades.

D. Truck mixers shall have adequate water supply and metering devices. No water can be added to the concrete after the initial mixing without the permission of the Engineer.

E. After mixing, the concrete shall be transported to the forms in a manner which will prevent separation or segregation of the aggregates and shall be placed without undue delay. It shall be deposited as nearly as practicable in its final position in order to avoid rehandling or flowing of the concrete. As the concrete is placed, it shall be vibrated by means of a vibrator of the type which is submerged in the concrete.

F. Mixing at mixing speed shall begin immediately after all ingredients are in the mixer. For complete mixing in the truck each batch shall be mixed not less than 70 or more revolutions of the drum. For partial mixing in the truck each batch shall be mixed not less than 50 or more than 100 revolutions of the drum. Mixing speed shall be as designated by the manufacturer. All revolutions after the prescribed mixing time shall be at agitating speed. The agitating speed shall be not less than one or nor more than four revolutions per minute. The drum shall be kept in continuous motion from the time mixing is started until the discharge is completed.

G. The maximum time interval between the introduction of the mixing water to the cement and aggregates, and the placing of the concrete in the forms shall not exceed the following:

AIR OR CONCRETE TEMPERATURE (Whichever is Higher)	MAXIMUM TIME
90 degrees F. or above (Air Only)	45 minutes
75 degrees F. to 89 degrees F.	60 minutes
35 degrees F. to 74 degrees F.	90 minutes

H. Concrete shall not be placed when the ambient temperature is less than 40 degrees Fahrenheit and falling, but may be placed if the temperature is 40 degrees Fahrenheit and rising. Concrete shall not be placed when the temperature will drop below 35 degree Fahrenheit within 24 hours after placement as projected by the National Weather Service unless properly protected. The temperature of the concrete at the time of placement in the forms shall not be less than 50 degrees Fahrenheit nor more than 90 degrees Fahrenheit. When placing concrete in freezing weather, means shall be provided for keeping the concrete at a temperature of at least 50°F for not less than 72 hours after placing or until the concrete has thoroughly hardened. Concrete shall not be placed when weather conditions are unsuitable for such work.

3.2 TRANSPORTING

A. Concrete shall be handled from the mixer to the place of final deposit in a manner that will prevent segregation and when practicable, shall be deposited in its final position without rehandling or flowing. All equipment used in transporting concrete shall be maintained in a clean condition. Concrete shall not be delivered from hoists, by spout, by trough, or dumped into carts with a free fall of more than 4 feet. Every precaution shall be taken to prevent separation or loss of ingredients while transporting the concrete. Runways for carts or buggies shall not bear upon the reinforcing or fresh concrete. Pumping and conveying of concrete shall be done only after approval by the Engineer and with equipment that will insure a continuous flow without segregation.

3.3 PLACING

A. Concrete shall not be placed until all reinforcement is securely and properly fastened in its correct position. Form ties shall be checked and re-tightened where necessary. Forms and reinforcement shall be inspected and approved by the Engineer prior before beginning placement of concrete. All embedded items shall be in place and clean-out openings closed before such inspection. A procedure for inspection of forms reinforcing, inserts, etc., prior to all concrete placement will be instituted and coordinated by the Engineer. At least 24 hours prior to concrete placement the Contractor shall submit an inspection sheet to the Engineer. The inspection sheet, to be developed shall show the location and quantity of concrete to be placed, the time and date schedule for placement and shall be signed by the Contractor's representative. Signing of this sheet will certify that all of the items necessary have been inspected, and that the area is ready for final review by the Engineer. If the Engineer determines that the corrections are excessive, the placement should be rescheduled and the Engineer notified 12 hours before scheduled placement after the corrections are made. A representative of the Engineer will be on the job during the placement of concrete and concrete shall not be placed unless the Engineer or his representative is present.

B. Concrete shall be placed in a manner that will prevent segregation, thoroughly embed all reinforcement and fixtures, fill all angles in the forms and prevent formation of aggregate pockets or honeycomb. Placement in walls columns or other deep forms shall be done through openings in the forms, spaced at frequent intervals, or through tremies so that the free fall shall not exceed 4 feet. Points of depositing the concrete shall be spaced so that the concrete surfaces can be kept level without using vibrators or others equipment to cause it to flow into place.

