AGREEMENT AND SPECIFICATIONS

HILLCREST CENTER WATER IMPROVEMENTS PROJECT (PHASE I)

BID NUMBER 22-025

VOLUME 1 OF 2

CONTRACT DOCUMENTS

MAY 2022

EL PASO COUNTY TEXAS

STATE OF TEXAS
TROY A. SVEDE
142584
LICENSED PROFESSIONAL ENGINEER
5/20/2022

Ricardo A Samaniego, County Judge
Carlos Leon, Commissioner Precinct 1
David Stout, Commissioner Precinct 2
Liliana Holguin, Commissioner Precinct 3
Carl L. Robinson, Commissioner Precinct 4

PLANNING • ENGINEERING • PROJECT MANAGEMENT

MCi Moreno Cardenas Inc.

Leaders in Project Delivery & Performance

Firm Registration No. F-000554

Certificate of Insurance

Coverage shall be in amounts as required in 00800 Supplementary Conditions (EJCDC C-800), Section SC-6.03, and paragraph 9.06 of 00700 Standard General Conditions of the Construction Contract, and must provide for at least 10 days written notice of cancellation as required by 00700 Standard General Conditions of the Construction Contract, paragraph 6.03.I.3

COUNTY OF EL PASO

HILLCREST CENTER WATER IMPROVEMENTS PROJECT (PHASE I)

BID NO. 22-025

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IN EJCDC CONTRACT DOCUMENTS

PROJECT: **HILLCREST CENTER WATER IMPROVEMENT PROJECT (PHASE I)**

I, the undersigned Professional Engineer certify that no unapproved changes were made to the content of the EJCDC Contract documents, including the USDA Section of the Contract Documents.

Troy Svede, P.E.
Moreno Cardenas, Inc.

5/26/2022
Date

OWNER
COUNTY OF EL PASO
800 E. OVERLAND STREET
EL PASO, TEXAS

CONSULTANT ENGINEERS
MORENO CARDENAS, INC.
2505 E. MISSOURI AVENUE SUITE 100
EL PASO, TEXAS 79903

COUNTY OF EL PASO, TEXAS
EL PASO, TEXAS
BID NOTICE 22-025
HILLCREST CENTER WATER IMPROVEMENTS PROJECT (PHASE I)

ADVERTISEMENT FOR BIDS

Sealed bids for the construction of the **Hillcrest Center Water Improvements Project (Phase I)** will be received by the County of El Paso, Texas, at the office of the 500 E San Antonio, Suite 300, El Paso, Texas 79901, until 2:00 p.m. local time on **July 21, 2022**. At that time, the Bids received will be publicly opened and read via a virtual meeting.

The Project consists of constructing a drinking water distribution system for the Hillcrest Center Residents, including the installation of 8-inch and 12-inch PVC (approximately 3.78 miles) water distribution lines, 41 8-inch gate valves, 13 12-inch gate valves, HMAC removal and replacement (approximately 10,700 square yards), residential meters, and a master meter connecting to El Paso Water's distribution system.

The Project is being partially financed by the U.S. Department of Agriculture (USDA) and the North American Development Bank (NADBank) through its Border Environmental Infrastructure Fund Program (BEIF), which is funded by the U.S. Environmental Protection Agency (EPA). EPA-funded or assisted projects must comply with the Civil Rights Act, and Equal Employment Opportunity requirements, promote small, minority, and women-owned business participation through EPA's Disadvantaged Business Enterprise (DBE) Program. Bidding for contracts to be financed with the proceeds of a NADBank grant is open to firms from any eligible country.

Bids will be received for a single prime Contract. Bids shall be on a lump sum and unit price basis, with additive alternate bid items indicated in the Bid Form.

The Issuing Office for the Bidding Documents is the County of El Paso Purchasing Department, located at 800 E. Overland, Suite 3, El Paso, Texas 79901. Prospective Bidders may examine the Bidding Documents at the Issuing Office on Monday through Thursday between the hours of 8:00 a.m. and 5:00 p.m. MST. They may obtain copies of the Bidding Documents from the Issuing Office as described below. Bidding Documents also may be examined at the Engineer's office, Moreno Cardenas, Inc., located at 2505 E. Missouri Ave. Suite 100, El Paso, Texas 79903, on Mondays through Thursdays between 8:00 a.m. and 5:00 p.m. MST.

Printed copies of the Bidding Documents may be obtained from the Issuing Office, during the hours indicated above, upon payment of a deposit of $50.00 for each set. Bidders who return full sets of the Bidding Documents in good condition (suitable for re-use) within 30 days after receipt of Bids will receive a full refund. Non-Bidders, and Bidders who obtain more than one set of the Bidding Documents, will receive a refund of $25.00 for documents returned in good condition within the time limit indicated above. Checks for Bidding Documents shall be payable to "The County of El Paso, Texas." Upon request and receipt of the document deposit indicated above plus a non-refundable shipping charge, the Issuing Office will transmit the Bidding Documents via delivery service. The shipping charge amount will depend on the shipping method selected by the prospective Bidder. The date that the Bidding Documents are transmitted by the Issuing Office will be considered the Bidder's date of receipt. Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including Addenda if any, obtained from sources other than the Issuing Office. The Bidding Documents will also be available electronically.

A pre-bid conference will be held at **10:00 AM** local time on **June 30, 2022,** via virtual meeting. Attendance at the pre-bid conference is highly encouraged but is not mandatory.

Bid security shall be furnished in accordance with the Instructions to Bidders.

Owner: **The County of El Paso, Texas**

By: **Karen L. Davidson**

Title: **Purchasing Agent**

Date: **June 12, 2022**

INSTRUCTIONS TO BIDDERS

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ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. Construction Manager - The construction manager for the project representing the Owner is Moreno Cardenas, Inc., located at 2505 East Missouri Avenue, Suite 100, El Paso, Texas, 79903

B. Engineer - The engineer for the project is Moreno Cardenas, Inc., located at 2505 East Missouri Avenue, Suite 100, El Paso, Texas, 79903.

C. Issuing Office – The office from which the Bidding Documents are to be issued.

D. Owner - The owner for the project is the County of El Paso, Texas.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the advertisement or invitation to bid.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – SOURCE OF FUNDS

3.01 The Owner intends to use a Border Environment Infrastructure Fund Program (BEIF) grant awarded by the North American Development Bank (NADB) for eligible payments under the Contract(s) for which this Invitation for Bids (IFB) is issued. The grant program is funded by the U.S. Environmental Protection Agency (EPA). Payment by NADB will be made only at the request of the Owner and upon acceptance by the NADB following the terms and conditions of the grant agreement and will be subject in all respects to the terms and conditions of that agreement.

3.02 Bidding for contracts to be financed with the proceeds of a NADB grant is open to firms from any eligible country.

ARTICLE 4 – EXCLUDED PARTIES

4.01 The proceeds of NADB's grant will not be used for payments to persons or entities or any import of goods if such payment or import is prohibited by a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations.

4.02 A Bidder listed on the U.S. Excluded Parties List (https:///www/sam.gov/portal/public/sam/) or on the debarment list for the state or locality where the project will be constructed on the IFB official closing date or is excluded at any time before the award of the contract will render the organization as non-responsible. An excluded or debarred organization will not be considered for a contract.

4.03 The Owner will not consider a Bid from, or award a contract to, any person, company, corporation, or organization that is in arrears or is in default to the Owner of any debt or contract, or that has defaulted as surety or otherwise upon any obligation to the Owner.

4.04 No agent, representative, officer, or employee of the Owner, or the spouse or any other relative, who resides in the same household as any of the foregoing, may be a Contractor, subcontractor, or have a personal interest therein in the Project.

4.05 Where a firm, its affiliates or parent company, in addition to consulting also can manufacture or supply goods or construct works, that firm, its affiliates or parent company normally cannot be a supplier of goods or works on a project for which it provides consulting services unless it can be demonstrated that there is not a significant degree of common ownership, influence or control.

4.06 A Bidder may submit or participate in any capacity whatsoever in only one Bid for each contract. Submission or participation by a Bidder in more than one Bid for a contract (other than alternatives which have been permitted or requested) will result in the disqualification of all Bids for that contract in which the party is involved. However, this does not limit the inclusion of the same subcontractor in more than one Bid.

ARTICLE 5 – LANGUAGE OF THE BID

5.01 The Bid and all documents and correspondence relating to the bid exchanged by the Bidder and the Purchaser shall be written in the English Language. Supporting documents and printed literature furnished by the Bidders may be in another language provided they are accompanied by an accurate translation in English, in which case, for the purposes of interpretation of the Bid, the translation shall govern. All communications, correspondence, and dimensions relating to the Project during construction shall be in English and U.S. units of measure.

ARTICLE 6 – PUBLIC INFORMATION

6.01 The Owner is governed by the Texas Public Information Act. Only trade secrets, proprietary information, or private commercial or financial information will be exempt from disclosure as provided by the law. If you submit trade secrets or other information that may be exempted from public disclosure, you must segregate and label each pertinent page with the term "Exempt from Public Disclosure". Do not use the word "confidential." If you submit the information that you consider exempt from public disclosure, you must identify with specificity which page(s)/paragraph(s) of your Bid package is (are) exempt from the Texas Public Information Act and identify the specific statutory exemption.

ARTICLE 7 – QUALIFICATIONS OF BIDDERS

7.01 To demonstrate Bidder's qualifications to perform the Work, after submitting its Bid, and within five days of Owner's request, Bidder shall submit written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and the following additional information:

A. Minimum Project Qualifications:

1. Project involves the installation of 8-inch and 12-inch PVC pipe.

2. Project involves the installation of 8-inch and 12-inch gate valves.

3. Project involves installing approximately 117 water connection service tie-in.

4. Project involves compacted earthwork for roadbed preparation, installation of 2 sack flowable fill base material and installation of Hot Mix Asphalt Cement Pavement. This requirement may be satisfied by employing the services of a qualified subcontractor and list of paving project.

5. Project involves the installation of one 12-inch magnetic flow meter. This requirement may be satisfied by employing the services of a qualified magnetic flow meter subcontractor with a list of such projects completed successfully.

6. The Key Personnel for this project includes, project manager, scheduler, project superintendent, project foreman, and a master plumber. Owner reserves the right to review, approve, or reject the persons listed as key personnel. Please fill in the blanks below for key personnel.

Project Manager: _____

Scheduler: _____

Project Superintendent: _____

Project Foreman: _____

Master Plumber: _____

B. Key Personnel: Individuals who will be directly assigned to this project. Resumes of Key Personnel must be submitted with the bid and accepted by the Engineer in order for Bidder to receive the Award. Resumes for the following personnel assigned to this Project are to be submitted:

1. The Project Manager
2. The Project Scheduler (may be same as Project Manager)
3. The Project Superintendent
4. Foreman
5. Name of the Texas Licensed Master Plumber, License Number and current License Expiration Date

Bidder must include resumes of alternates for Key Personnel (Project Manager and Project Superintendent) with the Bid and if in the process of bid evaluation the Owner rejects any Key Personnel, the Owner will consider the alternates.

7.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

7.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

7.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

ARTICLE 8 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

8.01 Site and Other Areas

A. The Site is identified in the Bidding Documents, specifically Volume 2 of 2 El Paso County Hillcrest Center Water Improvement Project (Phase I) design drawings. By definition, the Site includes rights-of-way and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

8.02 Existing Site Conditions

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions

1. The Supplementary Conditions identify:

a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.

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

c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.

d. Technical Data contained in such reports and drawings.

2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

4. General Subsurface Soils Evaluation Report: The Bidding Documents reference a General Subsurface Soils Evaluation Report (GSSER). The GSSER describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations ("Baseline Conditions"). The GSSER is a Contract Document.

The Baseline Conditions in the GSSER are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GSSER, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.

Nothing in the GSSER is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.

B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

8.03 Site Visit and Testing by Bidders

A. Bidder shall conduct the required Site visit during normal working hours, and shall not disturb any ongoing operations at the Site.

B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.

D. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

E. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

8.04 Owner's Safety Program

A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions.

8.05 Other Work at the Site

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 9 – BIDDER'S REPRESENTATIONS

9.01 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;

B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;

D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings;

E. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs;

F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations,

tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;

I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and

J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 10 – PRE-BID CONFERENCE

10.01 A pre-Bid conference will be held at the time and location stated in the invitation or advertisement to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 11 – INTERPRETATIONS AND ADDENDA

11.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to The County Purchasing Department in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions received less than seven days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

11.02 Addenda may be issued to clarify, correct, supplement, or change the Bidding Documents.

ARTICLE 12 – BID SECURITY

12.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions.

12.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.

12.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

12.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the Bid opening.

ARTICLE 13 – CONTRACT TIMES

13.01 The number of days within which, or the dates by which the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 14 – LIQUIDATED DAMAGES

14.01 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 15 – SUBSTITUTE AND "OR-EQUAL" ITEMS

15.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute or materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No. item of material or equipment will be considered by Engineer as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids in the case of a proposed substitute and 5 days prior in the case of a proposed "or-equal." Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner. Substitutes and "or-equal" materials and equipment may be proposed by Contractor in accordance with Paragraphs 7.04 and 7.05 of the General Conditions after the Effective Date of the Contract.

15.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

15.03 If an award is made, Contractor shall be allowed to submit proposed substitutes and "or-equals" in accordance with the General Conditions.

ARTICLE 16 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

16.01 If required by the bid documents, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work: on-site sewage tie-in and decommissioning including a licensed hauler, and magnetic flow meter assemblies.

If requested by Owner, such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, 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.

16.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will constitute grounds for

forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.

16.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom contractor has reasonable objection.

16.04 The Contractor shall not award work to Subcontractor(s) in excess of limits stated in SC 7.06

ARTICLE 17 – PREPARATION OF BID

17.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."

17.02 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown.

17.03 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.

17.04 A Bid by an individual shall show the Bidder's name and official address.

17.05 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.

17.06 All names shall be printed in ink below the signatures.

17.07 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

17.08 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

17.09 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 18 – BASIS OF BID

18.01 Unit Price

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.

B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity" (which Owner or its representative has set forth in the Bid Form) for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

C. Discrepancies between 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.

ARTICLE 19 – SUBMITTAL OF BID

19.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 7 of the Bid Form.

19.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to Owner at address in Article 1.01 of Bid Form. The Bidder must submit one hard copy and four (4) electronic copies on a USB.

19.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 20 – MODIFICATION AND WITHDRAWAL OF BID

20.01 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

20.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.

20.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 21 – OPENING OF BIDS

21.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 22 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

22.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 23 – EVALUATION OF BIDS AND AWARD OF CONTRACT

23.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or

attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.

23.02 If Owner awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid.

23.03 Evaluation of Bids

A. In evaluating Bids, Owner will consider 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.

B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. To determine the Bid prices for purposes of comparison, Owner shall announce to all bidders a "Base Bid plus alternates" budget after receiving all Bids, but prior to opening them. For comparison purposes alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.

23.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

23.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 24 – BONDS AND INSURANCE

24.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the Agreement (executed by Successful Bidder) to Owner, it shall be accompanied by required bonds and insurance documentation.

ARTICLE 25 – SIGNING OF AGREEMENT

25.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within ten days thereafter, Owner shall deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 26 – SALES AND USE TAXES

26.01 Owner is exempt from Municipal and Texas State sales and use taxes on materials and equipment to be incorporated in the Work. Said taxes shall not be included in the Bid. Refer to Paragraph SC-7.09 of the Supplementary Conditions for additional information.

ARTICLE 27 – CONTRACTS TO BE ASSIGNED

27.01 Owner as "buyer" will execute a contract with the lowest responsive Contractor as "seller" for the procurement of goods and special services for N/A. The materials and equipment provided in the procurement contract are to be furnished and delivered to the Site for installation by Contractor. The said procurement contract will be assigned by Owner to Contractor as set forth in the Agreement Contractor will accept the assignment and assume responsibility for the "seller," who will become a Subcontractor to the Contractor.

ARTICLE 28 – WAGE RATE REQUIREMENTS

28.01 If the contract price is in excess of $100,000, provisions of the Contract Work Hours and Safety Standards Act at 29 CFR 5.5(b) apply.

28.02 Contingent Award of Contract

A. This contract is contingent upon release of funds from the U.S. Department of Agricultural (USDA). Any contract(s) awarded under this Invitation for Bids is/are expected to be funded in part by a grant or loan with principal forgiveness from the USDA and a grant from the United States Environmental Protection Agency, U.S. EPA. Neither the State of Texas, the U.S. EPA, nor any of its departments, agencies, or employees, are or will be a party to this Invitation for Bids or any resulting contract.

28.03 American Iron and Steel Requirements

A. Any contract(s) awarded under this Invitation for Bids is/are subject to the American Iron and Steel (AIS) requirements of 33 U.S.C §1388. The Contractor must complete the statement of understanding regarding this requirement, found in Supplemental Contract Conditions, Item No. 9.

28.04 Equal Employment Opportunity and Affirmative Action

A. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex (including pregnancy), sexual orientation, gender identity, national origin, age (40 or older), disability or genetic information. Bidders on this work will be required to comply with the Department of Labor regulations at 41 CFR Part 60.

SUPPLEMENTAL INFORMATION FOR BIDDERS

"Each bid in excess of $100,000.00 must be accompanied by Lobbying Activity Certification, as required by Public Law (PL) 101-121. The certification form provided in the bidding documents must be signed and dated by the Bidder. Any bids submitted without the certification will be rejected."

The certification form is 00500 RD 1940-Q Exhibit A-1 Certification for Contracts, Grants and Loans

QUALIFICATIONS STATEMENT

THE INFORMATION SUPPLIED IN THIS DOCUMENT IS CONFIDENTIAL TO THE EXTENT PERMITTED BY LAWS AND REGULATIONS

1. SUBMITTED BY:

Official Name of Firm: Moreno Cardenas, Inc.

Address: 2505 E. Missouri Ave. Suite 100

El Paso, Texas

79903

2. SUBMITTED TO: The County of El Paso

3. SUBMITTED FOR:

Owner: The County of El Paso

Project Name: Hillcrest Center Water Improvements Project (Phase I)

TYPE OF WORK: Furnishing and Installing 8-inch and 12-inch potable Water, Gate Valves, Piping, service connections, stub-outs, and magnetic flow meter

4. CONTRACTOR'S CONTACT INFORMATION

Contact Person:

Title:

Phone:

Email:

5. AFFILIATED COMPANIES:

Name:

Address:

6. TYPE OF ORGANIZATION:

☐ SOLE PROPRIETORSHIP

Name of Owner: _____

Doing Business As: _____

Date of Organization: _____

☐ PARTNERSHIP

Date of Organization: _____

Type of Partnership: _____

Name of General Partner(s): _____

_____

_____

☐ CORPORATION

State of Organization: _____

Date of Organization: _____

Executive Officers:

- President: _____
- Vice President(s): _____

_____

_____

- Treasurer: _____
- Secretary: _____

☐ LIMITED LIABILITY COMPANY

State of Organization: _____

Date of Organization: _____

Members: _____

_____

_____

_____

☐ JOINT VENTURE

Sate of Organization: _____

Date of Organization: _____

Form of Organization: _____

Joint Venture Managing Partner

- Name: _____
- Address: _____

Joint Venture Managing Partner

- Name: _____
- Address: _____

Joint Venture Managing Partner

- Name: _____
- Address: _____

7. LICENSING

Jurisdiction: _____

Type of License: _____

License Number: _____

Jurisdiction: _____

Type of License: _____

License Number: _____

8. CERTIFICATIONS

CERTIFIED BY:

Disadvantage Business Enterprise: _____

Minority Business Enterprise: _____

Woman Owned Enterprise: _____

Small Business Enterprise: _____

Other (_____): _____

9. BONDING INFORMATION

Bonding Company: _____

Address: _____

_____

Bonding Agent: _____

Address: _____

_____

_____

Contact Name: _____

Phone: _____

Aggregate Bonding Capacity: _____

Available Bonding Capacity as of date of this submittal: _____

10. FINANCIAL INFORMATION

Financial Institution: _____

Address: _____

_____

Account Manager: _____

Phone: _____

INCLUDE AS AN ATTACHMENT AN AUDITED BALANCE SHEET FOR EACH OF THE LAST 3 YEARS

11. CONSTRUCTION EXPERIENCE:

Current Experience:

List on **Schedule A** all uncompleted projects currently under contract (If Joint Venture list each participant's projects separately).

Previous Experience:

List on **Schedule B** all projects completed within the last 5 Years (If Joint Venture list each participant's projects separately).

Has firm listed in Section 1 ever failed to complete a construction contract awarded to it?

☐YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

Has any Corporate Officer, Partner, Joint Venture participant or Proprietor ever failed to complete a construction contract awarded to them in their name or when acting as a principal of another entity?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

Are there any judgments, claims, disputes or litigation pending or outstanding involving the firm listed in Section 1 or any of its officers (or any of its partners if a partnership or any of the individual entities if a joint venture)?

☐YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

12. SAFETY PROGRAM:

Name of Contractor's Safety Officer:_____

Include the following as attachments:

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) OSHA No. 500- Log & Summary of Occupational Injuries & Illnesses for the past 5 years.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all OSHA Citations & Notifications of Penalty (monetary or other) received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all safety citations or violations under any state all received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide the following for the firm listed in Section V (and for each proposed Subcontractor furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) the following (attach additional sheets as necessary):

Workers' compensation Experience Modification Rate (EMR) for the last 5 years:

YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____

Total Recordable Frequency Rate (TRFR) for the last 5 years:

YEAR	_____	TRFR	_____

	_____		_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____

Total number of man-hours worked for the last 5 Years:

YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____

Provide Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) Days Away From Work, Days of Restricted Work Activity or Job Transfer (DART) incidence rate for the particular industry or type of Work to be performed by Contractor and each of Contractor's proposed Subcontractors and Suppliers) for the last 5 years:

YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____

13. EQUIPMENT:

MAJOR EQUIPMENT:

List on **Schedule C** all pieces of major equipment available for use on Owner's Project.

I HEREBY CERTIFY THAT THE INFORMATION SUBMITTED HEREWITH, INCLUDING ANY ATTACHMENTS, IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

NAME OF ORGANIZATION: _____

BY: _____

TITLE: _____

DATED: _____

NOTARY ATTEST:

SUBSCRIBED AND SWORN TO BEFORE ME

THIS _____ DAY OF _____, 20___

NOTARY PUBLIC - STATE OF _____

MY COMMISSION EXPIRES:_____

REQUIRED ATTACHMENTS

1. Schedule A (Current Experience).
2. Schedule B (Previous Experience).
3. Schedule C (Major Equipment).
4. Audited balance sheet for each of the last 3 years for firm named in Section 1.
5. Evidence of authority for individuals listed in Section 7 to bind organization to an agreement.
6. Resumes of officers and key individuals (including Safety Officer) of firm named in Section 1.
7. Required safety program submittals listed in Section 13.
8. Additional items as pertinent.

SCHEDULE A

CURRENT EXPERIENCE

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE C - LIST OF MAJOR EQUIPMENT AVAILABLE

ITEM	PURCHASE DATE	CONDITION	ACQUIRED VALUE

Form 1295 Required

In 2015, the Texas Legislature adopted House Bill 1295, which added section 2252.908 of the Government Code. The law states that a governmental entity or state agency may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties (Form 1295) to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency. The Texas Ethics Commission has adopted rules requiring the business entity to file Form 1295 electronically with the Commission. Before an affected contract may be executed, the vendor must submit a disclosure form to the Ethics Commission. The form must disclose all persons with a "controlling interest" in the vendor, as well as any intermediaries who facilitated or negotiated the contract.

The law applies only to a contract of a governmental entity or state agency that either:

(1) Requires an action or vote by the governing body of the entity or agency before the contract may be signed; or

(2) Has a value of at least $1 million.

Gov't Code § 2252.908. The disclosure requirement applies to a contract entered into on or after January 1, 2016.

In order for Contractors to comply with this law, it must access the Texas Ethics Commission website at

https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm and follow the instructions provided there. The required form cannot be filed on paper, only electronically.

1. Use the application to enter the required information on FORM 1295 (including the County identification number for this contract).

2. Print a copy of the completed FORM 1295, which will include a certification of filing that will contain a unique certification number.
3. Have the FORM 1295 signed by an authorized agent of contractors and notarized.
4. Send the signed and notarized FORM 1295 with the certification of filing to the County after the contract award, but not later than at the time the business entity submits the final signed contract to the county. Send it to the County by mail, fax, or scanned and emailed, to the address.

BID FORM

Project Identification: Hillcrest Center Water Improvements Project (Phase I)

Contract Identification Number: Bid No. 22-025

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ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

County of El Paso, Texas
Purchasing Department
800 E. Overland Suite 300
El Paso, Texas 79901

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform and furnish 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. Bidder will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within ten (10) days after the date of the Owner's Notice of Award.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner and is contingent upon USDA-RD and EPA funding for the project.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

Addendum No.	Addendum, Date

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

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

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2)

the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.

F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.

J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the e execution of the Contract.

ARTICLE 5 – BASIS OF BID

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

Base Bid A (USDA)

Item	Description	Unit	Qty	Unit Cost	Total
1.	Insurance, Bonds, and Move-in Related Expenses, not to exceed 5% of Bid Item Nos. 2 through 13. (If Item No. 1 exceeds 5%, Bid may be deemed non-responsive.)	LS	1	$_____	$_____
2.	Trench Safety	LF	9,530	$_____	$_____
3.	Project Wide Video Tape (before and after construction)	LS	1	$_____	$_____
4.	Furnish and Install Traffic Control	LS	1	$_____	$_____
5.	Remove and replace 2-inch (Type C) HMAC complete and in place	SY	5,000	$_____	$_____
6.	Furnish and Install 8-inch PVC water pipeline complete and in place	LF	6,555	$_____	$_____
7.	Furnish and Install 12-inch PVC water pipeline complete and in place	LF	2,975	$_____	$_____
8.	Furnish and install 8-inch gate valve and bonnet box complete and in place	EA	16	$_____	$_____
9.	Furnish and install 12-inch gate valve and bonnet box complete and in place	EA	10	$_____	$_____
10.	Furnish and install 3/4-inch water service connections and appurtenances (5 additional service connections)	EA	51	$_____	$_____
11.	Furnish and Install stub-out connections to Right-of-Way line inclusive of cap and appurtenances complete and in place (10 additional stub-outs)	EA	95	$_____	$_____
12.	Furnish and install new fire hydrant (including gate valve and pipe the distribution main)	EA	10	$_____	$_____
13.	Furnish and install master meter will all appurtenances (including piping, fittings, joints, and gate valve)	LS	1	$_____	$_____
	Base Bid A (USDA) Subtotal				$_____

Base Bid B (EPA)

Item	Description	Unit	Qty	Unit Cost	Total
14.	Insurance, Bonds, and Move-in Related Expenses, not to exceed 5% of Bid Item Nos. 15 through 25. (If Item No. 14 exceeds 5%, Bid may be deemed non-responsive.)	LS	1	$_____	$_____
15.	Trench Safety	LF	10,495	$_____	$_____
16.	Project Wide Video Tape (before and after construction)	LS	1	$_____	$_____
17.	Furnish and Install Traffic Control	LS	1	$_____	$_____
18.	Remove and replace 2-inch (Type C) HMAC complete and in place	SY	5,700	$_____	$_____
19.	Furnish and Install 8-inch PVC water pipeline complete and in place	LF	6,630	$_____	$_____
20.	Furnish and Install 12-inch PVC water pipeline complete and in place	LF	3,865	$_____	$_____
21.	Furnish and install 8-inch gate valve and bonnet box complete and in place	EA	17	$_____	$_____
22.	Furnish and install 12-inch gate valve and bonnet box complete and in place	EA	14	$_____	$_____
23.	Furnish and install 3/4-inch water service connections and appurtenances (5 additional service connections)	EA	66	$_____	$_____
24.	Furnish and Install stub-out connections to Right-of-Way line inclusive of cap and appurtenances complete and in place (10 additional stub-outs)	EA	71	$_____	$_____
25.	Furnish and install new fire hydrant (including gate valve and pipe the distribution main)	EA	6	$_____	$_____

Base Bid B (EPA) Subtotal $_____

Total Bid (Base Bid A + Base Bid B) $_____

Bidder acknowledges that (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) 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.

All Bid Items (both Base Bid A and Base Bid B) are subjected to the American Iron and Steel Requirements stated in Section 00800d.

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security;

B. List of Proposed Subcontractors;

C. List of Proposed Suppliers;

D. List of Project References;

E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;

F. Contractor's License No.: _____ or Evidence of Bidder's ability to obtain a State Contractor's License and a covenant by Bidder to obtain said license within the time for acceptance of Bids;

G. Required Bidder Qualification Statement with supporting data;

H. If Bid amount exceeds $10,000, signed Compliance Statement (RD 400-6). Refer to specific equal opportunity requirements set forth in the Supplemental General Conditions;

I. IF Bid amount exceeds $25,000, signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions (AD-1048); and

J. If Bid amount exceeds $100,000, signed RD Instruction 1940-Q, Exhibit A-1, Certification for Contracts, Grants, and Loans.

ARTICLE 8 – DEFINED TERMS

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

ARTICLE 9 – BID SUBMITTAL

BIDDER:

_____

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

_____

_____

_____

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

_____

Bidder's License No.: _____
(where applicable)

SECTION 00420

CERTIFICATION OF BIDDER
OF
COMPLIANCE TO TEXAS STATE LAW

Art. 601g of V.A.C.S. applies to non-resident bidders and defines a non-resident as a bidder whose principal place of business is not in this state, but excludes a contractor whose ultimate parent company or majority owner has its principal place of business in this state. The appropriate blanks in Section A must be filled out by all out-of-state or non-resident bidders in order for your bid to meet specifications. The failure of out-of-state or non-resident contractors to do so will automatically disqualify that Bidder. Resident Bidders must check the box in Section B.

↑ A. Non-resident bidders in _____ (give state), our principal place of business, are required to be _____percent lower than the lowest bid of resident bidders by said state law to obtain a comparable contract in the state in which the undersigned non-resident's principal place of business is located. A copy of the statute is attached.

Non-resident bidders in _____ (give state), our principal place of business, are not required to underbid resident bidders.

↑ B. Our principal place of business or corporate offices are in the State of Texas.

BIDDER

_____ By_____
Company (Please Print)

_____ Signature:_____
Address

_____ Title:_____
City State Zip (Please Print)

_____
Phone

BID BOND

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

BIDDER *(Name and Address)*:

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

OWNER *(Name and Address)*:

BID
Bid Due Date:
Description: El Paso County Hillcrest Center Water Improvements Project (Phase I)

BOND
Bond Number:
Date:
Penal sum _____ $ _____
(Words) (Figures)

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

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

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 Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

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 of 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 the 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 the 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.

EJCDC C-430 BID BOND

"IMPORTANT – Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located."

00460 NON-COLLUSION 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_____(Local Public Agency) 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 _____

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____ _____

(name) (date)

_____

(title)

oOo

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

NOTICE OF AWARD

Date of Issuance:

Owner: County of El Paso, Texas | Owner's Contract No.:

Engineer: Moreno Cardenas, Inc. | Engineer's Project No.: 16-125

Project: **COUNTY OF EL PASO HILLCREST CENTER WATER IMPROVEMENTS PROJECT (PHASE I)** | Contract Name:

Bidder:

Bidder's Address:

TO BIDDER:

You are notified that Owner has accepted your Bid dated [_____] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

County of El Paso Hillcrest Center Water Improvements Project (Phase I)

The project is to provide first-time water service to Hillcrest Center Area residents. The project includes approximately 13,185 linear feet of 8-inch PVC pipe, 6,840 linear feet of 12-inch PVC pipe, 107 water service connections and appurtenances, 146 stub-out connections and appurtenances, 33 8-inch gate valves, 24 12-inch gate valves, project-wide video tape, pavement removal and replacement, cement stabilized backfill, concrete cap, fire hydrants, one master meter and all appurtenances, trench safety, and project-wide traffic control.

The Contract Price of the awarded Contract is: $_____

[ ] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

☐ a set of the Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date this Notice of Award:

1. Deliver to Owner County of El Paso, Texas counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security *[e.g., performance and payment bonds]* and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner**:**

Authorized Signature

By:

Title:

Copy: Engineer

SECTION 00520

AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between County of El Paso, Texas ("Owner") and

("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 The Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

The Project is to provide first-time water service to Hillcrest Center Area residents. The Project includes approximately 13,185 linear feet of 8-inch PVC pipe, 6,840 linear feet of 12-inch PVC pipe, 117 water service connections and appurtenances, 166 stub-out connections and appurtenances, 33 8-inch gate valves, 24 12-inch gate valves, project-wide videotape, pavement removal and replacement, cement stabilized backfill, concrete cap, fire hydrants, one master meter and all appurtenances, trench safety, and project-wide traffic control.

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: Hillcrest Center Water Improvements Project (Phase I)

ARTICLE 3 – ENGINEER

3.01 The Owner has retained Moreno Cardenas, Inc. ("Engineer") 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 the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Contract Times: Days*

A. The Work will be substantially completed within **240** days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **270** days after the date when the Contract Times commence to run.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration 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):

1. Substantial Completion: Contractor shall pay Owner $700 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.

2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $300 for each day that expires after such time until the Work is completed and ready for final payment.

3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:

A. For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item):

Unit Price Work					
Item No.	**Description**	**Unit**	**Estimated Quantity**	**Unit Price**	**Extended Price**
Base Bid A (USDA)					
1	Insurance, Bonds, and Move-in Related Expenses, not to exceed 5% of Bid Item Nos. 2 through 13. (If Item No. 1 exceeds 5%, Bid may be deemed non-responsive.)	LS	1		
2	Trench Safety	LF	9,530		
3	Project Wide Video Tape (before and after construction)	LS	1		
4	Furnish and Install Traffic Control	LS	1		
5	Remove and replace 2-inch (Type C) HMAC complete and in place	SY	5,000		
6	Furnish and Install 8-inch PVC water pipeline complete and in place	LF	6,555		
7	Furnish and Install 12-inch PVC water pipeline complete and in place	LF	2,975		
8	Furnish and install 8-inch gate valve and bonnet box complete and in place	EA	16		
9	Furnish and install 12-inch gate valve and bonnet box complete and in place	EA	10		

Unit Price Work					
Item No.	**Description**	**Unit**	**Estimated Quantity**	**Unit Price**	**Extended Price**
10	Furnish and install 3/4-inch water service connections and appurtenances	EA	51		
11	Furnish and Install stub-out connections to Right-of-Way line inclusive of cap and appurtenances complete and in place	EA	95		
12	Furnish and install new fire hydrant (including gate valve and pipe the distribution main)	EA	10		
13	Furnish and install master meter will all appurtenances (including piping, fittings, joints, and gate valve)	LS	1		
Base Bid B (EPA)					
14	Insurance, Bonds, and Move-in Related Expenses, not to exceed 5% of Bid Item Nos. 15 through 25. (If Item No. 1 exceeds 5%, Bid may be deemed non-responsive.)	LS	1		
15	Trench Safety	LF	10,495		
16	Project Wide Video Tape (before and after construction)	LS	1		
17	Furnish and Install Traffic Control	LS	1		
18	Remove and replace 2-inch (Type C) HMAC complete and in place	SY	5,700		
19	Furnish and Install 8-inch PVC water pipeline complete and in place	LF	6,630		
20	Furnish and Install 12-inch PVC water pipeline complete and in place	LF	3,865		
21	Furnish and install 8-inch gate valve and bonnet box complete and in place	EA	17		
22	Furnish and install 12-inch gate valve and bonnet box complete and in place	EA	14		
23	Furnish and install 3/4-inch water service connections and appurtenances	EA	66		
24	Furnish and Install stub-out connections to Right-of-Way line inclusive of cap and appurtenances complete and in place	EA	71		

Unit Price Work					
Item No.	**Description**	**Unit**	**Estimated Quantity**	**Unit Price**	**Extended Price**
25	Furnish and install new fire hydrant (including gate valve and pipe the distribution main)	EA	6		
Total of all Extended Prices for Unit Price Work (subject to final adjustment based on actual quantities)					$

The extended prices for Unit Price Work set forth as of the Effective Date of the Contract are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.

B. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 30th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract

a. 95 percent of Work completed (with the balance being retainage); and

b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion of the entire construction to be provided under the Contract Documents, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 100 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – INTEREST

7.01 All amounts not paid when due shall bear interest at the rate of 4.5 percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.

B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

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

D. Contractor has carefully studied all: reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

G. Contractor is aware of the general nature of Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement.
2. Performance bond.
3. Payment bond.
4. Other bonds.
5. General Conditions.

6. Supplementary Conditions.

7. Specifications as listed in the table of contents of the Project Manual.

8. Drawings (not attached but incorporated by reference) consisting of 24 sheets with each sheet bearing the following general title: El Paso County Hillcrest Center Water Improvements Project (Phase I), Bid Number 22-025, Volume 2 of 2.

9. Addenda (numbers ___ to ___, inclusive).

10. Exhibits to this Agreement (enumerated as follows):

    a. Contractor's Bid (pages ___ to ___, inclusive).

11. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:

    a. Notice to Proceed.

    b. Work Change Directives.

    c. Change Orders.

    d. Field Orders.

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 *Assignment of Contract*

A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 *Successors and Assigns*

A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 *Severability*

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

10.06 *Other Provisions*

A. Owner stipulates that if the General Conditions that are made a part of this Contract are based on EJCDC® C-700, Standard General Conditions for the Construction Contract, published by the Engineers Joint Contract Documents Committee®, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on _____ (which is the Effective Date of the Contract).

OWNER:	CONTRACTOR:
County of El Paso, Texas	
By:	By:
Title: County Judge	Title:
	(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest:	Attest:
Title:	Title:
Address for giving notices:	Address for giving notices:
	License No.: *(where applicable)*

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

NOTICE TO PROCEED

Owner:	County of El Paso, Texas	Owner's Contract No.:	
Contractor:		Contractor's Project No.:	
Engineer:	Moreno Cardenas, Inc.	Engineer's Project No.:	16-125
Project:	Hillcrest Center Water Improvements Project (Phase I)	Contract Name:	
		Effective Date of Contract:	

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on _____, 20_____.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, [the date of Substantial Completion is _____, and the date of readiness for final payment is _____.

Before starting any Work at the Site, the Contractor must comply with the following:

Owner**:**

Authorized Signature

By:

Title:

Date Issued:

Copy: Engineer

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PERFORMANCE BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

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

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ *(seal)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

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

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

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

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

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

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

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

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

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

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

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

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

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

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction 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 the Owner or its heirs, executors, administrators, successors, and assigns.

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

11. 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 a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the 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 periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions

conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

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

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

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PAYMENT BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form ☐ None ☐ See Paragraph 18

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

CONTRACTOR AS PRINCIPAL

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

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

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

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

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

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

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond shall arise after the following:

   5.1 Claimants who do not have a direct contract with the Contractor,

      5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

      5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

   5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

   7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

   7.2 Pay or arrange for payment of any undisputed amounts.

   7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

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

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

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

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, 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.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

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

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. **Definitions**

    16.1 **Claim:** A written statement by the Claimant including at a minimum:

        1. The name of the Claimant;
        2. The name of the person for whom the labor was done, or materials or equipment furnished;
        3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
        4. A brief description of the labor, materials, or equipment furnished;
        5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
        6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
        7. The total amount of previous payments received by the Claimant; and
        8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

    16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the 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.

    16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

    16.4 **Owner Default**: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

    16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

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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)	**$**
4. TOTAL COMPLETED AND STORED TO DATE (Column F total on Progress Estimates)	**$**
5. RETAINAGE:	
a. X _____ Work Completed	**$**
b. X _____ Stored Material	**$**
c. Total Retainage (Line 5.a + Line 5.b)	**$**
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5.c)	**$**
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	**$**
8. AMOUNT DUE THIS APPLICATION	**$**
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G total on Progress Estimates + Line 5.c above)	**$**

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:
(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 the Work covered by prior Applications for Payment;
(2) Title to 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 the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor Signature

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 or Financing Entity (if applicable) (Date)

Progress Estimate - Unit Price Work

Contractor's Application

For (Contract):								Application Number:			
Application Period:								Application Date:			
A					B	C	D	E	F		
Item		Contract Information				Estimated Quantity Installed	Value of Work Installed to Date	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	Item Quantity	Units	Unit Price	Total Value of Item ($)						
	Totals										

Stored Material Summary

Contractor's Application

For (Contract):								Application Number:			
Application Period:								Application Date:			
A		B	C		D		E		F		G
Bid Item No.	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Storage Location	Description of Materials or Equipment Stored	Stored Previously		Amount Stored this Month ($)	Subtotal Amount Completed and Stored to Date (D + E)	Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
					Date Placed into Storage (Month/Year)	Amount ($)			Date (Month/ Year)	Amount ($)	
				Totals							

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CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	The County of El Paso	Owner's Contract No.:	
Contractor:		Contractor's Project No.:	
Engineer:	Moreno Cardenas, Inc.	Engineer's Project No.:	16-125
Project:	Hillcrest Center Water Improvements Project (Phase I)	Contract Name:	

This [preliminary] [final] Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows:

Amendments to Owner's responsibilities: ☐ None ☐ As follows

Amendments to Contractor's responsibilities: ☐ None ☐ As follows:

The following documents are attached to and made a part of this Certificate: *[punch list; others]*

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract.

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By: _____ (Authorized signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: Project Manager	Title:	Title:
Date:	Date:	Date:

USDA
Form RD 400-6
(Rev.12-09)

Form Approved
OMB No. 0575-0018

COMPLIANCE STATEMENT

This statement relates to a proposed contract with _____

_____,
(Name of borrower or grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1. I ☐ have, ☐ have not, participated in a previous contract or subcontract subject to Executive Order 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.

2. If I have participated in such a contract or subcontract, I ☐ have, ☐ have not, filed all compliance reports that have been required to file in connection with the contract or subcontract.

☐ If the proposed contract is for $50,000 or more: or ☐ If the proposed nonconstruction contract is for $50,000 or more and I have 50 or more employees, I also represent that:

3. I ☐ have, ☐ have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.

4. If I have participated in such a contract or subcontract, ☐ I have, ☐ have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, may 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding $ 10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

DATE _____

_____

(Signature of Bidder or Prospective Contractor)

_____

Address (including Zip Code)

This form is available electronically.

OMB Control No. 0505-0027
Expiration Date: 04/30/2022

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion Lower Tier Covered Transactions

AD-1048

The following statement is made in accordance with the Privacy Act of 1974 (5 U.S.C. § 552a, as amended). This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, and 2 C.F.R. §§ 180.300, 180.335, Participants' responsibilities. The regulations were amended and published on August 31, 2005, in 70 Fed. Reg. 51865-51880. Copies of the regulations may be obtained by contacting the Department of Agriculture agency offering the proposed covered transaction.

According to the Paperwork Reduction Act of 1995 an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0505-0027. The time required to complete this information collection is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The provisions of appropriate criminal, civil, fraud, privacy, and other statutes may be applicable to the information provided.

(Read instructions on page two before completing certification.)

A. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency;

B. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

ORGANIZATION NAME	PR/AWARD NUMBER OR PROJECT NAME

NAME(S) AND TITLE(S) OF AUTHORIZED REPRESENTATIVE(S)	
SIGNATURE(S)	DATE

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint (https://www.ascr.usda.gov/filing-program-discrimination-complaint-usda-customer) and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442.

Instructions for Certification

(1) By signing and submitting this form, the prospective lower tier participant is providing the certification set out on page 1 in accordance with these instructions.

(2) The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension or debarment.

(3) The prospective lower tier participant shall provide immediate written notice to the person(s) to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(4) The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549, at 2 C.F.R. Parts 180 and 417. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of those regulations.

(5) The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

(6) The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

(7) A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the System for Award Management (SAM) database.

(8) Nothing contained in the foregoing shall be construed to require establishment of a system of records to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(9) Except for transactions authorized under paragraph (5) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. 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, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

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

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document 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, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

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

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

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

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

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

27. *Notice to Proceed*—A written notice 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.

28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. *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.

30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.

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

34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.

35. *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.

36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *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, and such other lands furnished by Owner which are designated for the use of Contractor.

38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. *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.

40. *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.

41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

43. *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 a Subcontractor.

44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *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 but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

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

47. *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; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 *Terminology*

A. The words and terms discussed in the following paragraphs 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 Article 10 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 15.03 or 15.04).

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. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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. *Bonds*: 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 Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

C. *Evidence of Owner’s Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), 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;

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.

2.04 *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 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, 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 and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *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 2.03.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 the component parts of the Work.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, 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.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, 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, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract 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, reference standard, 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 part of the Contract Documents prepared by or for Engineer. 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 part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict,

error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or 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) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) 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 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

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 part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

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

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers 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 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; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

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.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *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 Contract 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 Contract. 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 Contract, whichever date is earlier.

4.02 *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 such date.