C. Concrete shall be placed with the aid of approved mechanical vibrating equipment. Vibration shall be applied to the concrete and shall be of sufficient intensity and duration to cause flow or settlement of the concrete, thoroughly compacting, and complete embedment of reinforcement and fixtures. Supplemental forking and spading by hand may be required to secure dense uniform surfaces and complete filling of corners and angles.

D. Excessive spading or vibrating causing undue water gain or segregation will not be permitted. If moderate working causes excessive water gain the mix shall be adjusted. Excess water shall be removed when it appears. When concrete in floors or slabs are deposited on the ground, the subgrade shall be thoroughly compacted and moistened before placement. A grill tamp shall be used on floor slabs. Completed sections shall

conform to the details on the contract drawings and the concrete shall be dense, uniform and free of aggregate pockets or honeycomb.

E. Concrete in vertical walls shall be placed in continuous horizontal layers approximately 18 inches in depth. Not more than one hour shall elapse between the placing of successive layers of concrete in any portion of a structure included in a continuous placement.

F. The contractor shall adhere to the requirements ACI 306 and ACI 605 for cold and hot weather concreting respectively.

G. Concrete shall generally not be placed during high winds with blowing dust that will contaminate the surface and cause entrapment of sand and dust particles in the finished surfaces.

3.4 SLUMP

A. The slump of all concrete shall be between 3 and 6 inches with the condition governing the exact slump to be used. In all cases the Engineer shall specify the slump to be used prior to placement. When a 3 inch slump is specified, the allowable tolerance shall be 1/2 inch. When the specified tolerance is greater than 3 inches the tolerance shall be 1 inch. In general flat work will require a slump of approximately 3" or more and concrete for vertical members, i.e. walls columns, etc. shall be 5 inches. Slump for concrete to be added to CMU units shall be 6 inches.

3.5 EXPOSED VERTICAL SURFACES

A. Such surfaces shall have all tie rod holes filled, fins and rough edges removed and all defects removed or patched. Following this the surfaces shall be rubbed with carborundum stones and clean, clear water until a smooth surface, uniform in color and texture has been obtained. This finishing shall be done as soon as is practical after removal of forms. No cement slurry stucco finishing will be permitted.

3.6 UNEXPOSED VERTICAL SERVICES

A. Such surfaces shall be finished as specified for exposed vertical surfaces except that no rubbing will be required.

3.7 FLAT SLABS

A. Flat slabs shall be troweled, after floating, and then lightly brushed to provide a "non-skid" surface.

3.8 EMBEDDED ITEMS

A. All bolts, pipe, pipe sleeves, inserts or other fixtures required by the plans or these specifications to be embedded in the concrete, shall be set accurately in place and maintained in such positions during concreting operations.

3.9 TESTS

A. Test certificates for cement shall be furnished as specified in Item 4.1 above. The Contractor shall furnish results of tests made by a competent commercial laboratory on each material source he proposed to use before start of construction and material shall not be shipped until such results have been examined by the Engineer and the source of material approved. Laboratory mix designs and conformation cylinders will not be required for this project. However, the proposed mix for each class of concrete shall be submitted to the Engineer for approval prior to placing any concrete. The cost of all pre-construction tests shall be borne by the Contractor. Additional test certificates shall be furnished on the aggregate if the material source is changed.

B. Seven day and twenty-eight day compressive tests shall be conducted on all cylinders. A minimum of 2 cylinders shall be taken per cast in place manhole or at each placement of fifty cubic yards.

3.10 BAR REINFORCING

A. Except where plain bars are specifically shown on the plans, all bar reinforcing shall be deformed bars. The deformed bar reinforcing shall conform to the requirements of ASTM A-615 Grade 60. Plain steel bars including 1/4 inch diameter bars shall conform to the requirements of ASTM A-307, grade 60. Weldable reinforcing bars shall conform to ASTM-A-706.

3.11 WELDED WIRE FABRIC

A. Welded wire fabric shall be as designated on the drawings and shall conform to the requirements of the New Mexico State Department of Transportation "Standard Specifications for Highway and Bridge Construction" Item 602.2 Materials.

3.12 STORING REINFORCING

A. Reinforcing stored at the site shall be protected from accumulation of grease, mud, or other foreign matter and from rust producing conditions. Bars shall be free from loose flaky rust, scale, oil, mud or structural defects when incorporated in the structures.