4.03 *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.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 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 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. 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, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, 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 Times and Contract Price. 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.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. 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. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. abnormal weather conditions;

3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and

4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *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.

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 permanent improvements are to be made 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.

5.02 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, 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 any such claim, and against all 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 directly or indirectly, in whole or in part

by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent 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 and adjacent areas 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 of 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 structures or land to stresses or pressures that will endanger them.

5.03 *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 adjacent to the Site;

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

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on 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.

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site 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 5.03 is materially inaccurate; or

2. is of such a nature as to require a change in the Drawings or Specifications; 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 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, 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 fall within any one or more of the categories described in Paragraph 5.04.A;

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 Paragraph 13.03; and,

c. 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.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a 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 otherwise; or

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

c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent 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 do not warrant or guarantee 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 information and data regarding existing Underground Facilities at the Site;

b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

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

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then 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 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

    a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

    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 Paragraph 13.03;

    c. 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; and

    d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

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

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on 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 removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) 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 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. 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, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. 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, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. 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 (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. 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 failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, 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. 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 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond 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 the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then 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 bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

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

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, 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.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

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

6.03 *Contractor's Insurance*

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

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

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).

B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

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

2. claims for damages insured by reasonably available personal injury liability coverage.

3. 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.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:

a. Such insurance shall be maintained for three years after final payment.

b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against 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. The automobile liability policy shall be written on an occurrence basis.

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; 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 (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that 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.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, 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.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable 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 Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

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; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; 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. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

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

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, 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 insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the 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 Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, 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 or Contractor as trustee or fiduciary, 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 occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.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, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, 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 builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *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.

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.

7.02 *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, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *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, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work 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.

7.04 *"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 Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item 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 is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that 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, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, 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;

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

4) it is not objectionable to Owner.

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.

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

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. 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:

a. shall certify that the proposed substitute item will:

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

2) be similar in substance to that specified, and

3) be suited to the same use as that specified.

b. will state:

1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

2) 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

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

c. will identify:

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

2) available engineering, sales, maintenance, repair, and replacement services.

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

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

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. 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.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. 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 the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. 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.

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. 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.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. 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 money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *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.

7.08 *Permits*

A. Unless otherwise provided in the Contract Documents, 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 the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *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.

7.10 *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 or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and 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 such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

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

7.12 *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, other work in progress, 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 Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

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 7.12.A.2 or 7.12.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 at its expense (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 protection 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 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *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.

7.14 *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.

7.15 *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.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

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

a. reviewed and coordinated the 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 and equipment 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 of that submittal, and that Contractor approves the 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 set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings*:

a. Contractor shall submit the number of copies required in the Specifications.

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 7.16.D.

2. *Samples*:

   a. Contractor shall submit the number of Samples required in the Specifications.

   b. Contractor shall 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 7.16.D.

3. 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. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

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 or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample 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 7.16.A.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 will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

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.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *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 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;

6. the issuance of a notice of acceptability by Engineer;

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

8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, 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 7.18.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 7.18.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.

7.19 *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 Laws and Regulations.

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, 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, 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 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. 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.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, 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.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

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

8.03 *Legal Relationships*

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. 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.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) 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 any such claims, and against all 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 damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

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

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *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.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *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 (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

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.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *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.

10.02 *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 10.08. 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.

10.03 *Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. 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.

10.04 *Rejecting Defective Work*

A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. 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, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

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

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, 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 15.06.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 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes 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. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-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. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *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, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. 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, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, 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 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.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 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

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 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

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

1. 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;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *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.

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work 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 13.01.C, 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, and 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 13.01.

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 6.05), 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 communication 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 that Contractor is required by the Contract Documents to purchase and maintain.

C. *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 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here 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 Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole 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, Change Proposal, Claim, set-off, or other 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 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, 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.

13.02 *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*: Contractor agrees that:

1. 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

2. 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*: 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.

13.03 *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. Payments to Contractor for Unit Price Work will be based on actual quantities.

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. 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 the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price 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;

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

3. Contractor believes that it 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 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction 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.

14.02 *Tests, Inspections, and Approvals*

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

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

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, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. 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. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages 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. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then 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, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages 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 pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. 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, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *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, then 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.

14.07 *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, 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, then 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 14.07, 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, 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 incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. 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 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 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 during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *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, a warehouse bond, 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.

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, 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 13.03, 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; 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 money 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 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

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

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

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

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

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

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. 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;

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, 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, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

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 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *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 and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

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

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. 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 punch list.

15.04 *Partial Use or Occupancy*

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. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be 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 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work 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 15.03 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 6.05 regarding builder's risk or other property insurance.

15.05 *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, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *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, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

   d. a list of all disputes that Contractor believes are unsettled; and

   e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) 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, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

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 have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. 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 15.07. 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. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *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 Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

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 to 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. 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 repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

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, 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 are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *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 written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and 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);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, 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 complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.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 the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

and damages exceeds 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.

F. 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, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *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; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) 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 16.03.

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 are not intended to preclude Contractor from submitting a Change Proposal 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 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *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, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract 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.

18.03 *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. 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.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY CONDITIONS

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC-1.01 Defined Terms

A. If the Contract will include a Geotechnical Baseline Report (see Article 5 below), include the following definitions:

SC-1.01. Add to the list of definitions in Paragraph 1.01.A by inserting the following as numbered items in their proper alphabetical positions:

Geotechnical Subsurface Soils Evaluation Report (GSSER) — The interpretive report prepared by or for Owner regarding subsurface conditions at the Site, and containing specific baseline geotechnical conditions that may be anticipated or relied upon for bidding and contract administration purposes, subject to the controlling provisions of the Contract, including the GSSER's own terms. The GSSER is not a Contract Document, but is available as a reference. Refer to Article 5 - Availability of Lands; Subsurface and Physical conditions; Hazardous Environmental Conditions.

SC 1.0.A.8 Add the following language at the end of the last sentence of Paragraph 1.01.A.8:

The Change Order form to be used on this Project is EJCDC C-941. Agency approval is required before Change orders are effective.

SC 1.01.A.48 Add the following language at the end of the last sentence of Paragraph 1.01.A.48:

A Work Change Directive cannot change Contract Price or Contract Times without a subsequent Change Order.

SC 1.01.A.49 Add the following new Paragraph after Paragraph 1.01.A.48:

Abnormal Weather Conditions – Conditions of extreme or unusual weather for a given region, elevation, or season as determined by Engineer. Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered Abnormal Weather Conditions.

SC 1.01.A.50 Add the following new Paragraph after Paragraph 1.01.A.49:

Agency - The Project is financed in whole or in part by USDA Rural Utilities Service pursuant to the Consolidated Farm and Rural Development Act (7 USC Section 1921 et seq.). The Rural Utilities Service programs are administered through the USDA Rural Development offices; therefore, the Agency for these documents is USDA Rural Development.

ARTICLE 2 – PRELIMINARY MATTERS

SC-2.01 Delivery of Bonds and Evidence of Insurance

A. Paragraph 2.01.B of the General Conditions requires that Contractor furnish certificates of insurance. Paragraph 6.02.C states that upon request by Owner or other named or additional insureds, Contractor must provide evidence of insurance such as copies of required policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Parallel

provisions apply to Owner and the insurance that Owner is required to provide. Rather than relying on this two-step process (delivery of certificates of insurance at the outset; subsequent requests for additional evidence of insurance), some contract drafters may elect to require from the outset that copies of the insurance policies, rather than certificates of insurance, be delivered to the other party. If exchange of copies of insurance policies is required, the following should be used:

SC-2.01 Delete Paragraphs 2.01 B. and C. in their entirety and insert the following in their place:

B. Evidence of Contractor's Insurance: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies of insurance (including all endorsements, and identification of applicable self-insured retentions and deductibles) required to be provided by Contractor in Article 6. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

C. Evidence of Owner's Insurance: After receipt from Contractor of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor copies of the policies of insurance to be provided by Owner under Article 6 (if any). Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

SC-2.02 Copies of Documents

SC-2.02.A. Amend the first sentence of Paragraph 2.02.A. to read as follows:

Owner shall furnish to Contractor five (5) copies of the Contract Documents (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF).

SC- 2.06.B Delete Paragraph 2.06.B and replace it with the term [Deleted].

SC-2.06.B Add the following language to the end of 2.06.B:

Special requirements for electronic data apply to this Project. See attached Exhibit entitled "Electronic Communications Protocol Addendum," Consensus DOCS form 200.2.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

SC-4.01 Commencement of Contract Times; Notice to Proceed

SC 4.01.A AMEND THE LAST SENTENCE OF PARAGRAPH 4.01.A BY STRIKING OUT THE FOLLOWING WORDS:

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 Contract, whichever date is earlier

SC 4.05.C.2 Amend Paragraph 4.05.C.2 by striking out the following text: "abnormal weather conditions;" and inserting the following text:

Abnormal Weather Conditions;

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

SC-5.03 Subsurface and Physical Conditions

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.B:

C. The following reports of explorations and tests of subsurface conditions at or adjacent to the Site are known to Owner:

1. Geotechnical report dated February 2021 called "General Subsurface Soils Evaluation Report For County of El Paso – Hillcrest Center Water Improvement Project (Phase I) El Paso, El Paso County, Texas" prepared by Construction Quality Control (CQC) Testing and Engineering, El Paso, TX. The technical data contained in such report consists of boring logs which are not included with the Specifications.

D. Contractor may examine copies of reports and drawings identified in SC 5.03.C and SC 5.03.D that were not included with the Bidding Documents at Moreno Cardenas, Inc 2505 E Missouri Ave. # 100, El Paso, Texas 79903 during regular business hours, or may request copies from Engineer.

If there are no known Site-related reports or drawings, use the following version of SC-5.03:

SC 5.03 Delete Paragraphs 5.03.A and 5.03.B in their entirety and insert the following:

A. No reports of explorations or tests of subsurface conditions at or adjacent to the Site, or drawings of physical conditions relating to existing surface or subsurface structures at the Site, are known to Owner.

SC 5.06 Delete Paragraphs 5.06.A and 5.06.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.

ARTICLE 6 – BONDS AND INSURANCE

SC-6.02 Insurance—General Provisions

SC-6.02 Add the following paragraph immediately after Paragraph 6.02.B:

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

SC-6.03 Contractor's Liability Insurance

SC 6.03 Add the following new paragraph immediately after Paragraph 6.03.J:

K. The limits of liability for the insurance required by Paragraph 6.03 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 coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State:	Statutory
Federal, if applicable (e.g., Longshoreman's):	Statutory

Employer's Liability:

Bodily injury, each accident	$ 500,000
Bodily injury by disease, each employee	$ 500,000
Bodily injury/disease aggregate	$ 500,000

Foreign voluntary worker compensation	Statutory

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

General Aggregate	$ 2,000,000
Products - Completed Operations Aggregate	$ 1,000,000
Personal and Advertising Injury	$ 1,000,000
Each Occurrence (Bodily Injury and Property Damage)	$ 1,000,000

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Bodily Injury:

Each person	$ 1,000,000
Each accident	$ 1,000,000

Property Damage:

Each accident	$ 1,000,000
Combined Single Limit of	$ 1,000,000

4. Excess or Umbrella Liability:

Per Occurrence	$ 5,000,000
General Aggregate	$ 5,000,000

5. Contractor's Pollution Liability:

Each Occurrence	$
General Aggregate	$

☒ If box is checked, Contractor is not required to provide Contractor's Pollution Liability insurance under this Contract

6. Additional Insureds: In addition to Owner and Engineer, include as additional insureds the following: *United States Department of Agriculture - Rural Development (USDA-RD)*

SC-6.05 Property Insurance

SC-6.05. Add the following to the list of requirements in Paragraph 6.05.A, as a numbered item:

13. be subject to a deductible amount of no more than $500,000 for direct physical loss in any one occurrence.

SC-6.05.A.1 Add the following new subparagraph after subparagraph 6.05.A.1:

a. In addition to Owner, Contractor, and all Subcontractors, include as insureds the following:

Engineer, United States Department of Agriculture - Rural Development, and other individuals or entities identified herein, and the officers, directors, members, partners, employees, agents and other consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed an insured, additional insured, or loss payee as their interest may appear.

SC-6.05.A. Delete Paragraph 6.05.A of the General Conditions and substitute the following in its place:

Contractor shall provide and maintain installation floater insurance for property under the care, custody, or control of Contractor. The installation floater insurance shall be a broad form or "all risk" policy providing coverage for all materials, supplies, machinery, fixtures, and equipment that will be incorporated into the Work. Coverage under the Contractor's installation floater will include:

1. any loss to property while in transit,
2. any loss at the Site, and
3. any loss while in storage, both on-site and off-site.

Coverage cannot be contingent on an external cause or risk, or limited to property for which the Contractor is legally liable. The Contractor will be solely responsible for any

deductible carried under this coverage and claims on materials, supplies, machinery, fixture, and equipment that will be incorporated into the Work while in transit or in storage. This policy will include a waiver of subrogation applicable to Owner, Contractor, Engineer, all Subcontractors, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them.

SC 6.05.A. Delete the first sentence of Paragraph 6.05.A and insert the following sentence in its place:

Owner shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations).

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

SC-7.02 Labor; Working Hours

SC-7.02.B. Add the following new subparagraphs immediately after Paragraph 7.02.B:

1. Regular working hours will be Monday -Friday 8:00 AM -5:00 PM
2. Owner's legal holidays are New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, Christmas Eve, Christmas Day, and New Year's Eve.

SC-7.02.C. Add the following new paragraph immediately after Paragraph 7.02.B:

Contractor shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

SC 7.04.A Amend the third sentence of Paragraph 7.04.A by striking out the following words:

Unless the specification or description contains or is followed by words reading that no like, equivalent, or 'or-equal' item is permitted.

SC 7.04.A.1 Amend the last sentence of Paragraph a.3 by striking out "and;" and adding a period at the end of Paragraph a.3.

SC 7.04.A.1 Delete paragraph 7.04.A.1.a.4 in its entirety and insert the following in its place:

[Deleted]

SC 7.06.A Amend Paragraph 7.06.A by adding the following text to the end of the Paragraph:

The Contractor shall not award work valued at more than fifty percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

SC 7.06.B Delete paragraph 7.06.B in its entirety and insert the following in its place:

[Deleted]

SC 7.06.E Amend the second sentence of Paragraph 7.06.E by striking out "Owner may also require Contractor to retain specific replacements; provided, however, that".

SC-7.09 Taxes

A. If Owner qualifies for a state or local sales or use tax exemption in the purchase of certain materials and equipment, add the following Supplementary Condition, with any revisions necessary to meet the specific applicable exemption rules. (Note: If instructions to bidders or proposers are used, confirm that the provisions here are consistent with the corresponding provisions in such instructions. See Suggested Instructions to Bidders for Construction Contracts, EJCDC® C-200, Article 23.)

SC 7.09 Add a new paragraph immediately after Paragraph 7.09.A:

B. Owner is exempt from payment of sales and compensating use taxes of the State of Texas 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.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.03 Project Representative

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.A:

B. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.

1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.

2. Schedules: Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.

3. 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.

4. Liaison:

    a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and 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.

5. 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.

6. Shop Drawings and Samples:

    a. Record date of receipt of Samples and Contractor-approved Shop Drawings.

    b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.

    c. Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.

7. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, if any, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

8. 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 is defective, 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.

9. Inspections, Tests, and System Start-ups:

    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.

10. Records:

    a. Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.

    b. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.

    c. Maintain records for use in preparing Project documentation.

11. Reports:

    a. Furnish to Engineer periodic 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. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.

    c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, force majeure or delay events, damage to property by fire or other causes, or the discovery of any Constituent of Concern or Hazardous Environmental Condition.

12. 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.

13. 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 Contract Documents 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.

14. Completion:

    a. Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.

b. Participate in Engineer's final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch 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, or Suppliers.

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.

5. Advise on, issue directions regarding, or assume control over security or 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.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

SC-11.07 Execution of Change Orders

SC 11.07.C Add the following new Paragraph after Paragraph 11.07.B:

All Contract Change Orders must be concurred in by Agency before they are effective.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC-13.01 Cost of the Work

SC 13.01.B.5.c Delete Paragraph 13.01.B.5.c in its entirety and insert the following in its place:

c. Construction Equipment and Machinery:

1) Rentals of all construction equipment and machinery, and the parts thereof, 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.

2) Costs for equipment and machinery owned by Contractor will be paid at a rate shown for such equipment in the Rental Rate Blue Book (Volumes 1 through 3), by Equipment Watch. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs. Costs will include the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, shall cease to accrue when the use thereof is no longer necessary for the changed Work. Equipment or machinery with a value of less than $1,000 will be considered small tools.

SC-13.02 Allowances

SC 13.02.C Delete Paragraph 13.02.C in its entirety and insert the following in its place:

[Deleted]

SC-13.03 Unit Price Work

SC 13.03.E Delete Paragraph 13.03.E in its entirety and insert the following in its place:

E. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

1. if the extended price of a particular item of Unit Price Work amounts to 25 percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 50 percent from the estimated quantity of such item indicated in the Agreement; and

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

3. if Contractor believes that Contractor has incurred additional expense as a result thereof, Contractor may submit a Change Proposal, or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, Owner may make a Claim, seeking an adjustment in the Contract Price.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

SC-15.01 Progress Payments

SC 15.01.B Amend the second sentence of Paragraph 15.01.B.1 by striking out the following text:
"a bill of sale, invoice, or other."

SC 15.01.B.3 Add the following language at the end of paragraph 15.01.B.3:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC 15.01.B.4 Add the following new Paragraph after Paragraph 15.01.B.3:

The Application for Payment form to be used on this Project is EJCDC C-620. The Agency must approve all Applications for Payment before payment is made.

SC 15.01.D.1 Delete Paragraph 15.01.D.1 in its entirety and insert the following in its place:

The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 15.01.E will become due twenty (20) days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-15.02 Contractor's Warranty of Title

SC 15.02.A Amend Paragraph 15.02.A by striking out the following text: "no later than seven days after the time of payment by Owner" and insert "no later than the time of payment by Owner."

SC-15.03 Substantial Completion

SC 15.03.B Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, shall be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.

SC-17.02 Arbitration

A. All matters subject to final resolution under this Article will be decided by arbitration in accordance with El Paso County requirements, subject to the conditions and limitations of this paragraph. This agreement to arbitrate and any other agreement or consent to arbitrate entered into will be specifically enforceable under the prevailing law of any court having jurisdiction.

B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitrator or arbitration provider, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the specific time required in this Article, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the

applicable statute of limitations. The demand for arbitration should include specific reference to Paragraph SC-17.02.D below.

C. No arbitration arising out of or relating to the Contract shall include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:

1. the inclusion of such other individual or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration; and

2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings.

D. The award rendered by the arbitrator(s) shall be consistent with the agreement of the parties, in writing, and include a concise breakdown of the award, and a written explanation of the award specifically citing the Contract provisions deemed applicable and relied on in making the award.

E. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.

F. The fees and expenses of the arbitrators and any arbitration service shall be shared equally by Owner and Contractor.

SC-17.03 Attorneys' Fees

SC-17.03 Add the following new paragraph immediately after Paragraph 17.02.

SC-17.03 Attorneys' Fees: For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, arbitrator, arbitration panel, or other arbiter of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.

ARTICLE 18 – MISCELLANEOUS

SC-18.09 Tribal Sovereignty

SC 18.09 Add the following new paragraph after Paragraph 18.08:

Tribal Sovereignty. No provision of this Agreement will be construed by any of the signatories as abridging or debilitating any sovereign powers of the {insert name of Tribe} Tribe; affecting the trust-beneficiary relationship between the Secretary of the Interior, Tribe, and Indian landowner(s); or interfering with the government-to-government relationship between the United States and the Tribe.

ARTICLE 19 – FEDERAL REQUIREMENTS

SC-19.01 Agency Not a Party

SC 19.01 Add the following language as Paragraph 19.01 with the title "Agency Not a Party":

A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

SC-19.02 Contract Approval

SC 19.02 Add the following sections after Article 19.01 with the title "Contract Approval":

A. Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the following "Certificate of Owner's Attorney" (Attachment GC-A) before Owner submits the executed Contract Documents to Agency for approval.

B. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

SC-19.03 Conflict of Interest

SC 19.03 Add the following language after Article 19.02.B with the title "Conflict of Interest":

A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

SC-19.04 Gratuities

SC 19.04 Add the following language after Article 19.03.A with the title "Gratuities":

A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

B. In the event this Contract is terminated as provided in paragraph 19.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

SC-19.05 Audit and Access to Records

SC 19.05 Add the following language after Article 19.04.B with the title "Audit and Access to Records":

A. Owner, Agency, the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor which are pertinent to the Agreement, for the purpose of making audits, examinations, excerpts, and transcriptions. Engineer shall maintain all required records for three years after final payment is made and all other pending matters are closed.

SC-19.06 Small, Minority and Women's Businesses

SC 19.06 Add the following language after Article 19.05.A with the title "Small, Minority and Women's Businesses":

A. If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of: (1) including qualified small, minority and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority, and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms.

SC-19.07 Anti-Kickback

SC 19.07 Add the following after Article 19.06.A with the title "Anti-Kickback":

A. Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

SC-19.08 Clean Air and Pollution Control Acts

SC 19.08 Add the following after Article 19.07.A with the title "Clean Air and Pollution Control Acts":

A. If this Contract exceeds $100,000, compliance with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h) and 42 USC 7401et. seq.), section 508 of the Clean Water Act (33 U.S.C. 1368) and Federal Water Pollution Control Act (33 USC 1251 et seq.), Executive Order 11738, and Environmental Protection Agency regulations is required. Contractor will report violations to the Agency and the Regional Office of the EPA.

SC-19.09 State Energy Policy

SC 19.09 Add the following after Article 19.08 with the title "State Energy Policy":

A. Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

SC-19.10 Equal Opportunity Requirements

SC 19.10 Add the following after Article 19.09 with the title "Equal Opportunity Requirements":

A. If this Contract exceeds $10,000, Contractor shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

B. Contractor's compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the Contract, and in each trade, and Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting Contractor's goals shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR part 60-4. Compliance with the goals will be measured against the total work hours performed.

C. Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

SC-19.11 Restrictions on Lobbying

SC 19.11 Add the following after Article 19.10.C with the title "Restrictions on Lobbying":

A. Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontracts that exceed $100,000 at any tier under a Federal loan that exceeds $150,000 or a Federal grant that exceeds $100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of

any agency, a member of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Certifications and disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

SC-19.12 Environmental Requirements

SC 19.12 Add the following after Article 19.11.A with the title "Environmental Requirements":

When constructing a Project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental conditions:

A. Wetlands–When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.

B. Floodplains–When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100-year floodplain areas (Standard Flood Hazard Area) delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, e.g., alluvial soils on NRCS Soil Survey Maps.

C. Historic Preservation–Any excavation by Contractor that uncovers an historical or archaeological artifact or human remains shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO).

D. Endangered Species–Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

E. Mitigation Measures–The following environmental mitigation measures are required on this Project:

1. If cultural materials or human remains are encountered during construction, work must cease in the immediate area; work can continue in the project area where no cultural materials are present. In the discovery area, work must cease, and the contractor must notify the consultant engineer, City of El Paso and both the State Historic Preservation Officer at (512) 463-5867 and the USDA Rural Development State Environmental Coordinator at (254) 742-9700.

2. To avoid potential harm to the State listed endangered species list; the Project Engineer and Owner will implement the following measures:

    a. Prior to the start and throughout construction where feasible, a monitor authorized by the Texas Parks and Wildlife Department (TPWD) to capture and relocate protected species will inspect the project site and provide contractor training to identify and avoid disturbance to protected species.

    b. All pipeline trenches should be covered by the end of each day when feasible, or if not, inspected prior to the intitiation of daily construction. Contractors should be made aware of the potential presence of horned lizards and instructed to notify an individual authorized by the Texas Parks and Wildlife Department to relocate any individual species out of the path of construction.

    c. All construction areas should be stabilized by overseeding with native grasses suitable to the local area, such as Bouteloua spp.(Gramma grass), Buchloe dactyloides (Buffalo grass), Muhlenbergia spp. (Muhly grass, Schizachyrium scoparioum (Little bluestem) and similar species.

    d. Prior to the start of construction, an on-ground survey for nesting migratory birds should be conducted. In the event that nesting species are present, construction should be avoided during nesting season (March-August).

CERTIFICATE OF OWNER'S ATTORNEY

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

I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements 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:_____

AGENCY CONCURRENCE

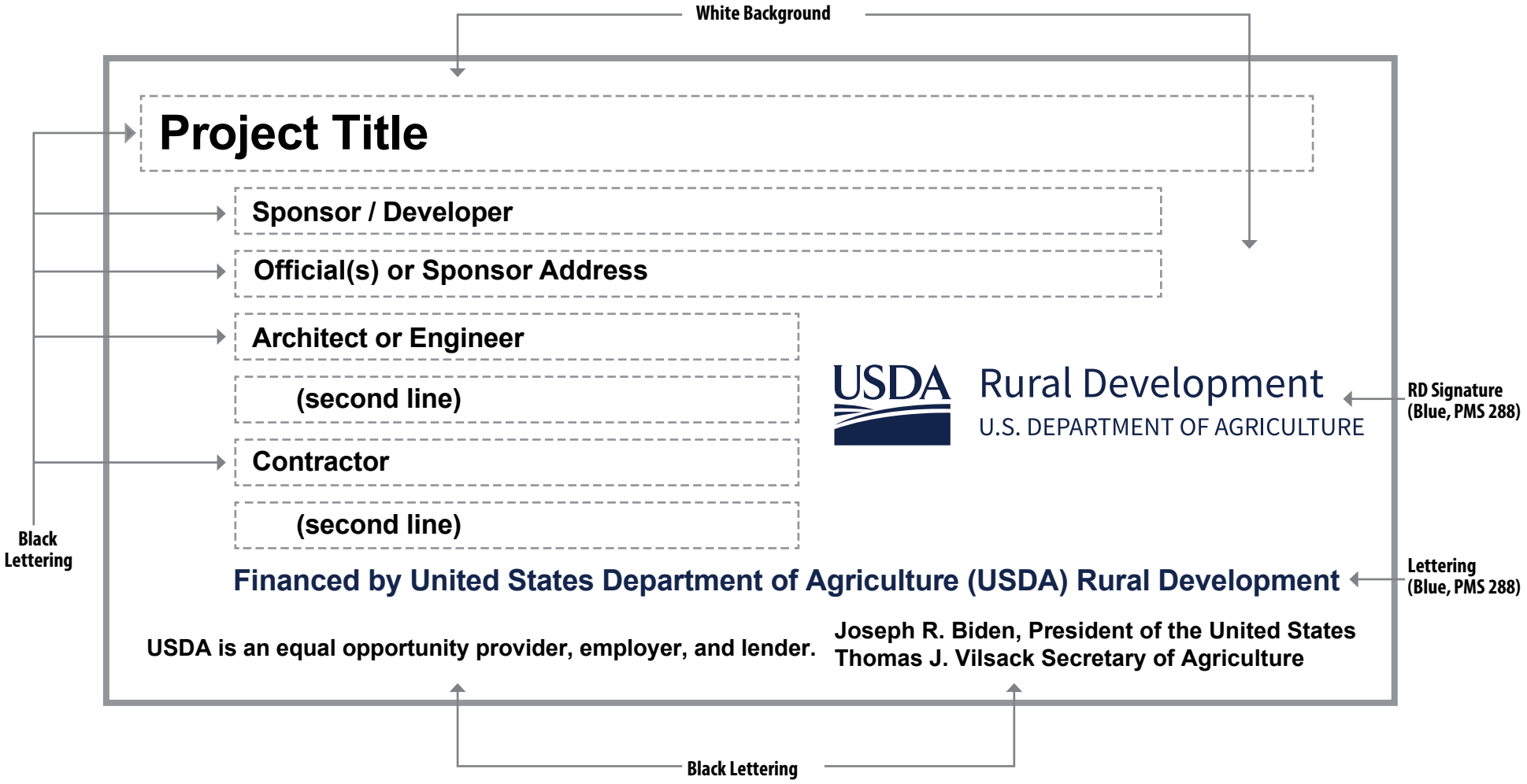
As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

By:_____ Date:_____

Print Name:_____

TEMPORARY CONSTRUCTION SIGN FOR RURAL DEVELOPMENT PROJECTS

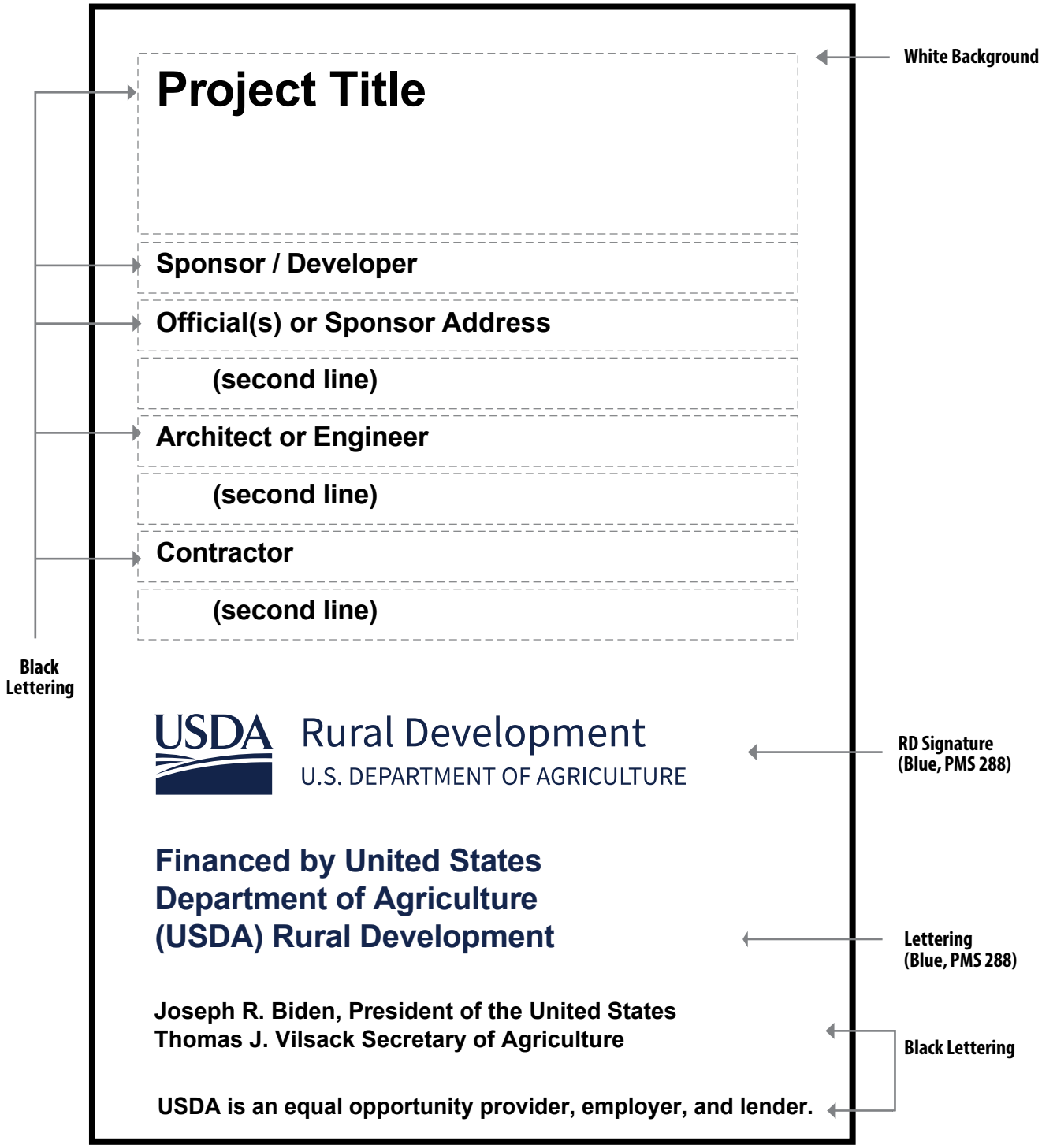
Recommended Fonts: Helvetica or Arial



SIGN DIMENSIONS : 1200 mm x 2400 mm x 19 mm (approx. 4′ x 8′ x ¾″)
PLYWOOD PANEL (APA RATED A-B GRADE–EXTERIOR)

TEMPORARY CONSTRUCTION SIGN FOR RURAL DEVELOPMENT PROJECTS

Recommended Fonts: Helvetica or Arial



SIGN DIMENSIONS : 1200 mm x 1800 mm x 19 mm (approx. 4′ x 6′ x ¾″)
PLYWOOD PANEL (APA RATED A-B GRADE–EXTERIOR)

It is required to place a sign at construction sites supported under this award displaying the EPA logo in a manner that informs the public that the project is funded in part or wholly by the EPA. The sign must be placed in a visible location that can be directly linked to the work taking place and must be maintained in good condition throughout the construction period. Here is the EPA a link to the guidance: https://www.epa.gov/sites/production/files/2015-01/documents/signage_required_tc.pdf

Cultural Materials Encountered During Construction:

If cultural materials are encountered during construction, work will cease in the immediate area of the discovery. Work may continue in those project locations outside of the discovery area, with written approval from USDA Rural Development. In the event of discovery, the contractor must immediately notify the Owner, Project Engineer, the Texas Historical Commission (512) 463-6100, and the USDA Rural Development State Environmental Coordinator (254) 742-9755.

UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Utilities Service
RUS BULLETIN 1780-35

SUBJECT: Guidance for the Implementation of American Iron and Steel (AIS) Requirements with Rural Utilities Service (RUS) Financial Assistance

TO: Rural Development (RD) state directors, RUS program directors, and state engineers.

EFFECTIVE DATE: Date of approval.

OFFICE OF PRIMARY INTEREST: Engineering and Environmental Staff (EES), Water and Environmental Programs (WEP).

INSTRUCTIONS: This is a new Bulletin and does not replace any existing RUS Bulletin.

AVAILABILITY: This Bulletin, as well as any RD or RUS instructions, regulations, or forms referenced in this Bulletin are available at any RD State Office. The State Office staff is familiar with the use of the documents in their States and can answer specific questions on RD requirements.

This Bulletin is available on the RUS website at https://www.rd.usda.gov/publications/regulations-guidelines/bulletins/water-and-environmental.

PURPOSE: This Bulletin assists RD staff in providing information and guidance to applicants, professional consultants, general contractors, and manufacturers regarding the AIS Requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. The intended outcome of this Bulletin is to instruct and inform RD State Office staff and others on how to implement these requirements to ensure compliance with the AIS requirements.

MODIFICATIONS: RD State Offices may modify this guidance when appropriate to comply with state statutes and regulations in accordance with the procedures outlined at RD Instruction 2006-B (2006.55).

for SCOTT BARRINGER
Acting Assistant Administrator
Water and Environmental Programs

August 30, 2017
Date

TABLE OF CONTENTS

Exhibits:

ABBREVIATIONS

AIS – American Iron and Steel
ANTHC – Alaska Native Tribal Health Consortium
AWWA – American Water Works Association
CFR – Code of Federal Regulations
EO – Executive Order
NIST – National Institute of Standards and Technology
NSF – National Sanitation Foundation
OGC – Office of General Counsel
PL – Public Law
PER – Preliminary Engineering Report
RAVG – Rural Alaska Village Grant
RD – Rural Development
RUS – Rural Utilities Service
USC – United States Code
USDA – United States Department of Agriculture
WEP – Water and Environmental Programs
WWD – Water and Waste Disposal

DEFINITIONS

"Assistance recipient" is the entity that receives funding assistance from programs required to comply with Section 746 Division A Title VII of the Consolidated Appropriations Act of 2017 (Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. This term includes owner and/or applicant.

"Certifications" means the following:

- *Manufacturers'* certification is documentation provided by the manufacturer or fabricator to various entities stating that the iron and steel products to be used in the project are produced in the United States in accordance with American Iron and Steel (AIS) Requirements. If items are purchased via a supplier, distributor, vendor, etc. vs. from the manufacturer or fabricator directly, then the supplier, distributor, vendor, etc. will be responsible for obtaining and providing these certification letters to the parties purchasing the products.
- *Engineers*' certification is documentation that plans, specifications, and bidding documents comply with AIS.
- *Contractors'* certification is documentation submitted upon substantial completion of the project that all iron and steel products installed were produced in the United States.

"Coating" means a covering that is applied to the surface of an object. If a coating is applied to the external surface of a domestic iron or steel component, and the application takes place outside of the United States, said product would be considered a compliant product under the AIS requirements. Any coating processes that are applied to the external surface of iron and steel components that would otherwise be AIS compliant would not disqualify the product from meeting the AIS requirements regardless of where the coating processes occur, provided that final assembly of the product occurs in the United States. This exemption only applies to coatings on the *external surface* of iron and steel components. It does not apply to coatings or linings on internal surfaces of iron and steel products, such as the lining of lined pipes. All manufacturing processes for lined pipes, including the application of pipe lining, must occur in the United States for the product to be compliant with AIS requirements.

"Construction materials" are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel". See Exhibit F for examples.
Note: Mechanical and electrical components, equipment and systems are not considered construction materials. See definition of mechanical and electrical equipment.

"Consulting engineer" is an individual or entity with which the owner has contracted to perform engineering/architectural services for water and waste projects funded by the programs subject to AIS requirements).

"De minimis incidental components" are various miscellaneous low-cost components that are essential for, but incidental to, the construction and are incorporated into the physical structure of

the project. Examples of incidental components could include small washers, screws, fasteners (such as "off the shelf" nuts and bolts), miscellaneous wire, corner bead, ancillary tube, signage, trash bins, door hardware etc.
Costs for such de minimis incidental components cumulatively may comprise no more than a total of five percent of the total cost of the materials used in and incorporated into a project; the cost of an individual item may not exceed one percent of the total cost of the materials used in and incorporated into a project.

"General contractor" is the individual or entity with which the applicant has contracted (*or is expected to*) to perform construction services (or for water and waste projects funded by the programs subject to AIS requirements). This includes bidders, contractors that have received an award from the applicant and any party having a direct contractual relationship with the owner/applicant. A general contractor is often referred to as the prime contractor.

"Iron and steel products" are defined as the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. Only items on the above list made primarily of iron or steel, permanently incorporated into the project must be produced in the United States. For example trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

"Manufacturers" meaning a supplier, fabricator, distributor, materialman, or vendor is an entity with which the applicant, general contractor or with any subcontractor has contracted to furnish materials or equipment to be incorporated in the project by the applicant, contractor or a subcontractor.

"Manufacturing processes" are processes such as melting, refining, forming, rolling, drawing, finishing, and fabricating. Further, if a domestic iron and steel product is taken out of the United States for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-U.S. sources.

"Mechanical equipment" is typically that which has motorized parts and/or is powered by a motor. "Electrical equipment" is typically any machine powered by electricity and includes components that are part of the electrical distribution system. AIS does apply to mechanical equipment.

"Minor components" are components *within* an iron and/or steel product otherwise compliant with the American Iron and Steel requirements. This is different from the de minimis definition where de minimis pertains to the entire project and the minor component definition pertains to a single product. This waiver, would allow non-domestically produced miscellaneous minor

components comprising up to five percent of the total material cost of an otherwise domestically produced iron and steel product to be used. However, unless a separate waiver for a product has been approved, all other iron and steel components in said product must still meet the AIS requirements. This waiver does not exempt the whole product from the AIS requirements only minor components within said product and the iron or steel components of the product must be produced domestically. Valves and hydrants are also subject to the cost ceiling requirements described here. Examples of minor components could include items such pins and springs in valves/hydrants, bands/straps in couplings, and other low cost items such as small fasteners etc.

"Municipal castings" are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and solid waste infrastructure. See Exhibit E for examples.

"National Office" refers to the office responsible for the oversight and administration of the program nationally. The National Office sets policy, develops program regulations, and provides training and technical assistance to help the state offices administer the program. The National Office is located in Washington, D.C.

"Owner" is the individual or entity with which the general contractor has contracted regarding the work, and which has agreed to pay the general contractor for the performance of the work, pursuant to the terms of the contract for water and waste projects funded by the programs subject to AIS requirements. For the purpose of this Bulletin, this term is synonymous with the term "applicant" as defined in 7 CFR 1780.7 (a) (1), (2) and (3) and is an entity receiving financial assistance from the programs subject to the AIS requirements.

"Pass through Entities" is an entity that provides a subaward to a loan and/or grant recipient to carry out part of a Federal program. Examples are grantees utilizing the Revolving Loan Program and Household Water Well Program and Alaska Native Tribal Health Consortium (ANTHC) or the State of Alaska from the RAVG Program.

"Primarily iron or steel" is defined as a product made of greater than 50 percent iron or steel, measured by cost. The cost should be based on the material costs. An exception to this definition is reinforced precast concrete (see Definitions). All technical specifications and applicable industry standards (e.g. NIST, NSF, AWWA) must be met. If a product is determined to be less than 50 percent iron and steel, the AIS requirements do not apply.

For example, the cost of a fire hydrant includes:
(1) The cost of materials used for the iron portion of a fire hydrant (e.g. bonnet, body and shoe); and
(2) The cost to pour and cast to create those components (e.g. labor and energy).

Not included in the cost are:
(1) The additional material costs for the non-iron and steel internal workings of the hydrant (e.g. stem, coupling, valve, seals, etc.); and
(2) The cost to assemble the internal workings into the hydrant body.

“Produced in the United States” means that the production in the United States of the iron or steel products used in the project requires that all manufacturing processes must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives.

“Project” is the total undertaking to be accomplished for the applicant by consulting engineers, general contractors, and others, including the planning, study, design, construction, testing, commissioning, and start-up, and of which the work to be performed under the contract is a part. A project includes all activity that an applicant is undertaking to be financed in whole or part by programs subject to AIS requirements. The intentional splitting of projects into separate and smaller contracts or obligations to avoid AIS requirements is prohibited.

“Reinforced Precast Concrete” may not consist of at least 50 percent iron or steel, but the reinforcing bar and wire must be produced in the United States and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the United States. The cement and other raw materials used in concrete production are not required to be of domestic origin. If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the United States.

“Steel” means an alloy that includes at least 50 percent iron, between 0.02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel, and other specialty steels.

“Structural steel” is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees, and zees. Other shapes include but are not limited to, H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

“Ultimate recipient” is a loan or grant recipient receiving funds from a pass-through entity. Examples include: (1) a loan recipient from the Revolving Loan Fund; (2) a loan recipient from the Household Water Well Program; and (3) a grant recipient from ANTHC or the State of Alaska from the RAVG Program.

“United States” means each of the several states, the District of Columbia, and each Federally Recognized Indian Tribe.

1 BACKGROUND

a Section 746 Division A Title VII of the Consolidated Appropriations Act of 2017 (Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference, applies a new American Iron and Steel (AIS) requirement to the following programs:

(1) Water and Waste Disposal Loan and Grant program;

(2) Guaranteed Loan Funds;

(3) Revolving Loan Funds;

(4) Emergency Community Water Assistance Grants;

(5) Section 306C Colonias and Tribal Set-Aside Grants;

(6) Rural Alaskan Native Village Grants;

(7) Household Water Well System Grants; and

(8) Rural Economic Area Partnership Zone projects.

b The basic concept of this new requirement is that all iron and steel products used in projects funded by RUS WEP must be produced in the United States. Iron and steel products are specifically defined and does not include every item consisting of any quantity of iron and/or steel.

c Statutory Language: SEC. 746 Division A Title VII the Consolidated Appropriations Act of 2017.
(a)(1) No Federal funds made available for this fiscal year for the rural water, waste water, waste disposal, and solid waste management programs authorized by sections 306, 306A, 306C, 306D, 306E, and 310B of the Consolidated Farm and Rural Development Act (7 U.S.C. 1926 et seq.) shall be used for a project for the construction, alteration, maintenance, or repair of a public water or wastewater system unless all of the iron and steel products used in the project are produced in the United States.
(2) In this section, the term “iron and steel products” means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) Subsection (a) shall not apply in any case or category of cases in which the Secretary of Agriculture (in this section referred to as the "Secretary") or the designee of the Secretary finds that—
(1) applying subsection (a) would be inconsistent with the public interest;
(2) iron and steel products are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality; or
(3) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the Secretary or the designee receives a request for a waiver under this section, the Secretary or the designee shall make available to the public on an informal basis a copy of the request and information available to the Secretary or the designee concerning the request, and shall allow for informal public input on the request for at least 15 days prior to making a finding based on the request. The Secretary or the designee shall make the request and accompanying information available by electronic means, including on the official public Internet Web site of the Department.

(d) This section shall be applied in a manner consistent with United States obligations under international agreements.