3.13 FABRICATION AND PLACING

A. Reinforcement shall be accurately fabricated to the dimensions and shapes shown on the plans in accordance with the ACI Manual of Standard Practice unless variations are specifically shown on the plans.

B. Reinforcement shall be accurately placed and adequately supported by concrete, metal or other approved chairs, spacers, or ties and shall be secured against displacement. Reinforcement shall be placed in specified positions within the following tolerances:

C. Depth in structural slabs, flexural members, walls and columns: + 1/4 inch.

D. Longitudinal location of bends and ends of bars: + 2 inches except that the required concrete cover at ends of members shall not be reduced.

E. Unless noted otherwise on the Contract Drawings, the concrete cover for reinforcing shall be in accordance with the requirements of the ACI Building Code Requirements for Reinforced Concrete (ACI 318).

F. Splices shall be made as shown on the Contract Drawings by lapping the bars the required amount and securely wiring them together. Where details of splices are not shown or where unanticipated splices are required, they shall be made in a location approved by the

Engineer and the length of lap shall be as required by the ACI Building Code Requirements for Reinforced Concrete (ACI 318).

G. Reinforcing bars partially embedded in concrete shall not be field bent, except as indicated on the Contract Documents or permitted by the Engineer.

H. Torch cutting of reinforcing bars will not be allowed.

I. Mats of wire fabric shall overlap each other sufficiently to maintain a uniform strength and shall be fastened securely at the ends and edges.

3.14 JOINTS

A. Construction and expansion joints shall be constructed at the locations and in accordance with the details shown on the drawings. If it becomes necessary to stop placement of concrete between joints, or if the Contractor desires for his own convenience to construct joints other than those shown, such joints shall be made only at locations approved by the Engineer and all such joints shall be constructed in accordance with the plans and specifications.

B. All horizontal joints shown on the plans shall be made truly horizontal and chamfered. Vertical joints shall be truly vertical.

C. Before concreting operations are resumed at any construction joint, or wherever fresh concrete is to be bonded to hardened concrete, the surface of the hardened concrete shall be cut or chipped to remove laitance and expose aggregate. The surface of the concrete shall be thoroughly cleaned, saturated, and then sloshed with a coating of neat cement grout against which the fresh concrete shall be placed before the grout has attained initial set. Care shall be taken to insure that the first layer of new concrete contains sufficient mortar for adequate bond.

3.15 EXPANSION JOINT MATERIALS

A. Where pre-molded expansion joint material is shown on the plans such material shall be 1/2 inch Bituminous type preformed joint filler, AASHTO M-33.

3.16 JOINT CONSTRUCTION

A. All joints shall be constructed in a workman like manner with joints truly vertical or horizontal, as required, and at right angles to the axis of the member in which the joint occurs. Expansion joint material shall be accurately positioned and held in position during placement of concrete.

3.17 WATERSTOPS

A. Where waterstop is shown or required it shall be of the materials specified herein and of the dimensions shown on the drawings. All installation of waterstop, including splicing joints shall be in strict accordance with the manufacturer's recommendations as approved by the Engineer.

3.18 POLYVINYL CHLORIDE WATERSTOP

A. Polyvinyl Chloride (PVC) Waterstop shall be 6-inch, 2-bulb type with minimum thickness of 3/8-inch and minimum bulb diameter of 3/4-inch and shall be of the serrated type, 6-inches wide weighing not less than 110 pounds per one hundred linear feet in all locations.

B. The waterstop shall be fabricated from a plastic compound, the basic resin of which is polyvinyl chloride, with additional resins, plasticizer, stabilizers or other materials such that, when compounded shall conform to the requirements of Corps of Engineers Specification CRD-C-572-63. Neither reclaimed PVC, nor any PVC compound other than that specified herein shall be used. The manufacturer shall, furnish an affidavit certifying compliance with this specification.

C. All installation, including spicing joints, and intersections, shall be in strict accordance with the manufacturer's recommendations, as approved by the Engineer. All splices must be made with an electrical welding appliance specifically fabricated for use in the welding of PVC waterstop joints. Devices utilizing externally applied head will not be permitted.

3.19 COLD-JOINT WATERSTOPS

A. Cold-Joint water stops shall be as manufactured by Synkoflex Products, Inc or approved equal. The material property shall conform to ASTM D71, D217 and Federal Specifications SS-S-210A. Provide the cold-joint waterstops as indicated on the drawings. Contractor shall submit manufacturer product information for approval. Installation shall be per the manufacturer's instructions.