(e) The Secretary may retain up to 0.25 percent of the funds appropriated in this Act for "Rural Utilities Service—Rural Water and Waste Disposal Program Account" for carrying out the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

(f) Subsection (a) shall not apply with respect to a project for which the engineering plans and specifications include use of iron and steel products otherwise prohibited by such subsection if the plans and specifications have received required approvals from State agencies prior to the date of enactment of this Act.

(g) For purposes of this section, the terms "United States" and "State" shall include each of the several States, the District of Columbia, and each federally recognized Indian tribe.

d American Iron and Steel (AIS) refers to requirements mandated by Section 746 Division A Title VII of the Consolidated Appropriations Act of 2017 (Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.

e The statute refers to Section 746 Division A Title VII of the Consolidated Appropriations Act of 2017 (Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.

2 APPLICABILITY

a The requirements of AIS apply only to projects that construct, alter, enlarge, extend, maintain, repair or otherwise improve rural water, sanitary sewage, solid waste disposal, and storm wastewater disposal facilities.

b The requirements apply to projects using funds from programs listed in Section 1 a of this Bulletin. Any amount of funding from these programs requires compliance with the AIS requirements. Use of funds from these programs is not allowed unless the requirements for AIS are met for the entire project. Projects that leverage funds from other funding sources are also subject the requirements.

c The requirements apply in the United States as defined in Section 746 (g) of the statute and therefore do not apply to projects located in Puerto Rico, the Virgin Islands, or the Western Pacific Territories.

d The requirements apply to any used AIS products to be constructed in the project.

e The requirements do not apply to projects for which any funds were obligated on or before May 5, 2017. The requirements therefore do not apply to subsequent obligations of funds for projects which had an initial obligation of funds on or before May 5, 2017.

f The requirements do not apply to contracts which were executed prior to or on May 5, 2017, regardless of the date of obligation.

g The requirements do not apply to projects for which contracts were executed and/or construction is already underway and/or completed prior to applying to USDA funding.

h The requirements do not apply to products primarily composed of iron and/or steel (composed of more than 50 percent) if they are not listed in the statute.

i The requirements do not apply to raw materials used in the production of iron or steel such as iron ore, limestone, scrap iron and scrap steel.

j The requirements do not apply to any items that are at the construction site temporarily, such as scaffolding, trench boxes, or equipment temporarily used or stored on site.

k The requirements do not apply when the sole purpose of the loan and/or grant is to fund non-construction activities such as capacity/connection fees or the acquisition of a system.

l The requirements supersede any regulation on full and open competition stated in 7 CFR 1780.70 (b) and 2 CFR Part 200.319. For example, if an iron and steel product that is compliant with AIS is made by only one manufacturer provided documentation is submitted and verified, sole source procurement of said product may be used.

m The requirements only apply to the final product as delivered to the work site and incorporated into the project. The need for compliance of an item with AIS depends on whether or not the final assembled product is listed. Components of a final product even if they are listed, do not need to comply with the AIS requirements. In the case of an assembled product where the primary component is not listed in the 2017 Consolidated Appropriations Act and includes components/appurtenances that are specifically listed, said assembled product is not subject to AIS (e.g. pump assembly).

3 IMPLEMENTATION (Agency, Owner, Engineer, General Contractor, Manufacturers et. al., Pass through Entities, Ultimate Recipients)

a There are several parties involved in compliance with the AIS requirements and some requirements are specific to a party.

b The parties that have one or more responsibilities under AIS include: the Agency, funding recipients under the Water and Waste Disposal Loan and Grant program and Guaranteed Loan Program, consulting engineers, construction contractors, suppliers, distributors, manufacturers, lenders under the Guaranteed Loan Program; grantees under the revolving loan program, Household Water Well program, and grantees under the 306C, ECWAG programs, and RAVG programs, as well as loan recipients under the Revolving Loan and Household Water Well program.

c For exceptions please see Section 2.

4 RESPONSIBILITIES UNDER THE WATER & WASTE DISPOSAL (WWD) LOAN & GRANT PROGRAM: *AGENCY RESPONSIBILITIES*

a State Director:

(1) ***Approve*** and set aside a sufficient budget for travel so that Area Specialists and State Engineers can perform their responsibilities under this section.

b Community Programs Director:

(1) ***Ensure*** that all Grant Agreements, Letters of Conditions, Loan Resolutions and Conditional Commitments for Guarantees, include appropriate language prior to obligation of funds (see Section 17).

(2) ***Budget*** for travel so that State Engineers (as applicable) can perform their responsibilities under this section.

c State Engineer:

(1) ***Ensure*** that the cost estimates in the PER reflect AIS requirements.

(2) ***Ensure*** that agreements for engineering services include AIS language (see Section 16).

(3) ***Ensure*** that plans, specifications and bidding documents include required language (see Section 16).

(4) ***Obtain*** engineer's certification letter where the consulting engineer certifies that plans, specifications, and bidding documents comply with AIS and commits that bid addenda, executed contracts and change orders will comply with AIS (see Exhibit B).

(5) Monitoring: For each project, ***perform*** a site visit during active construction and complete the AIS checklist (see Exhibit J). Provide an electronic copy to National Office upon final payment.

(6) Change orders and partial payment estimates: ***Verify*** the consulting engineer, general contractor and owner have signed C-941 and C-620 of EJCDC and manufacturers' certifications letters (as applicable) (see Exhibit D) are included with the submittal.

(7) Substantial completion of project: ***Obtain*** a copy of the contractor's certification letter (see Exhibit C). ***Obtain*** a list of manufacturers from the consulting engineer for AIS products used in the project (including manufacturer name and location, product(s)) and provide an electronic copy to the National Office Engineer(s).

(8) *Special cases:*

(a) Where owner provides their own engineering and/or construction services, ***obtain*** copies of engineers', contractors' (prepared by the owner), and manufacturers' certification letters (as applicable) for the Agency to insert into the Agency file.

(b) Where owner directly procures AIS products, ***obtain*** copies of manufacturers' certification letters for the Agency to insert into the Agency file.

d Area Office Specialist:

(1) Pre-construction Conference: ***Read*** a statement outlining the AIS requirements (see Exhibit A) during the conference.

(2) Guaranteed Program: ***Ensure*** that conditional commitments include AIS language (i.e. Section 17 a)

(3) Partial payment estimates: ***Verify*** that the consulting engineer, general contractor and owner have signed C-620 of EJCDC.

5 OWNER RESPONSIBILITIES

a Owners are ultimately responsible for compliance with AIS requirements.

(1) ***Sign*** loan resolutions, grant agreements and letters of intent to meet conditions which include AIS language, accepting AIS requirements in those documents and in the letter of conditions.

(2) ***Sign*** agreements for engineering services, executed construction contracts and all other appropriate and necessary documents which include AIS language.

(3) ***Acknowledge*** responsibility for compliance with AIS requirements by signing change orders (i.e. C-941 of EJCDC) and partial payment estimates (i.e. C-620 of EJCDC).

(4) Substantial completion of project: ***Obtain*** the certification letters from the consulting engineer and ***maintain*** this documentation for the life of the loan.

(5) *Special Cases*

(a) Where the owner provides their own engineering and/or construction services, ***provide*** copies of engineers' (see Exhibit B), contractors' (see Exhibit C), and manufacturers' certification letters (see Exhibit D) (*as applicable*) to the Agency. All certification letters must be kept in the engineer's project file and on site during construction. For Owner Construction (Force Account), all AIS clauses from Section 16 must be included in the Agreement for Engineering Services.

(b) Where the owner directly procures AIS products, the owner must:

(i) ***Include*** clauses from Section 17 a not including 17 a (1) in the procurement contracts.

(ii) ***Obtain*** manufacturers' certification letters and provide copies to consulting engineers and contractors.

6 CONSULTING ENGINEER RESPONSIBILITIES

(1) ***Include*** costs of compliance with AIS in engineering fees (if appropriate) and in engineer's opinions of probable cost and associated revisions.

(2) Agreements for engineering services: ***Include*** AIS language (see Section 16).

(3) Plans, specifications, bidding documents and bid addenda: ***Include*** required AIS language (see Section 16). For any AIS products specified by brand names, ***obtain*** a manufacturer's certification letter (see Exhibit D) from the manufacturer to verify the products comply with AIS.

(4) ***Certify*** that plans, specifications, and bidding documents comply with AIS and ***commit*** that bid addenda, executed contracts and change orders will comply with AIS and ***submit*** a letter to the Agency prior to authorization to advertise for bids (see Exhibit B).

(5) Award: ***Provide*** copies of manufacturers' certification letters to the general contractor on any specified brand name AIS products in the plans, specifications and bidding documents including any bid addenda.

(6) Shop drawing submittal: ***Review*** shop drawings and change orders to ensure compliance with AIS. For shops drawings under consideration for any brand name, equal and/or substitute, and any iron and steel products subject to AIS, ***obtain*** a manufacturers' certification letter (see Exhibit D) from the general contractor to verify the products comply with AIS.

(7) ***Keep*** all certification letters (including those from the engineer, contractor and any manufacturer providing AIS products) in the engineer's project file.

(8) Change Order: For any change order under consideration for any AIS products, ***obtain*** a manufacturer's certification letter (see Exhibit D) from parties submitting the change proposal to ensure compliance with AIS.

(9) ***Acknowledge*** responsibility for compliance with AIS requirements by signing change orders (i.e. C-941 of EJCDC) and partial payment estimates (i.e. C-620 of EJCDC).

(10) Substantial completion of project: ***Obtain*** the contractors' certification letter (see Exhibit C) and copies of manufacturers' certification letters for all AIS products used in the project. ***Provide*** copies of engineer's, contractors', and manufacturers' certification letters to the owner and copy of contractor's certification letter to the Agency. ***Provide*** a list of manufacturers to the RD State Engineer for AIS products used in the project (including manufacturer name and location, product(s)).

7 CONSTRUCTION CONTRACTOR RESPONSIBILITIES

a Construction contractors must use and install iron and steel products that are compliant with AIS as part of the permanent work.

(1) Bid submittal: for proposed equals and substitutes, ***provide*** manufacturers' certification letter (see Exhibit D) to verify the products comply with AIS.

(2) Award: ***Obtain*** copies of manufacturers' certification letters (see Exhibit D) from the consulting engineer for brand name products specified by the consulting engineer.

(3) Shop drawing submittal: For proposed equals, substitutes and any iron and steel product subject to AIS, ***provide*** manufacturers' certification letters (see Exhibit D) to verify the products comply with AIS.

(4) Prior to construction: ***Ensure*** that copies of manufacturers' certification letters including those from others (e.g. consulting engineer, owner, etc.) for any AIS products to be used in the project is in the project file on site prior to installation.

(5) Change Order: For any AIS products proposed in a change proposal, ***provide*** manufacturers' certification letter (see Exhibit D) to the consulting engineer to verify the products comply with AIS.

(6) ***Acknowledge*** responsibility for compliance with AIS requirements by signing change orders (i.e. C-941 of EJCDC) and partial payment estimates (i.e. C-620 of EJCDC).

(7) ***Keep*** all manufacturer certification letters (including those from the engineer, general contractor and any manufacturer providing AIS products) on site during construction in the construction project file.
(8) Substantial completion of the project: ***Provide*** the general contractor's certification (see Exhibit C) letter to the engineer that all iron and steel products installed comply with AIS. This certification is to be submitted upon substantial completion of the project to the project engineer.

8 MANUFACTURER, SUPPLIER, DISTRIBUTOR RESPONSIBILITIES

(1) If iron and steel products are produced in the United States as defined in this Bulletin, ***prepare*** (*applicable to manufacturers and fabricators) or* ***obtain*** (*applicable to suppliers, distributors, vendors, etc.)* manufacturers' certification letters (see Exhibit D) and make available upon request to consulting engineers, general contractors, etc.

9 PASS THROUGH ENTITIES (e.g. Grantees utilizing the Revolving Loan Program and Household Water Well Program)

(1) ***Sign*** Grant Agreements which include AIS language (See Section 17).
(2) ***Include*** AIS language in loan agreement their borrowers (See Section 17 a).
(3) ***Monitor*** for compliance.
(4) ***Perform*** corrective actions to ensure compliance where needed.

10 ULTIMATE RECIPIENT (e.g. Loan Recipients under Revolving Loan Program, Homeowners under the Household Water Well Program)

a Loan recipients are ultimately responsible for compliance with AIS requirements.
(1) ***Sign*** loan agreements which include AIS language (see Section 17 a).
(2) ***Include*** required AIS language (see Section 17 a) in any agreements for engineering services and contracts for construction services and procurement of AIS products.
(3) ***Obtain*** manufacturers' certification letters for AIS products and include a copy in project files.

b Homeowners are ultimately responsible for compliance with AIS requirements.
(1) ***Sign*** a loan agreement accepting responsibility to ensure AIS products used to construct, refurbish, or service individually-owned household water well systems are produced in the United States.
(2) ***Obtain*** manufacturers' certification letters (see Exhibit D) from contracted service providers (e.g. well driller) and maintain a copy on-site for the duration of the loan.

11 RESPONSIBILITIES UNDER THE GUARANTEED LOAN PROGRAM

AIS applies to projects funded by Section 306A – Guaranteed Loan Program.

a Lenders are responsible to ensure that ultimate recipients comply with AIS requirements.

b Loan recipients are ultimately responsible for compliance with AIS requirements.

c Project specialists will ensure that conditional commitments include AIS language (i.e. Section 17 a)

12 ECWAG

AIS applies to projects funded by ECWAG.

a If construction contracts were awarded and/or executed or construction began prior to application, these projects are not subject to AIS (see Section 2).

b If construction contracts were awarded and/or executed or construction began during the application process, these projects are subject to AIS.

13 SECTION 306C COLONIAS AND TRIBAL SET-ASIDE GRANTS

AIS applies to projects funded by Section 306 C including Colonias and Tribes.

14 RURAL ALASKAN NATIVE VILLAGE GRANTS

AIS applies to projects funded by Section 306 D – the Rural Alaskan Native Village Grant Program.

a *Special* Cases:

(1) If a project is administered by Alaska RD State Office, please ***follow*** this Bulletin.

(2) If the project is administered by the State of Alaska or ANTHC:

(a) ***Sign*** grant agreements and letters of intent to meet conditions which include AIS language (See Section 17), accepting AIS requirements in those documents and in the letter of conditions.

(b) ***Include*** AIS language in grant agreement their grantees (See Section 17 a).

(c) ***Monitor*** for compliance.

(d) ***Perform*** corrective actions to ensure compliance where needed.

15 RURAL ECONOMIC AREA PARTNERSHIP ZONE (REAP)

AIS applies to projects funded by Section 310 B – REAP.

16 CONTRACT PROVISIONS

To ensure compliance with the AIS requirements specific AIS contract language must be included in each contract including agreements for engineering services, construction contract documents and purchase agreements prepared by the owner.

a Agreement Between Owner and Engineer for Professional Services (EJCDC E-500, 2014)

(1) (E-500, Article 5.01.A)
Add *the following to 5.01.A*: "Opinions of Probable Cost and any revisions thereof should reflect compliance with American Iron & Steel requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference."

(2) (E-500, Article 5.03.B)
Add *paragraph 5.03.B*: "Opinions of Total Project Costs and any revisions thereof should reflect compliance with American Iron & Steel requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference."

(3) (E-500, Exhibit A.1.03.A.13):
Add *paragraph A.1.03.A.13*: "Services required to determine and certify that to the best of the Engineer's knowledge and belief all iron and steel products referenced in engineering analysis, the Plans, Specifications, Bidding Documents, and associated Bid Addenda requiring design revisions are either produced in the United States or are the subject of an approved waiver; and services required to determine to the best of the engineer's knowledge and belief that approved substitutes, equals, and all iron and steel products proposed in the shop drawings, Change Orders and Partial Payment Estimates are either produced in the United States or are the subject of an approved waiver under Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. The deminimis and minor components waiver *{add project specific waivers as applicable}* apply to this contract."

(4) (E-500, Exhibit A.1.04.A.10)
Add *paragraph A.1.04.A.10*: "Provide copies of Manufacturers' Certification letters to the Bidders on any brand name iron and steel products along with the Plans, Specifications and Bidding Documents. Manufacturers' Certification Letters are to be included in the Bidding

Documents and must be kept in the engineer's project file and on site during construction."

(5) (E-500, Exhibit A.1.04.11)
Add *paragraph A.1.04.A.11*: "Provide copies of Manufacturers' Certification letters to the Contractor on any brand name iron and steel products along with the Plans, Specifications, Bidding Documents including any Bid Addenda and Change Orders. Manufacturers' Certification Letters must be kept in the engineer's project file and on site during construction."

(6) (E-500, Exhibit A.1.05.A.17)
Modify *A.1.05.A.17 by adding the following prior to the first sentence*: "Review and approve or take other appropriate action with respect to Shop Drawings, Samples, and other required Contractor submittals to ensure compliance with American and Iron Steel requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. Any iron and steel products included in any submittal by the General Contractor, must include a Manufacturers' Certification letter to verify the products were produced in the United States. Copies of Manufacturers' Certification letters must be kept in the engineer's project file and on site during construction."

(7) (E-500, Exhibit A.1.05.A.18)
Add *the following to A.1.05.A.18 to the end of the paragraph as amended by RUS Bulletin 1780-26*: "Prior to approval of any substitute "or equal" obtain a Manufacturers' Certification letter to verify the products were produced in the United States. Manufacturers' Certification letters must be kept in the engineer's project file and on site during construction to ensure compliance with American and Iron Steel requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference, if applicable."

(8) (E-500, Exhibit A.1.05.A.19)
Add *subparagraph A.1.05.A.19.d*: "Receive and review all Manufacturers' Certification Letters for materials required to comply with American and Iron Steel requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference to verify the products were produced in the United States. Manufacturers' Certification letters must be kept in the engineer's project file and on site during construction."

(9) (E-500, Exhibit A.1.05.A.20)
Add *subparagraph (c) to the end of A.1.05.A.20*: "(c) Review Change Proposals to ensure compliance with American and Iron Steel requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference."

(10) (E-500, Exhibit A.1.05.A.25)
Add *item "a" as a deliverable under paragraph A.1.05.A.25*: "(a) Obtain the Contractors' Certification letter and copies of Manufacturers' Certification letters for all American Iron and Steel products used in the project. Upon Substantial Completion, provide copies of Engineer's, Contractors', and Manufacturers' Certification letters to the Owner and a copy of Contractor's Certification letter to the Agency. Provide a list of manufacturers of American Iron and Steel products used in the project and include manufacturer's name and location, and product(s) to the Agency."

(11) (E-500, Exhibit B.2.02)
Add *the following language to B.2.02:* "Owners are ultimately responsible for compliance with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference and will be responsible for the following:

(a) ***Signing*** loan resolutions, grant agreements and letters of intent to meet conditions which include American Iron and Steel language, accepting American Iron and Steel requirements in those documents and in the letter of conditions.

(b) ***Signing*** change orders (i.e. C-941 of EJCDC) and partial payment estimates (i.e. C-620 of EJCDC) and thereby ***acknowledging*** responsibility for compliance with American Iron and Steel requirements.

(c) ***Obtaining*** the certification letters from the consulting engineer upon substantial completion of the project and ***maintaining*** this documentation for the life of the loan.

(d) Where the owner provides their own engineering and/or construction services, ***providing*** copies of engineers', contractors', and manufacturers' certification letters (*as applicable*) to the Agency. All certification letters must be kept in the engineer's project file and on site during construction. For Owner Construction (Force Account), all clauses from Section 17 of RUS Bulletin 1780-35 must be included in the Agreement for Engineering Services.

(e) Where the owner directly procures American Iron and Steel products, ***including*** American Iron and Steel clauses in the procurement

contracts and ***obtaining*** manufacturers' certification letters and ***providing*** copies to consulting engineers and contractors.

(12) (E-500, Exhibit D1.01.C.11.g)
Add *sub paragraph D.1.01.C.11.g:* "(g) Maintain all Manufacturers' Certification letters in the project file and on site during construction to ensure compliance with American and Iron Steel requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference, as applicable."

b Bidding and Construction Contract Documents (EJCDC C-Series, 2013)

(1) Advertisement for Bids (C-111):
Add *at the end of C-111 prior to the Owner's name:* "Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All listed iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. The deminimis and minor components waiver *{add project specific waivers as applicable}* apply to this contract."

(2) Instructions to Bidders (C-200):

(a) (C-200, Article 5.01.C)
Delete the semicolon at the end of 5.01.C and ***insert*** *the following*:
…including but not limited to American Iron and Steel requirements as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference which apply to the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) (C-200, Article 11.01)
Modify *paragraph 11.01, as previously amended by RUS 1780-26, by inserting the following sentence after* "Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions.

Each such request shall include Manufacturer's Certification letter for compliance with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents."

(c) (C-200, Article 24.02)
Add *paragraph to 24.02*: "Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. The deminimis and minor components waiver *{add project specific waivers as applicable}* apply to this contract."

(3) Bid Form (C-410)

(a) (C-410, Article 3.01.C)
Add *language at the end of the sentence of Article 3.01.C*: "…and including all American Iron and Steel requirements."

(b) (C-410, Article 7.01)
Add 7.01.K after 7.01.J (7.01.J added by RUS 1780-26): K. Manufacturers' Certification letter of compliance with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference for all equals or substitutes approved by Addenda for American Iron and Steel products as provided in these Contract Documents.

(4) Supplementary General Conditions (C-800)

(a) (C-800, Article SC 1.01.A.51)
Add *1.01.A.51 after 1.01.A.50 (as amended by RUS 1780-26)*:
"*Manufacturer's Certification letter* is documentation provided by the manufacturer, supplier, distributor, vendor, fabricator, etc. to various entities stating that the American Iron and Steel products to be used in the project are produced in the United States in accordance with American Iron and Steel requirements. Refer to Manufacturer's Certification Letter provided in these Contract Documents."

(b) (C-800, Article SC 1.01.A.52)
Add *1.01.A.52 after 1.01.A.51*: "AIS - refers to requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials."

(c) (C-800, Article SC 7.03)
Add *sentence 7.03.d*: "All iron and steel products must meet American Iron and Steel requirements."

(d) (C-800, Article SC 7.04.B.1)
Add *7.04.B.1*: "Contractor shall include a Manufacturer's Certification letter for compliance with American Iron and Steel requirements in support data, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents. In addition, for the Deminimis Waiver, Contractor shall maintain an itemized list of incidental components and ensure that the cost is less than 5% of total materials cost for project; for the Minor Components Waiver, the Contractor shall maintain a list of products to which the minor components waiver applies and the cost of the non-domestically produced component is less than 5% of total materials cost of that product."

(e) (C-800, Article SC 7.05.A.3.a.4)
Add *7.05.A.3.a.4*: "4) comply with American Iron and Steel by providing Manufacturer's Certification letter of American Iron and Steel compliance, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents."

(f) (C-800, Article SC 7.11.A)
Modify *7.11.A by inserting the following after "written interpretations and clarifications,"*: "Manufacturers' Certification letter is documentation provided by the manufacturer, supplier, distributor, vendor, fabricator, etc. to various entities stating that the iron and steel products to be used in the project are produced in the United States in accordance with American Iron and Steel Requirements. Refer to Manufacturer's Certification Letter provided in these Contract Documents."

(g) (C-800, Article SC 7.16.A.1.e)
Add *7.16.A.1.e*: "e. obtained Manufacturer's Certification letter for any item in the submittal subject to American Iron and Steel requirements and include

the Certificate in the submittal. Refer to Manufacturer's Certification Letter provided in these Contract Documents."

(h) (C-800, Article SC 7.16.D.9)
Add *7.16.D.9*: "Engineer's review and approval of Shop Drawing or Sample shall include review of compliance with American Iron and Steel requirements, as applicable."

(i) (C-800, Article SC 7.17.E)
Add *7.17.E*: "Contractor shall certify upon Substantial Completion that all Work and Materials has complied with American Iron and Steel requirements as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. Contractor shall provide said Certification to Owner. Refer to General Contractor's Certification Letter provided in these Contract Documents."

(j) (C-800, Article SC 10.10.A)
Add *10.10.A American Iron & Steel*: "A. "Services required to determine and certify that to the best of the Engineer's knowledge and belief all iron and steel products referenced in engineering analysis, the Plans, Specifications, Bidding Documents, and associated Bid Addenda requiring design revisions are either produced in the United States or are the subject of an approved waiver and services required to determine to the best of the engineer's knowledge and belief that approved substitutes, equals, and all iron and steel products proposed in the shop drawings, Change Orders and Partial Payment Estimates are either produced in the United States or are the subject of an approved waiver under Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017).

(k) (C-800, Article SC 11.06.A.1)
Modify *11.06.A.1 by inserting the following sentence after "within 15 days after the submittal of the Change Proposal."*: "Include supporting data (name of manufacturer, city and state where the product was manufactured, description of product, signature of authorized manufacturer's representative) in the Manufacturer's Certification Letter, as applicable."

(l) (C-800, Article SC 14.03.G)
Add *14.03.G*: "G. Installation of Materials that are non-compliant with American Iron and Steel requirements shall be considered defective work."

(m) (C-800, Article SC 15.01.B.4)
Add *15.01.B.4*: "4. By submitting Materials for payment, Contractor is certifying that the submitted Materials are compliant with American Iron and Steel requirements. Manufacturer's Certification letter for Materials satisfy this certification. Refer to Manufacturer's Certification Letter provided in these Contract Documents."

(n) (C-800, Article SC 15.01.C.2.d)
Add *15.01.C.2.d*: "d. the Materials presented for payment comply with American Iron and Steel."

(o) (C-800, Article SC 15.03.A)
Modify *15.03.A by adding the following after the last sentence*: "Services required to determine and certify that to the best of the Contractor's knowledge and belief all substitutes, equals, and all iron and steel products proposed in the shop drawings, Change Orders and Partial Payment Estimates, and those installed for the project are either produced in the United States or are the subject of an approved waiver under Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference."

(p) (C-800: Article 19, SC 19.14):
Add "Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. The deminimis and minor components waiver *{add project specific waivers as applicable}* apply to this contract."

(q) (C-800: Article 19, SC 19.15):
Add *SC 19.15 Definitions:*
"Assistance recipient" is the entity that receives funding assistance from programs required to comply with Section 746 Division A Title VII of the Consolidated Appropriations Act of 2017 (Agriculture, Rural Development,

Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. This term includes owner and/or applicant.

"Certifications" means the following:

- *Manufacturers'* certification is documentation provided by the manufacturer or fabricator to various entities stating that the iron and steel products to be used in the project are produced in the United States in accordance with American Iron and Steel (AIS) Requirements. If items are purchased via a supplier, distributor, vendor, etc. vs. from the manufacturer or fabricator directly, then the supplier, distributor, vendor, etc. will be responsible for obtaining and providing these certification letters to the parties purchasing the products.
- *Engineers*' certification is documentation that plans, specifications, and bidding documents comply with AIS.
- *Contractors'* certification is documentation submitted upon substantial completion of the project that all iron and steel products installed were produced in the United States.

"Coating" means a covering that is applied to the surface of an object. If a coating is applied to the external surface of a domestic iron or steel component, and the application takes place outside of the United States, said product would be considered a compliant product under the AIS requirements. Any coating processes that are applied to the external surface of iron and steel components that would otherwise be AIS compliant would not disqualify the product from meeting the AIS requirements regardless of where the coating processes occur, provided that final assembly of the product occurs in the United States. This exemption only applies to coatings on the *external surface* of iron and steel components. It does not apply to coatings or linings on internal surfaces of iron and steel products, such as the lining of lined pipes. All manufacturing processes for lined pipes, including the application of pipe lining, must occur in the United States for the product to be compliant with AIS requirements.

"Construction materials" are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel".
Note: Mechanical and electrical components, equipment and systems are not considered construction materials. See definition of mechanical and electrical equipment.

"Consulting engineer" is an individual or entity with which the owner has contracted to perform engineering/architectural services for water and waste projects funded by the programs subject to AIS requirements).

"De minimis incidental components" are various miscellaneous low-cost components that are essential for, but incidental to, the construction and are incorporated into the physical structure of the project. Examples of incidental components could include small washers, screws, fasteners (such as "off the shelf" nuts and bolts), miscellaneous wire, corner bead, ancillary tube, signage, trash bins, door hardware etc.
Costs for such de minimis incidental components cumulatively may comprise no more than a total of five percent of the total cost of the materials used in and incorporated into a project; the cost of an individual item may not exceed one percent of the total cost of the materials used in and incorporated into a project.

"General contractor" is the individual or entity with which the applicant has contracted (*or is expected to*) to perform construction services (or for water and waste projects funded by the programs subject to AIS requirements). This includes bidders, contractors that have received an award from the applicant and any party having a direct contractual relationship with the owner/applicant. A general contractor is often referred to as the prime contractor.

"Iron and steel products" are defined as the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. Only items on the above list made primarily of iron or steel, permanently incorporated into the project must be produced in the United States. For example trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

"Manufacturers" meaning a supplier, fabricator, distributor, materialman, or vendor is an entity with which the applicant, general contractor or with any subcontractor has contracted to furnish materials or equipment to be incorporated in the project by the applicant, contractor or a subcontractor.

"Manufacturing processes" are processes such as melting, refining, forming, rolling, drawing, finishing, and fabricating. Further, if a domestic iron and steel product is taken out of the United States for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin. Raw materials, such as

iron ore, limestone, scrap iron, and scrap steel, can come from non-U.S. sources.

"Mechanical equipment" is typically that which has motorized parts and/or is powered by a motor. "Electrical equipment" is typically any machine powered by electricity and includes components that are part of the electrical distribution system. AIS does apply to mechanical equipment.

"Minor components" are components *within* an iron and/or steel product otherwise compliant with the American Iron and Steel requirements. This is different from the de minimis definition where de minimis pertains to the entire project and the minor component definition pertains to a single product. This waiver, would allow non-domestically produced miscellaneous minor components comprising up to five percent of the total material cost of an otherwise domestically produced iron and steel product to be used. However, unless a separate waiver for a product has been approved, all other iron and steel components in said product must still meet the AIS requirements. This waiver does not exempt the whole product from the AIS requirements only minor components within said product and the iron or steel components of the product must be produced domestically. Valves and hydrants are also subject to the cost ceiling requirements described here. Examples of minor components could include items such pins and springs in valves/hydrants, bands/straps in couplings, and other low cost items such as small fasteners etc.

"Municipal castings" are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and solid waste infrastructure.

"National Office" refers to the office responsible for the oversight and administration of the program nationally. The National Office sets policy, develops program regulations, and provides training and technical assistance to help the state offices administer the program. The National Office is located in Washington, D.C.

"Owner" is the individual or entity with which the general contractor has contracted regarding the work, and which has agreed to pay the general contractor for the performance of the work, pursuant to the terms of the contract for water and waste projects funded by the programs subject to AIS requirements. For the purpose of this Bulletin, this term is synonymous with the term "applicant" as defined in 7 CFR 1780.7 (a) (1), (2) and (3) and is an entity receiving financial assistance from the programs subject to the AIS requirements.

“Pass through Entities” is an entity that provides a subaward to a loan and/or grant recipient to carry out part of a Federal program. Examples are grantees utilizing the Revolving Loan Program and Household Water Well Program and Alaska Native Tribal Health Consortium (ANTHC) or the State of Alaska from the RAVG Program.

“Primarily iron or steel” is defined as a product made of greater than 50 percent iron or steel, measured by cost. The cost should be based on the material costs. An exception to this definition is reinforced precast concrete (see Definitions). All technical specifications and applicable industry standards (e.g. NIST, NSF, AWWA) must be met. If a product is determined to be less than 50 percent iron and steel, the AIS requirements do not apply.

For example, the cost of a fire hydrant includes:
(1) The cost of materials used for the iron portion of a fire hydrant (e.g. bonnet, body and shoe); and
(2) The cost to pour and cast to create those components (e.g. labor and energy).

Not included in the cost are:
(1) The additional material costs for the non-iron and steel internal workings of the hydrant (e.g. stem, coupling, valve, seals, etc.); and
(2) The cost to assemble the internal workings into the hydrant body.

“Produced in the United States” means that the production in the United States of the iron or steel products used in the project requires that all manufacturing processes must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives.

“Project” is the total undertaking to be accomplished for the applicant by consulting engineers, general contractors, and others, including the planning, study, design, construction, testing, commissioning, and start-up, and of which the work to be performed under the contract is a part. A project includes all activity that an applicant is undertaking to be financed in whole or part by programs subject to AIS requirements. The intentional splitting of projects into separate and smaller contracts or obligations to avoid AIS requirements is prohibited.

“Reinforced Precast Concrete” may not consist of at least 50 percent iron or steel, but the reinforcing bar and wire must be produced in the United States and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the United States. The cement and other raw materials used in concrete production are not required to be of domestic origin. If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are

considered to be a construction material and must be produced in the United States.

"Steel" means an alloy that includes at least 50 percent iron, between 0.02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel, and other specialty steels.

"Structural steel" is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees, and zees. Other shapes include but are not limited to, H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

"Ultimate recipient" is a loan or grant recipient receiving funds from a pass-through entity. Examples include: (1) a loan recipient from the Revolving Loan Fund; (2) a loan recipient from the Household Water Well Program; and (3) a grant recipient from ANTHC or the State of Alaska from the RAVG Program.

"United States" means each of the several states, the District of Columbia, and each Federally Recognized Indian Tribe.

c Purchase Agreements

Add award language from Section 17 a not including 17 a (1).

17 PROVISIONS OF LETTERS OF CONDITIONS, LOAN RESOLUTIONS, GRANT AGREEMENTS, AND CONDITIONAL COMMITMENTS

a Standard Award Language for WWD, ECWAG, Guaranteed Loan Program, 306C, RAVG Administered by USDA, and REAP

Add the following language:
"Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies a new American Iron and Steel (AIS) requirement to obligations made after May 5th, 2017:

(1) No Federal funds made available for this fiscal year for the rural water, waste water, waste disposal, and solid waste management programs authorized by the Consolidated Farm and Rural Development Act (7 U.S.C. 1926 et seq.) shall be used for a project for the construction, alteration, maintenance, or repair of a public water or wastewater system unless all of the iron and steel products used in the project are produced in the United States.

(2) The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(3) The requirement shall not apply in any case or category of cases in which the Secretary of Agriculture (in this section referred to as the "Secretary") or the designee of the Secretary finds that—
(a) applying the requirement would be inconsistent with the public interest;
(b) iron and steel products are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality; or
(c) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent."

(1) Additional Language (*not to be included in purchase agreements*)

Add: "Owners are ultimately responsible for compliance with AIS requirements and will be responsible for the following:

(a) ***Signing*** loan resolutions, grant agreements and letters of intent to meet conditions which include AIS language, accepting AIS requirements in those documents and in the letter of conditions.
(b) ***Signing*** change orders (i.e. C-941 of EJCDC) and partial payment estimates (i.e. C-620 of EJCDC) and thereby ***acknowledging*** responsibility for compliance with American and Iron Steel requirements.
(c) ***Obtaining*** the certification letters from the consulting engineer upon substantial completion of the project and ***maintaining*** this documentation for the life of the loan.
(d) Where the owner provides their own engineering and/or construction services, ***providing*** copies of engineers', contractors', and manufacturers' certification letters (*as applicable*) to the Agency to insert into the Agency file. All certification letters must be kept in the engineer's project file and on site during construction. For Owner Construction (Force Account), all clauses from Section 17 must be included in the Agreement for Engineering Services.
(e) Where the owner directly procures AIS products, ***including*** AIS clauses in the procurement contracts and ***obtaining*** manufacturers' certification letters and ***providing*** copies to consulting engineers and contractors.

b Standard Award Language for Revolving Loan Funds, RAVG Administered by ANTHC or the State of Alaska, Guaranteed Loan Program and Household Water Well Program

Add the following language to award agreements to ultimate recipients: **"**Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies a new American Iron and Steel requirement to obligations made after May 5th, 2017:

(1) No Federal funds made available for this fiscal year for the rural water, waste water, waste disposal, and solid waste management programs authorized by the Consolidated Farm and Rural Development Act (7 U.S.C. 1926 et seq.) shall be used for a project for the construction, alteration, maintenance, or repair of a public water or wastewater system unless all of the iron and steel products used in the project are produced in the United States.

(2) The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(3) The requirement shall not apply in any case or category of cases in which the Secretary of Agriculture (in this section referred to as the "Secretary") or the designee of the Secretary finds that—
(a) applying the requirement would be inconsistent with the public interest;
(b)iron and steel products are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality; or
(c) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent."

18 PURCHASE OF EQUIPMENT AND MATERIALS

Irrespective of who purchases AIS products, owner, contractor or other parties must ensure that the products were produced in the United States as defined in this Bulletin. It is the manufacturers' responsibility to provide manufacturers' certification letters to ensure compliance with AIS requirements. The AIS requirements supersede any regulation on full and open competition stated in 7 CFR 1780.70(b) and (d) and 2 CFR Part 200.319. For example, if an iron and steel product that is compliant with AIS is made by only one manufacturer, sole source procurement of said product may be used.

19 WAIVER PROCESS

a General

Each entity that receives financial assistance for the construction, alteration, maintenance, or repair of water and waste infrastructure from programs mandated to comply with the statute, must use iron and steel products produced in the United States. A waiver is a legal document granting a project an exception to AIS requirements, to use iron and steel products of non-domestic origin specified in the waiver(s). More than one waiver could be applied to a project.

Any funding recipient including the ultimate recipients subject to AIS requirements are eligible to apply for waivers as outlined in the statute which states:

"A waiver may be granted by the Secretary of Agriculture or designee, if one or more of the following conditions are met:

1. Applying the American Iron and Steel requirements of the Act would be inconsistent with the public interest;
2. Iron and steel products are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality; or
3. Inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent."

Until a waiver is granted by USDA, the AIS requirement stands except with respect to municipalities covered by international agreements (see Section 22).

One public interest waiver has been granted by the Secretary of Agriculture or designee that addresses: (1) de minimis items and (2) minor components. This waiver is national in scope and applies to all projects. The term de minimis applies to products when they occur as de minimis incidental components and is intended for assistance recipients to use for their projects. The term minor components applies to minor components *within* an iron and/or steel product and is intended for manufacturers to certify that their products comply with the AIS requirements. For definitions of de minimis and minor components see Definitions.

b Application

To request a project specific waiver, proper and sufficient documentation must be provided by the assistance recipient (see Exhibit H).

To apply for a waiver under *condition one* (*public interest*), applicants and their consulting engineers must demonstrate definitive impacts on the community if a specified product is not utilized. Information must be submitted to the National

Office (via EESEngineering@wdc.usda.gov), copy the RD State Engineer and approved by the Administrator of RUS. Public interest waivers national in scope will be identified and approved by the Administrator of RUS.

To apply for a waiver under *condition two* (*quantity or quality*), applicants and their consulting engineers must submit the information outlined in Exhibit I to the National Office (via EESEngineering@wdc.usda.gov).

To apply for a waiver under *condition three* (*25 percent of project cost*), applicants and their consulting engineers must submit the information in Exhibit I and J to the National Office (via EESEngineering@wdc.usda.gov).

All waiver applications must be submitted to National Office. If a RD State Office receives any waiver requests, the request must be submitted to National Office for approval.

c Timing

Waivers should be submitted prior to and no later than with the submission of final plans, specifications, and bidding documents for any iron and steel products of known foreign origin. All waivers requests must be approved by the Agency prior to authorization to advertise for bids. In the event that a waiver is requested post award, it must be approved by the Agency prior to construction. In the event that a waiver is requested during construction such as via a change order, it must be approved by the Agency prior to installation.

d Evaluation by USDA

After receiving an application for a waiver of the AIS requirements, USDA National Office will publish the request on its website for 15 days and receive informal comment. National Office will evaluate whether the application adequately documents the statutory basis cited for the waiver. The Secretary or designee will determine whether or not to grant the waiver. Approved and disapproved waivers will be posted on the USDA AIS website.

For project specific waivers where EPA and USDA are co-funding and the applicant has already submitted a request to and received an approved waiver from EPA, USDA will review said waiver for the co-funded project. Applicants/owners or their representatives are required to submit the *approved* waiver to EESEngineering@wdc.usda.gov for USDA RD review and concurrence.

All approved waivers must be included in the bidding documents, any bid addenda, change orders, and partial estimates. All information presented in waiver requests are subject to verification. Waiver requests deliberately containing false information will be rejected.

20 MONITORING

In order to comply with the Executive Order 13788 “Buy American, Hire American”, dated April 18, 2017, and AIS requirements, monitoring activities will be completed by the State Office and/or the National Office.

21 NON-COMPLIANCE

No Federal funds made available for the rural water, waste water, waste disposal, and solid waste management programs authorized by sections 306, 306A, 306C, 306D, 306E, and 310B of the Consolidated Farm and Rural Development Act (7 U.S.C. 1926 et seq.) shall be used for a project for the construction, alteration, maintenance, or repair of a public utility system unless all of the iron and steel products used in the project are produced in the United States.

Noncompliance occurs when funds are used from these programs for construction, alteration, maintenance, or repair using non-domestic iron or steel products and the product is not covered by either a project-specific or a national waiver. Loan and grant recipients should avoid noncompliance at all times as it is a violation of a Federal statute.

Process for Noncompliance

(1) Identify the noncompliant product.
(2) The loan or grant recipient or pass through entity notifies appropriate USDA RD State or National Office contact.
(3) If USDA RD State Office is notified, the Program Director will notify the National Office, Director of EES.
(4) USDA will apply remedies for noncompliance as per 2 CFR 200 §§338 – 342.

22 INTERNATIONAL AGREEMENTS

The AIS requirements apply in a manner consistent with United States obligations under international agreements. In the few cases where such an agreement exists between a loan and/or grant recipient and an international entity, that recipient is under the obligation to determine the applicability of the AIS requirements and document the actions taken to comply with these requirements.

23 USE OF EXHIBITS

The following explains the purpose of each Exhibit to this Bulletin:

a AMERICAN IRON & STEEL COMPLIANCE STATEMENT: Exhibit A consists of a statement to be read by the Rural Development representative during the preconstruction conference. In addition, the RD representative should read Sections 5, 6, and 7 of this Bulletin to remind the owner, consulting engineer, and general contractor of their roles and responsibilities to comply with AIS.

b ENGINEER’S CERTIFICATION OF COMPLIANCE: Exhibit B consists of a letter to be completed and signed by the consulting engineer certifying that he/she will ensure that

plans, specifications, and bidding documents and associated bid addenda, executed contracts and change orders for this project will comply with the AIS requirements. This certification letter is to be submitted to the Agency for approval prior to approval of the Advertisement for Bids and must be kept in the engineers project file and on-site during construction.

c GENERAL (PRIME) CONTRACTOR'S CERTIFICATION OF COMPLIANCE: Exhibit C consists of a letter to be completed and signed by the general contractor certifying that he/she will ensure that all iron and steel products installed for this project by their company and by any and all subcontractors and manufacturers their company has contracted with comply with the AIS requirements. This certification letter is to be submitted upon substantial completion of the project to the project engineer.

d EXAMPLE OF A MANUFACTURER'S CERTIFICATION LETTER OF COMPLIANCE: Exhibit D is an example of a letter to be completed and signed by the manufacturer certifying that he/she will ensure that all iron and steel products and/or materials shipped or provided for the subject project are in full compliance with the American Iron and Steel requirement. This includes listing each individual item/product/material provided to the project and providing the location of this/these item(s) being manufactured including assembly. All manufacturers' certification letters must be kept in the engineer's project file and on site during construction.

e EXAMPLES OF MUNICIPAL CASTINGS: Exhibit E provides a sample list of iron and steel products that are subject to the AIS requirements. This list is not exhaustive and is meant to provide examples.

f EXAMPLES OF CONSTRUCTION MATERIALS: Exhibit F provides a sample list of construction materials that are subject to the AIS requirements. This list is not exhaustive and is meant to provide examples.

g EXAMPLES OF NON-CONSTRUCTION MATERIALS: Exhibit G provides a sample list of items that are not subject to the AIS requirements. This list is not exhaustive and is meant to provide examples.

h INFORMATIONAL CHECKLIST FOR PROJECT SPECIFIC WAIVER REQUEST: Exhibit I is a checklist that is to be completed by the applicant and/or consulting engineer to help ensure that all appropriate and necessary information is submitted with the request to USDA. This checklist should not be used for a public interest waiver, is for informational purposes only and does not need to be included as part of a waiver application. Project specific waivers may be requested if one or more of the following conditions applies: (1) The iron and/or steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; (2) The inclusion of iron and/or steel products produced in the United States will increase the cost of the overall project by more than 25 percent. All approved waivers must be included in the bidding documents, any bid addenda, change orders, and partial estimates.