3.20 CURING AND PROTECTING

A. All concrete work shall be covered with burlap or other suitable material as soon as it has set sufficiently to prevent marking and kept wet continuously for at least five (5) days. Care shall be taken to prevent mechanical injury to concrete work during this period and until the work is accepted. Any work damage prior to acceptance shall be repaired to the satisfaction of the Engineer.

B. All concrete work shall be protected until such time as it has set up sufficiently to prevent damage by vandals.

C. In lieu of the above method of curing, the concrete may be cured by applying a liquid membrane coating to all exposed surfaces, provided the materials and method of application are first approved by the Engineer. The coating shall conform to A.S.T.M. Designation C-309.

D. Suitable means shall be provided to prevent concrete from freezing for not less than 72 hours after placing. Any concrete damaged by freezing shall be removed and replaced by the Contractor at his expense. The addition of any admixture of chemicals to the concrete to prevent freezing shall not be allowed, unless specifically approved by the Engineer.

3.21 DEFECTIVE WORK

A. Any defective work disclosed after the forms have been removed shall be immediately removed and replaced. If any dimensions are deficient, or if any section is not constructed to the proper grade, or if the surface of the concrete is bulged, uneven, or shows honeycomb, which in the opinion of the Engineer cannot be repaired satisfactorily, the entire section shall be removed and replaced at the expense of the Contractor.

3.22 FORMWORK

A. Forms may be removed only upon approval by the ENGINEER. In general, removal of wall forms shall not be permitted within 24-hours. Adequate reshoring shall be placed when forms are removed and backfilling is begun, and shall remain in place until the design 28 day compressive strength is attained. The attained strength shall be determined from standard test cylinders molded, cured and broken in accordance with ASTM C31. The strength of the concrete shall be assumed to be the average strength of the two cylinders tested. If the Contractor wishes to determine the strength of the concrete prior to the 28 day tests, the Contractor shall bear the cost as well as the responsibility of obtaining additional cylinders as well as the tests.

B. It shall be the responsibility of the Contractor, in all form removal, to prevent damage or marring of the concrete surfaces.

3.23 BACKFILLING

A. Backfill behind and adjacent to all concrete work shall be made from good quality topsoil. This material shall be free from organic material such as leaves, grass, roots and other unsuitable materials and free of rocks or stones. The Contractor shall provide a smooth, even slope between the existing ground and the top of curb or other concrete structure.

B. Care shall be taken during the backfill and cleanup process not to scrape, chip, crack or otherwise damage the concrete including tire marks from equipment or trucks. Any damaged concrete will be removed and replaced at the expense of the Contractor.

3.24 PAYMENT

A. Payment will be made for all work covered in this section at the contract unit price per unit or will be included in the lump sum price per job for items, as shown on the proposal. For items not specifically addressed by unit price per unit nor included in a lump sum price per job, payment shall be included in the unit price per unit for pipeline rehabilitation and/or replacement. Such payments shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications.

END OF SECTION

SECTION 03600

GROUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 – General Requirements apply to Work of this Section.

1.2 SCOPE

A. Grout is specified herein and shall be used where indicated in the Contract Documents as specified. The Contractor shall furnish all material and perform all operations in connection with the grouting of sewer manholes and other miscellaneous uses, such as concrete patching.

PART 2 - PRODUCTS

2.1 NON-SHRINK NON-METALLIC GROUT

A. Non-shrink non-metallic grout shall be used where indicated on the drawings. The grout shall be Masterflow 713 grout by Masterbuilder, Five Star, or approved equal.
B. The grouting as installed shall be capable of developing a minimum compressive strength of 2,500 pound per square inch at twenty-eight days, when tested in the form of 2-inch cubes.

2.2 SAND CEMENT GROUT

A. Sand cement shall be used as indicated on the drawings. The grout shall contain 7-1/2 sacks of cement per cubic yard of grout and shall contain only sufficient water to provide required consistency. The sand shall be as specified for concrete in Section 03300. Curing requirements shall be as specified for concrete in Section 03300.

PART 3 - EXECUTION

3.1 PAYMENT

A. Payment will be made for all work covered in this section at the contract unit price per unit or will be included in the lump sum price per job items, as shown on the proposal. Either such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and specifications.

END OF SECTION