All information presented in waiver requests are subject to evaluation. Waiver requests deliberately containing false information will be rejected.

i EXAMPLE COST TABLE FOR A PROJECT COST WAIVER: This exhibit is an example of a table that must be included with any cost based project waiver request. Information included in the table: product reference in the specification, brief description of the product, quantity, unit, unit price and two costs of the item: (1) cost of an AIS compliant product and (2) cost of a non-domestic product. The total cost for all items will be part of the evaluation for the project cost waiver. Note: Information in this table is subject to evaluation. Waiver requests deliberately containing false information in order to receive a project cost waiver will be rejected.

j CHECKLIST FOR STATE ENGINEERS: This exhibit is a checklist that should be completed by the RD State Engineer for each project during active construction. It is important to note items being stored on-site for installation are compliant with AIS. Please ask the Resident Project Representative (RPR) if it is unclear whether or not the items in question are compliant with AIS (e.g. via manufacturer's certification letters). For checklists, RD field staff should take pictures of visible items subject to AIS. Pictures should include the manufacturer's label. If there is no label, please ask to be shown the manufacturer's certification for the item in question from the RPR or consulting engineer if on-site to verify that the items in question are compliant. These checklists and attached pictures are to be submitted to National Office upon final payment.

AMERICAN IRON & STEEL COMPLIANCE STATEMENT

"Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project.

All parties are required to comply with these requirements and to ensure that all iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials."

ENGINEER'S CERTIFICATION OF COMPLIANCE WITH PROVISIONS OF THE AMERICAN IRON AND STEEL REQUIREMENTS OF SECTION 746 OF TITLE VII OF THE CONSOLIDATED APPROPRIATIONS ACT OF 2017 (DIVISION A - AGRICULTURE, RURAL DEVELOPMENT, FOOD AND DRUG ADMINISTRATION, AND RELATED AGENCIES APPROPRIATIONS ACT, 2017) AND SUBSEQUENT STATUTES MANDATING DOMESTIC PREFERENCE

DATE: MAY 26, 2022

RE: PROJECT NAME HILLCREST CENTER WATER IMPROVEMENTS PROJECT (PHASE I)
APPLICANT EL PASO COUNTY
CONTRACT NUMBER TDB

I hereby certify that to the best of my knowledge and belief all iron and steel products referenced in the Plans, Specifications, and Bidding Documents for this project comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference or are the subject of a waiver approved by the Secretary of Agriculture or designee. This certification is not intended to be a warranty in any way, but rather the designer's professional opinion that to the best of their knowledge the documents comply.

I hereby commit that to the best of my ability all iron and steel products that will be referenced in the Bid Addenda, Executed Contracts, and Change Orders will comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference or will be the subject of a waiver approved by the Secretary of Agriculture or designee.

MORENO CARDENAS, INC.
Name of Engineering Firm (PRINT)

By Authorized Representative (SIGNATURE)

PROJECT ENGINEER
Title

This letter is to be submitted prior to Agency authorization of Advertisement for Bids.

GENERAL (PRIME) CONTRACTOR'S CERTIFICATION OF COMPLIANCE WITH PROVISIONS OF THE AMERICAN IRON AND STEEL REQUIREMENTS OF SECTION 746 OF TITLE VII OF THE CONSOLIDATED APPROPRIATIONS ACT OF 2017 (DIVISION A - AGRICULTURE, RURAL DEVELOPMENT, FOOD AND DRUG ADMINISTRATION, AND RELATED AGENCIES APPROPRIATIONS ACT, 2017) AND SUBSEQUENT STATUTES MANDATING DOMESTIC PREFERENCE

DATE:

RE: PROJECT NAME
APPLICANT
CONTRACT NUMBER

I hereby certify that to the best of my knowledge and belief all iron and steel products installed for this project by my company and by any and all subcontractors and manufacturers my company has contracted with for this project comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference or are the subject of a waiver approved by the Secretary of Agriculture or designee.

This certification is to be submitted upon completion of the project to the project engineer.

_____
Name of Construction Company (PRINT)

_____
By Authorized Representative (SIGNATURE)

_____
Title

EXAMPLE OF A MANUFACTURER'S CERTIFICATION LETTER OF COMPLIANCE WITH PROVISIONS OF THE AMERICAN IRON AND STEEL (AIS) REQUIREMENTS OF SECTION 746 OF TITLE VII OF THE CONSOLIDATED APPROPRIATIONS ACT OF 2017 (DIVISION A - AGRICULTURE, RURAL DEVELOPMENT, FOOD AND DRUG ADMINISTRATION, AND RELATED AGENCIES APPROPRIATIONS ACT, 2017) AND SUBSEQUENT STATUTES MANDATING DOMESTIC PREFERENCE

Date:

Company Name:

Company Address:

Subject: AIS Step Certification for Project (X), Owner's Name, and Contract Number

I, (company representative), certify that the (melting, bending, galvanizing, cutting, etc.) processes for (manufacturing or fabricating) the following products and/or material shipped or provided for the subject project is in full compliance with the AIS requirement as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.

Item, Products and/or Materials, and location of delivery (City, State):

1.
2.

Such processes for AIS took place at the following location:

_____
(City, State)

This certification is to be submitted upon request to interested parties (e.g. municipalities, consulting engineers, general contractors, etc.)

If any of the above compliance statements change while providing materials to this project, please immediately notify the person(s) who is requesting to use your product(s).

_____
Authorized Company Representative Signature
(Note: *Authorized signature shall be manufacturer's representative not the material distributor or supplier*)

EXAMPLES OF MUNICIPAL CASTINGS (*includes but not limited to*):

Access Hatches;
Ballast Screen;
Benches (Iron or Steel);
Bollards;
Cast Bases;
Cast Iron Hinged Hatches, Square and Rectangular;
Cast Iron Riser Rings;
Catch Basin Inlet;
Cleanout/Monument Boxes;
Construction Covers and Frames;
Curb and Corner Guards;
Curb Openings;
Detectable Warning Plates;
Downspout Shoes (Boot, Inlet);
Drainage Grates, Frames and Curb Inlets;
Inlets;
Junction Boxes;
Lampposts;
Manhole Covers, Rings and Frames, Risers;
Meter Boxes;
Service Boxes;
Steel Hinged Hatches, Square and Rectangular;
Steel Riser Rings;
Trash receptacles;
Tree Grates;
Tree Guards;
Trench Grates; and
Valve Boxes, Covers and Risers.

EXAMPLES OF CONSTRUCTION MATERIALS (*includes but not limited to*):

Wire rod, bar, angles
Concrete reinforcing bar, wire, wire cloth
Wire rope and cables
Tubing
Framing
Joists
Trusses
Fasteners (i.e., nuts and bolts)
Welding rods
Decking
Grating
Railings
Stairs
Access ramps
Fire escapes
Ladders
Wall panels
Dome structures
Roofing
Ductwork
Surface drains
Cable hanging systems
Manhole steps
Fencing and fence tubing
Guardrails
Doors
Stationary screens

EXAMPLES OF NON-CONSTRUCTION MATERIALS – (*includes but not limited to*):
(NOTE: *includes appurtenances necessary for their intended use and operation and are not subject to AIS*)

Pumps
Motors
Gear reducers
Drives (including variable frequency drives (VFDs)
Electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators)
Mixers
Gates (e.g. sluice and slide gates)
Motorized screens (such as traveling screens)
Blowers/aeration equipment
Compressors
Meters (flow and water meters)
Sensors
Controls and switches
Supervisory control Data acquisition (SCADA)
Membrane bioreactor systems
Membrane filtration systems (includes RO package plants)
Filters
Clarifier arms and clarifier mechanisms
Rakes
Grinders
Disinfection systems
Presses (including belt presses)
Conveyors
Cranes
HVAC (excluding ductwork
Water heaters
Heat exchangers
Generators
Cabinetry and housings (such as electrical boxes/enclosures)
Lighting fixtures
Electrical conduit
Emergency life systems
Metal office furniture
Shelving
Laboratory equipment
Analytical instrumentation
Dewatering equipment.

INFORMATIONAL CHECKLIST FOR PROJECT SPECIFIC WAIVER REQUEST

Please reference the specifications of the product.

Information	☐	**Note**
General • Waiver request includes the following information: – Description of the foreign and domestic construction materials – Unit of measure – Quantity – Price – Date that product is needed (e.g. time of delivery or availability) – Location of the construction project – Name and address of the proposed supplier – A detailed justification for the use of foreign construction materials • Waiver request was submitted according to the instructions in the memorandum • Assistance recipient made a good faith effort to solicit bids for domestic iron and steel products, as demonstrated by language in requests for proposals, contracts, and communications with the prime		
Cost Waiver Requests • Waiver request includes the following information: – Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products (Exhibit J) – Relevant excerpts from the bid documents used by the contractors to complete the comparison – Supporting documentation indicating that the contractor made a reasonable survey of the market, such as a description of the process for identifying suppliers and a list of contacted suppliers		
Availability Waiver Requests • Waiver request includes the following supporting documentation necessary to demonstrate the availability, quantity, and/or quality of the materials for which the waiver is requested: – Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery date for construction materials – Documentation of the assistance recipient's efforts to find available domestic sources, such as a description of the process for identifying suppliers and a list of contacted suppliers. – Date that product is needed (e.g. time of delivery or availability) to provide justification – Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction materials • Waiver request includes a statement from the prime contractor and/or supplier confirming the non-availability of the domestic construction materials for which the waiver is sought • Has the State received other waiver requests for the materials described in this waiver request, for comparable projects?		

EXAMPLE COST TABLE FOR A PROJECT COST WAIVER

AIS/Non-AIS Cost Comparison Table						
Specification	**Item or Description**	**Quantity**	**Unit**	**Unit Price**	**Cost if applying AIS**	**Cost if a waiver to AIS is applied**
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
TOTAL COST:					**$0.00**	**$0.00**

CHECKLIST FOR STATE ENGINEERS

Date_____ Project Name_____ State:___

Project Type: ☐ Water ☐ Wastewater ☐ Stormwater ☐ Solid Waste

Applicant/Owner Name: _____

Project % Completion (*estimated*): _____

Total Project Cost: _____ Estimated Materials Cost: _____

Items	Stored	Installed / Accessible	Installed / Inaccessible	U.S. Made?	Manufacturer Name
Ductile Iron Pipe	☐	☐	☐	☐	
Reinforced Conc. Pipe	☐	☐	☐	☐	
Other Steel Pipe	☐	☐	☐	☐	
Fittings	☐	☐	☐	☐	
Valve Boxes	☐	☐	☐	☐	
Hydrants	☐	☐	☐	☐	
Valves	☐	☐	☐	☐	
Fittings/Bends/etc.	☐	☐	☐	☐	
Manholes	☐	☐	☐	☐	
Manhole Frames/Covers	☐	☐	☐	☐	
Other Municipal Castings	☐	☐	☐	☐	
Detection Plates	☐	☐	☐	☐	
Grates	☐	☐	☐	☐	
Manholes/Precast Conc.	☐	☐	☐	☐	
Steel Roofing Materials	☐	☐	☐	☐	
Steel Doors & Frames	☐	☐	☐	☐	
Steel Tanks/Pressure Vessels	☐	☐	☐	☐	
Reinforcing Bar/Wire	☐	☐	☐	☐	
Steel Stairs/Catwalks/Railings	☐	☐	☐	☐	
Unknown Iron/Steel Item	☐	☐	☐	☐	

De minimis Waiver

General contractor maintains an itemized list of incidental components with no single item costing >1% and total costs <5% of total materials cost of the project?

◯ YES ◯ NO

Copy of *de minimis* list attached?

◯ YES ◯ NO

Project Specific Waiver

Is there an approved waiver(s) for this project? ◯YES ◯NO

Justification: ☐ Inconsistent with public interest
☐ Not produced in U.S. in sufficient quantities
☐ Cost of the overall project increased by more than 25%.

Miscellaneous

Is there a project file that includes all manufacturers' certifications on site?
(If yes, please review the project file for compliance.) ◯YES ◯NO

Photos taken of all visible, accessible iron / steel items attached ◯YES ◯NO

Representative sample (≤15) of manufacturers' certs attached ◯YES ◯NO

This site visit checklist was prepared by:

_____ _____
(Printed Name) (Signature)

Consulting Engineer/RPR present (If yes, print name): _____

General Contractor's representative present (If yes, print name): _____

Owner's/Applicant's representative present (If yes, print name): _____

Others (If yes, print name): _____

Other major AIS components required for project but not observed during this site visit:

Non-domestically produced or non-compliant iron or steel items observed:

Notes:

00810 SUPPLEMENTARY - NADB NON-BRIBERY CERTIFICATION

[*Bidder's letterhead*]

[*Date*]

[*Name and address*]

Dear :

The undersigned party certifies that [*name of bidding company*] complies with the following criteria:

1. They have not engaged and will not engage in bribery of domestic or foreign officials related to potential or active North American Development Bank projects.

2. They have corporate policies that clearly prohibit the use of any bribery in a corporate activity.

3. They have neither been convicted of (nor found by a civil judgment to have committed) bribery of domestic officials, fraud, embezzlement, theft, forgery, destruction of records, making false statements to government officials, receiving stolen property, or any other offense indicating a lack of business integrity or business honesty, within five years of the date of this certification.

_____
Printed name

_____
Signature

_____
Position in bidding company

_____
Date

00820 SUPPLEMENTARY - EPA GREEN CONSTRUCTION GUIDELINES

Guidelines to bidders for the Construction Phase of BEIF-funded Projects

The owner and owner representative (i.e. design professional, construction supervisor, etc.) will take additional steps to ensure that all project participants are familiar with the environmental performance goals of the construction process and infrastructure, as well as the intended use of green products and practices. These activities will entail the following actions:

1. The owner's representative will discuss these concepts at the pre-bid conference, encouraging general contractors to alert all subcontractors to the requirements.
2. The owner's representative shall repeat the instruction at the preconstruction conference, when both general and subcontractors are present.

The owner, owner's representative and contractor shall establish appropriate means to identify, review and implement any new green building opportunities proposed during construction.

The owner's representative will anticipate potential adjustments during the construction phase and will make provisions to accept modifications to proposed products and implementation measures that would be conducive to furthering environmental stewardship.

The contractor will perform as described in the contract documents. In addition, the contractor will inform the project owner about equal or better alternative materials or site construction practices that are available at low or no additional cost and that will not adversely affect areas outside of construction limits.

The contractor shall implement measures to protect vegetation, trees and other designated elements as stipulated in the contract documents. Moreover, the contractor shall implement additional actions as described below, with the approval of the owner and owner's representative, provided that such actions do not affect cost:

1. Opportunities to enhance the project's ecologically responsible actions to further improve the ecosystem and environment.
2. Environmentally friendly actions, either permanent or temporary, during the construction process.
3. Incorporate alternative materials that meet green building criteria for application in the construction process; and
4. Implement necessary activities to reclaim on-site materials not previously identified as suitable for use in the project.

If cost is a factor, the contractor shall identify the action(s) and corresponding costs and submit them to the owner for approval. If cost variation is relevant, owner must provide a statement to that effect and may waive those actions.

The owner's representative will observe that the work is being executed according to project specifications.

General

As described in the contract documents, the contractor will complete the following activities for the selected site(s) and pipeline location(s):

a. Further identify opportunities for on-site use of surplus materials from other construction projects, and off-site use of surplus materials from this project on other projects prior to final disposal.

b. Submit a list of proposed local materials and any recycled/reclaimed products for approval by the owner's representative prior to implementation. Local products are defined as those located in proximity to the project site, which will not require extensive and intensive maneuvers for transportation.

c. Recommend the use or substitution of materials by providing invoices, product information, and manufacturer documentation.

d. Implement measures to protect existing habitat.

Products

As described in contract documents, the contractor will complete the following activities for the selected site(s) and pipeline location(s):

a. Obtain required materials and products as specified for sub-base fill and fill material.

b. Obtain required products to meet pavement system designs and permeability standards.

Execution

As described in contract documents, the contractor will:

a. Specify methods of construction that minimize waste, reduce pollution, and maximize resource efficiency.

b. Provide requirements for clean-up and disposal, including sorting and recycling of materials and on-site reuse of materials.

c. Make provisions for phasing pavement work, from site clearing to asphalt placement, so as to protect the natural habitat and adhere to the drainage and erosion control plans

d. Complete the activities as described for the selected site(s) and pipeline location(s).

e. Implement the necessary measures to protect on-site vegetation, trees, natural habitats and other designated elements.

f. Apply site clearing practices as specified.

Signature for acknowledgment and commitment to follow guidelines

_____

Name:
Title:
Company:

00830 SUPPLEMENTARY - EPA Disadvantaged Business Enterprises (DBE) Requirements

Good Faith Efforts

Grant Recipients and their prime contractors must follow, document, and maintain documentation of their good faith efforts as listed below to ensure that Certified Disadvantaged Business Enterprises* (DBEs) have the opportunity to participate in the project by increasing DBE awareness of procurement efforts and outreach.

1. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities; including placing DBEs on solicitation lists and soliciting them whenever they are potential sources.

2. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitation for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.

3. Consider in the contracting process whether firms competing for large contracts could be subcontracted with DBEs. This will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.

4. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.

5. Use the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U. S. Department of Commerce.

6. If the prime contractor awards subcontracts, require the prime contractor to take the steps in numbers 1 through 5 above.

Required Contract Conditions

These conditions must be included in all procurement contracts entered into by the Grant Recipient for all EPA-funded projects:

1. The prime contractor must pay its subcontractor for satisfactory performance no more than 30 days from the prime contractor's receipt of payment from the owner.

2. The prime contractor must notify the owner in writing prior to the termination of any Disadvantaged Business Enterprise subcontractor for convenience by the prime contractor.

3. If a Disadvantaged Business Enterprise contractor fails to complete work under the subcontract for any reason, the prime contractor must employ the six good faith efforts if soliciting a replacement contractor.

4. The prime contractor must continue to employ the six good faith efforts even if the prime contractor has achieved its fair share objectives.

5. The prime contractor must provide EPA Form 6100-2 DBE Program Subcontractor Participation Form** to all of its Disadvantaged Business Enterprise subcontractors. Disadvantaged Business Enterprise subcontractors may send completed Form 6100-2 directly to the Region 6 DBE Coordinator with a copy to the North American Development Bank Grants Department.

6. The prime contractor must have its Disadvantaged Business Enterprise subcontractors complete EPA Form 6100-3 - DBE Program Subcontractor Performance Form**. The prime contractor must include all completed forms as part of the prime contractor's bid or proposal package to the Grant Recipient.

7. The prime contractor must complete and submit EPA Form 6100-4 DBE Program Subcontractor Utilization Form** as part of the prime contractor's bid or proposal package to the Grant Recipient.

8. A Grant Recipient must ensure that each procurement contract it awards contains the following terms and conditions:

> The contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The contractor shall carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies.

** A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.*

*** DBE forms can be downloaded from:*

https://www.epa.gov/grants/disadvantaged-business-enterprise-program-under-epa-assistance-agreements-dbe-program

SECTION 00940

GENERAL WAGE REQUIREMENTS

The following Wage Decision(s) will be utilized for this project. **If multiple Wage Decisions are included in the Contract Document, Contractor is required to indicate on his Certified Payroll Reports, the Wage Decision under which the work being reported was performed.**

CONSTRUCTION TYPE / WAGE DECISION	PORTION OF PROJECT FOR WHICH THE WAGE DECISION IS APPLICABLE
City of El Paso 2016 Paving and Street Construction, Dirt Work, Heavy Construction, Pipeline Work, Highway Wage Rates Adopted by El Paso City Council February 28, 2017 City of El Paso 2016 Building Construction Trades Wage Rates Adopted by El Paso City Council February 28, 2017	Entire Project. County of El Paso Wage Decision will be used.

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Change Order No. _____

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

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments:

CHANGE IN CONTRACT PRICE	**CHANGE IN CONTRACT TIMES** *[note changes in Milestones if applicable]*
Original Contract Price: $_____	Original Contract Times: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: $_____	[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: Substantial Completion: _____ Ready for Final Payment: _____ days
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for Final Payment: _____ days or dates

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (if required)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date _____	Date _____

Approved by Funding Agency (if applicable)

By: _____ Date:

Title: _____

EL PASO COUNTY

HILLCREST CENTER WATER IMPROVEMENT PROJECT (PHASE 1)

Bid Number 22-025

TABLE OF CONTENT

TECHNICAL SPECIFICATIONS

DIVISION 1 GENERAL REQUIREMENTS

DIVISION 2 SITE WORK

SECTION 01010

GENERAL

Part 1 GENERAL

1.1 SECTION INCLUDES

A. Work covered by Contract Documents for this portion of the project.

1.2 RELATED SECTIONS

A. Construction Document Drawings and the General Provisions of Contract, including General and Special Conditions and other Division I - Specifications apply to this section.

1.3 PROJECT DESCRIPTION

A. The Project consists of constructing a potable water system in Hillcrest Center. The proposed water system would consist of but not limited to the installation of an 8-inch and 12-inch PVC pipeline, connecting water services to the existing residents, gate valves with bonnet boxes, magnectic flow meter, clearing, trenching, backfill, compaction, fire hydrant connections, and all other related appurtenances and work-related for the completion of the project.

The project description, as shown above, is only a general overview of the project. The Contractor shall refer to the project plans and specifications for further information.

B. The Contractor shall furnish all labor, materials, equipment, tools, and incidentals, and completely construct the work, so it is ready to use as shown on the Drawings and as described in the specification.

1.4 WORK SEQUENCE

A. Refer to Contract Documents Division 1 (Sections 00300 & 00500) for the time of performance requirements.

B. Before beginning construction, the Contractor shall develop a detailed construction schedule of work for review and approval by the OWNER and the ENGINEER. The Contractor shall consider the sequence of construction that will allow continuous operation of the existing blend wells until the improvements are complete, tested, and operational. The Contractor shall include in their bid any temporary bypass operations to allow continued blend well flow.

C. No partial payments will be made until the OWNER approves the construction schedule. The Contractor shall update the schedule monthly, or more frequently if major construction elements are accomplished or if the construction approach changes.

D. The Contractor shall closely follow the submitted schedule throughout the duration of the project.

E. The Contractor shall incorporate a work priority to the project schedule. The priority list shall not limit the Contractor to have concurrent work schedules.

F. The Contract work shall be planned and executed in a manner that will ensure completion of the project within the contractually agreed upon time frame.

1.5 CONTRACTOR USE OF PREMISES

A. CONTRACTOR shall limit the use of the premises for their Work and storage to allow for:

1. Work by other contractors

2. EPWater occupancy

3. City of El Paso

C. Coordinate the use of premises with other contractors, EPWater, and the ENGINEER. All conflicts overuse of the premises shall be resolved without additional cost to the OWNER.

D. CONTRACTOR shall assume full responsibility for security clearance and security of all his and his subcontractors' materials and equipment stored on the site.

E. Obtain and pay for use of additional storage or work areas if needed to perform the Work.

1.6 EXISTING UTILITIES AND FACILITIES

A. The Contractor shall pothole all utilities before excavation of the construction area to determine their exact locations. The Contractor shall plot and map all utilities in the construction area after uncovering them. The Contractor shall bring any unknown utilities and facilities discovered and/or utilities believed to be in conflict, to the attention of the Owner and Engineer for resolution. The Contractor shall not proceed with construction work in the area until a resolution has been provided. 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.

B. The drawings only indicate the approximate location of existing utilities that could be located or approximated during design. Therefore, the Contractor shall be responsible for determining the exact location of all buried utilities within the project limits prior to starting any excavation activities. The Contractor shall be responsible for locating and protecting all utilities and service connections during construction.

C. The Contractor shall coordinate the work with all utility companies having facilities within the area of work. Any work associated with the protection, relocation, or by-passing of existing utility lines shall be reflected in the Contractor's project schedule so that the work may be completed without delay to the project. All the requirements of the contract documents will apply to any subcontractor who performs any relocation, by-passing, or protection of existing utility lines. All work associated with the relocating, by-passing, or protection of existing utility lines shall be at the expense of the Contractor. Prior to the commencement of any protection, relocation, or by-pass work, the Contractor shall submit a work plan to the utility line owner for approval. No relocation or by-pass work shall be performed without the prior written approval of the work by the owner of the utility line. Emergency protection of existing utility lines to protect the line from immediate damage may be performed by the Contractor without prior approval; however, the Contractor shall take every action available to notify the Utility, Owner and the Engineer of the situation within 24-hours.

1.7 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 5 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. The damage shall be repaired completely within 7 days of the complaint

1.8 TRAFFIC CONTROL

A. Traffic control for all areas of the project shall be the responsibility of the Contractor. The traffic control plan (TCP) shall conform to the specifications and principles given in the "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," latest edition and version issued by the Texas Department of Transportation (TxDOT). The TCP shall be

sealed by a licensed professional engineer in the State of Texas. The Contractor shall prepare a TCP acceptable to and approved by the City Engineer of the City of El Paso or his/her representative. The Contractor shall maintain permit active.

B. Businesses, emergency facilities, schools, and E.M.S. shall be advised and/or consulted prior to the start of construction. Access to the public and private property – local access shall be maintained to all properties at all times during construction and maintenance activities. The TCP shall show the hours of the day and the tentative total number of days it will be in effect.

C. Traffic Signals – The City Traffic & Transportation Departments shall be notified at least two (2) days prior to commencing work activity in the vicinity of signalized intersections. TCP & Street Name Signs – All existing TCP and street name signs and signposts adjacent to construction activity shall be protected from damage. The Contractor shall be responsible for any damage to existing TCP and street name signs and signposts. The damage shall be repaired completely and to the satisfaction of the Owner within 24-hours and a temporary sign shall be provided. Upon the completion and prior to opening streets to traffic, the Contractor must notify the City of El Paso for their approval.

1.9 AS-BUILT DIMENSIONS & DRAWINGS

A. The Contractor shall make appropriate daily measurements of facilities constructed and any existing utilities encountered (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. The "As-Built" drawings shall be maintained on-site and shall be available to the RPR at all times.

D. Upon completion of each facility, the Contractor shall furnish the Engineer with two (2) sets of direct prints, marked with a red pencil, to show as-built dimensions and locations of work constructed.

1.10 CONTRACTOR'S SUPERINTENDENCE

A. The Contractor shall keep at all times a qualified competent Project Superintendent, satisfactory to the Engineer. The Project Superintendent shall have the responsibility to coordinate all subcontractors and be capable of communicating with the Public, the Engineer, and the Owner. The Project Superintendent shall be responsible for and shall coordinate all activities of the various crews, subcontractors, and suppliers.

B. The Resident Superintendent shall be cooperative and authorized to receive orders to act for the Contractor. In the event, a competent Superintendent is not available the Owner may suspend work until one is available. Changes of Superintendent require prior written approval by the Engineer and the Owner.

C. 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/her work properly and skillfully, 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 the written consent of the Engineer.

D. Persons assigned to this project and identified by the Contractor during Pre-Award requirements as Key Personnel shall not be replaced without prior consent and approval of a substitute by the Owner. Prior to replacing any Key Personnel after initial acceptance by the Owner, a resume and work history shall be submitted to the Engineer for review and recommendation for approval.

1.11 EMERGENCY COMMUNICATION

A. The Contractor shall maintain at all times during construction, a local telephone number where responsible supervisory personnel may be contacted twenty-four hours a day for the full duration of the project. The telephone number shall be given to the Project Manager, Engineer, and to everyone requiring this information so that contact can be made in the event of any emergency.

1.12 VIDEOTAPING

A. Prior to any construction, the project construction sites (3) shall be videotaped by the Contractor accompanied by the Engineer or his representative, to show existing conditions of the roadways, adjacent properties, easements, structures, utilities, drainage structures, culverts, channels, and other existing improvements. Following substantial completion and site cleanup/demobilization activities, the Contractor shall videotape the post-construction condition of the entire project site (3 sites). Two copies in DVD format shall be furnished to the Engineer documenting pre and post-construction conditions and shall include labels including project title, Bid No., project site (3), and date recorded.

1.13 COMPLETE FACILITY

A. These specifications intend that the Project be a complete workable facility, functioning in accordance with the specified purpose. 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 in accordance with the specified requirements.

1.14 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 on Saturdays, Sundays or local or national holidays, he shall request in writing to do so and obtain approval before he starts such work. The Contractor shall acquire any necessary permits associated with such work and comply with all permit conditions and all laws and ordinances relating thereto.

B. The Contractor shall reimburse the Owner for additional costs incurred as a result of providing additional inspection personnel when the Contractor performs the nighttime, weekend, or holiday work. Additional inspection costs will be at the rate of $85.00 per hour.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01012

WORK BY OTHERS & CONNECTIONS TO WORK OF THIS CONTRACT

PART 1 GENERAL

1.1 GENERAL

A. Others will perform work (on or partially on this site) which will be related to, interface with and connect to Work performed under this Contract.

B. Contractor shall interface and coordinate with others performing work through the Engineer. Work under this Contract shall be interfaced and connected to Work by others as noted, especially as set out in this Section.

1.2 COORDINATION WITH OTHER CONTRACTORS

A. The Contractor shall cooperate with other contractors on the premises and other connecting projects to facilitate the progress of all projects at or near the site of Work.

B. The Contractor shall coordinate with other contractors for connections and testing of facilities where there is an interface between projects. Such coordination shall be performed under the direction of the Engineer.

C. Contractor shall coordinate work with any other construction in the area to avoid impacts to project progress as required.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01014

TRENCH SAFETY SYSTEM

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, and equipment and perform all operations to plan, design, construct, install, maintain, monitor, modify as necessary, and remove upon completion, a Trench Safety System as referenced in these specifications.

B. The requirements of this section apply to all trenches that exceed five (5) feet in depth, as measured from the ground surface at the highest side of the trench to the trench bottom.

C. All applicable and non-conflicting portions of Section 02221-Excavating, Backfilling And Compacting For Utilities apply as appropriate to provide a proper and complete system.

1.2 RELATED REQUIREMENTS

A. Section 02221: Excavating, Backfilling and Compacting for Utilities

B. State of Texas: HB 662, HB 665, and HB 1569

C. United States Government: 29 CFR Part 1926, Occupational Safety and Health Standards (OSHA), Subpart P - Excavations, Trenching, and Shoring

PART 2 PRODUCTS

2.1 GENERAL

A. All materials and products incorporated into the Trench Safety System shall be suitable for their intended use; shall meet all design criteria and parameters used by the Trench Safety System designer in designing the system and shall meet all applicable requirements of the OSHA regulations.

PART 3 EXECUTION

3.1 PROCEDURES

A. The Contractor shall adhere to the site-specific Trench Safety System Plan for all portions of the work having trenches deeper than five feet.

B. The plan shall be detailed to the extent that it shows the proposed limits (to the nearest foot) of the various types of trench safety systems the Contractor proposes to use.

C. The Contractor shall be responsible for obtaining borings and detailed geotechnical analyses as required to develop the plan.

D. After a review as to form only, without review for adequacy, by the Engineer and Owner's staff, the plan will be forwarded to the Owner and/or Project Representative for use in monitoring the Contractor's construction activities.

E. Contractor accepts sole responsibility for compliance with all applicable safety requirements. The review by the Engineer and Owner's staff is only for general conformance with the State of Texas and OSHA safety standards. Release of the safety plan for use in monitoring construction activities does not relieve Contractor from any or all construction means, methods, techniques, and procedures; and any property damage or bodily injury (including death) that arises from use of the trench safety plan, from Contractor's negligence in performance of contract work, or from Engineer's or Owner's failure to note exceptions to the safety plan, shall remain the sole responsibility and liability of the Contractor.

F. Changes in the Trench Safety Plan after initiation of construction, either for the Contractor's convenience or in response to unforeseen or differing conditions, are not cause for an extension of time or change order and will require the same review process as the original plan.

3.2 METHODS

A. The Contractor has three ways to meet OSHA Standards for trench safety and comply with the provisions of this section. The three methods are:

1. Use of a Trench Box

2. Shoring, Sheeting and Bracing Methods

3. Sloping and Benching Methods per Federal Register 29 CFR Part 1926 in Section 02221.

B. Contractors electing to use a Trench Box shall include in the Trench Safety Plan:

1. Physical dimensions, type, and grade of materials, positions in the trench, expected loads, the strength of the box, and all associated design calculations necessary to show that the proposed trench box is adequate for the trench conditions expected to be encountered.

2. Waiver of claim for delay cost.

C. Contractors electing to use Shoring, Sheeting, and Bracing shall include in the Trench Safety Plan:

1. Dimensions, type, and grade of materials of all uprights, stringers, and cross braces and spacing of each required to meet OSHA Standards for trench safety and comply with the requirements of this section.

2. All associated design calculations necessary to show that the proposed system is adequate for the trench conditions expected to be encountered.

3. Waiver of claims for delay cost.

3.3 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 maintain a permanent record of daily inspections.

B. If 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, Engineer, 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.

3.4 EMERGENCIES

A. In case of an emergency situation which may threaten or affect the safety or welfare of persons or property, the Contractor shall act at his/her 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 provisions of the General Conditions.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

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 OF PART 1926—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 OF PART 1926—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.

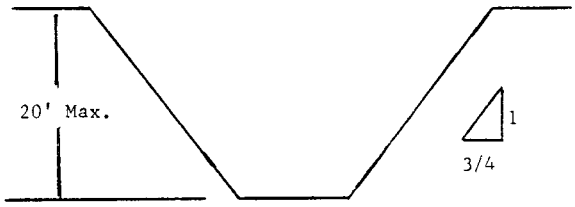
Figure B–1

Slope Configurations

(All slopes stated below are in the horizontal to vertical ratio)

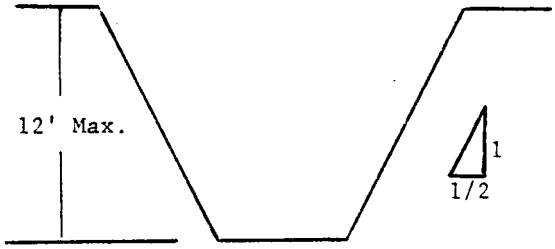
B–1.1 Excavations made in Type A soil.

1. All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of ¾:1.



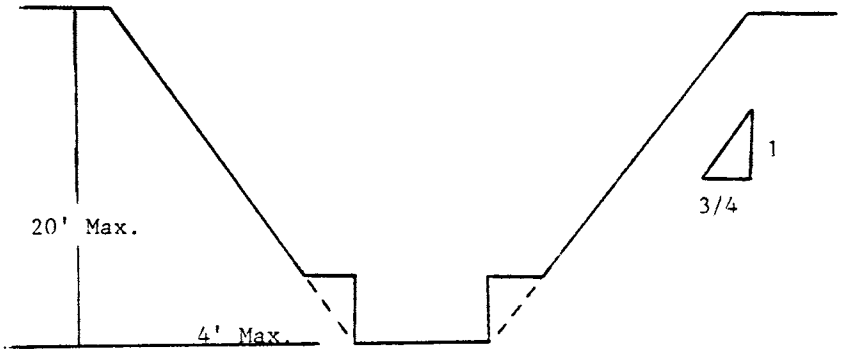
SIMPLE SLOPE—GENERAL

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.

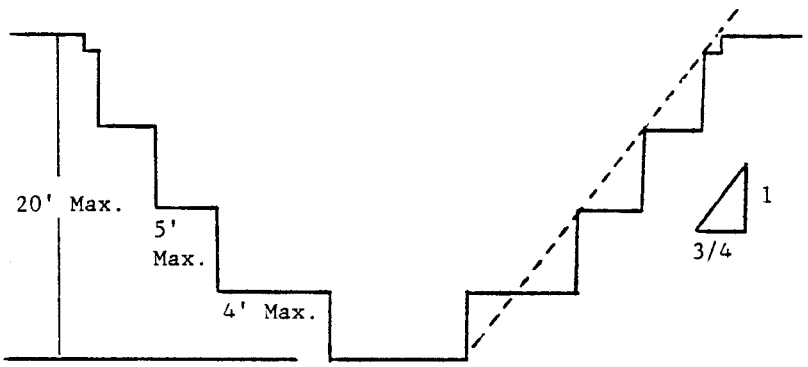


SIMPLE SLOPE—SHORT TERM

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:

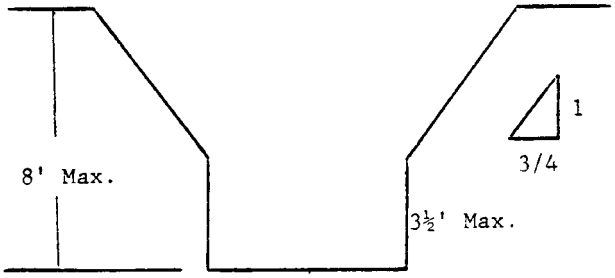


SIMPLE BENCH



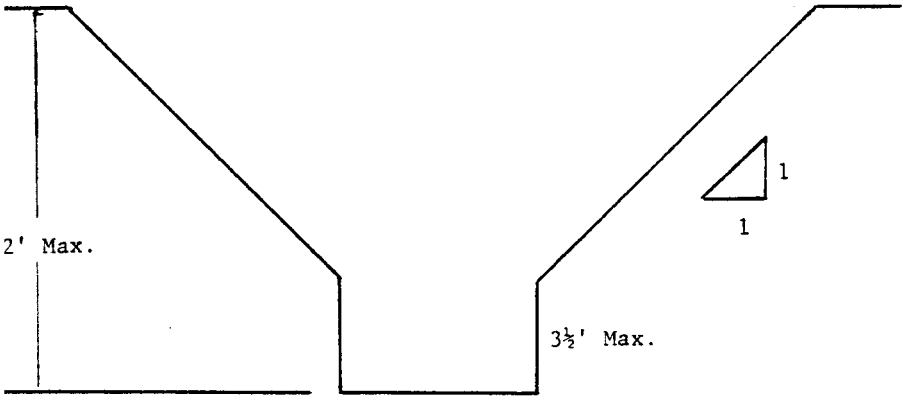
MULTIPLE BENCH

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.



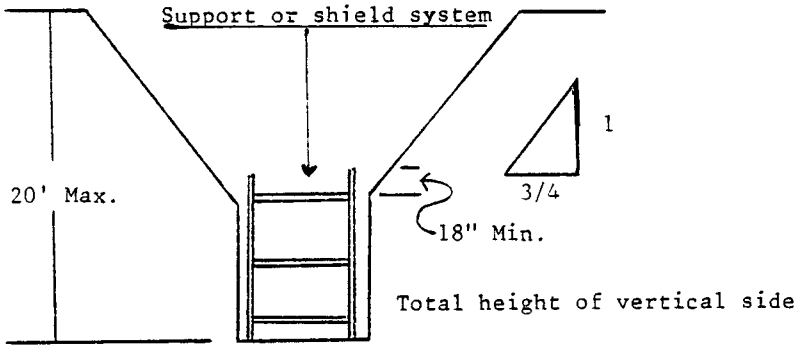
UNSUPPORTED VERTICALLY SIDED LOWER PORTION—MAXIMUM 8 FEET IN DEPTH

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.

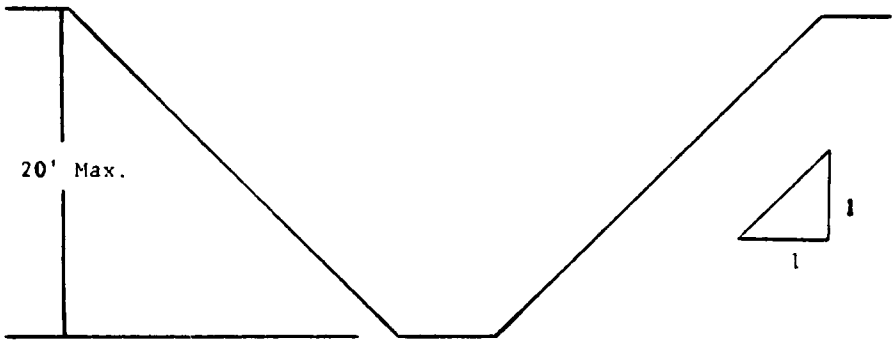


SUPPORTED OR SHIELDED VERTICALLY SIDED LOWER PORTION

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).

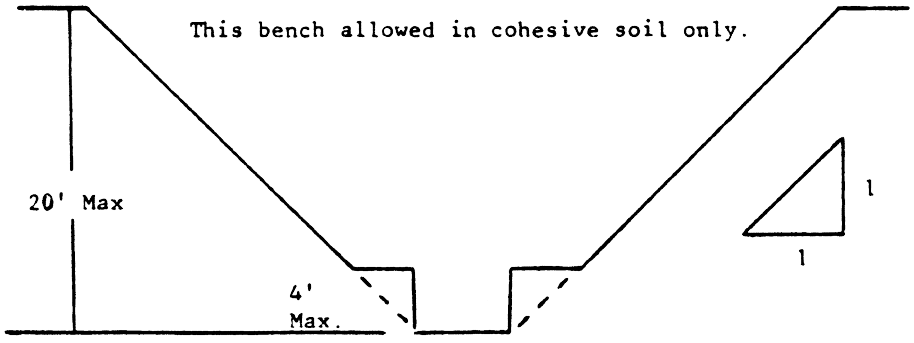
B–1.2 Excavations Made in Type B Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

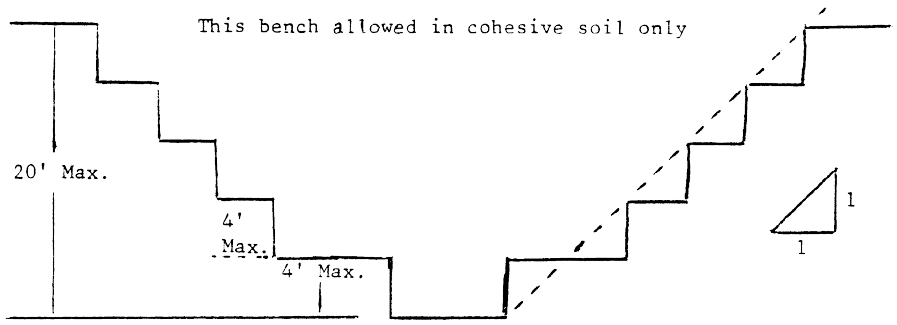


SIMPLE SLOPE

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:

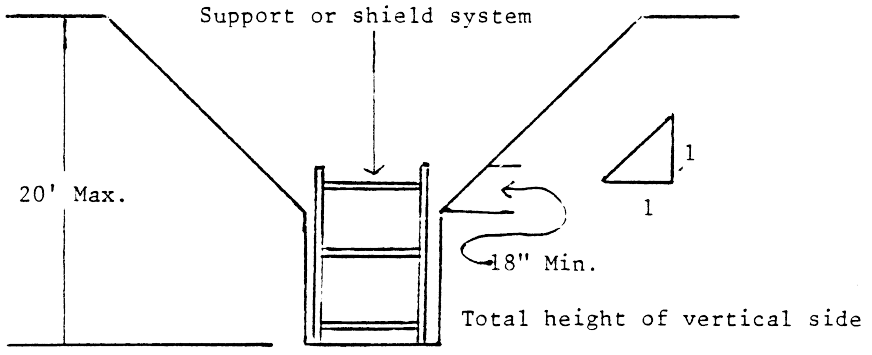


SINGLE BENCH



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.

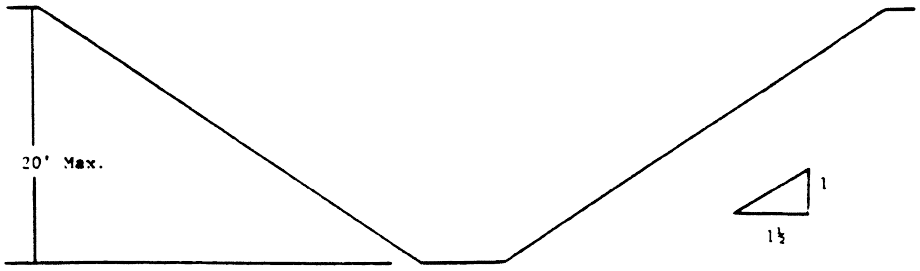


VERTICALLY SIDED LOWER PORTION

4. All other sloped excavations shall be in accordance with the other options permitted in §1926.652(b).

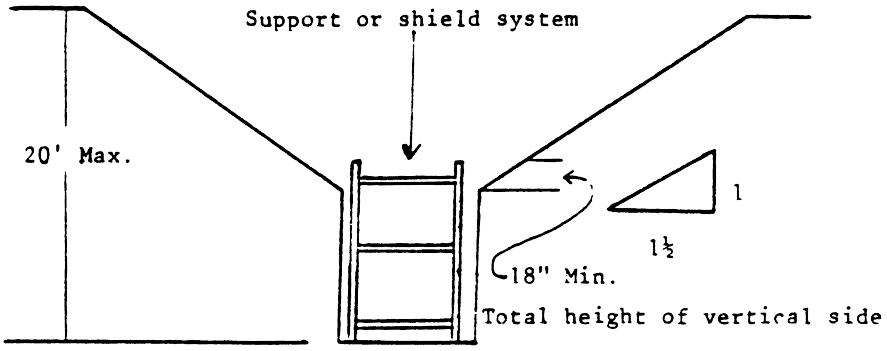
B–1.3 Excavations Made in Type C Soil

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.

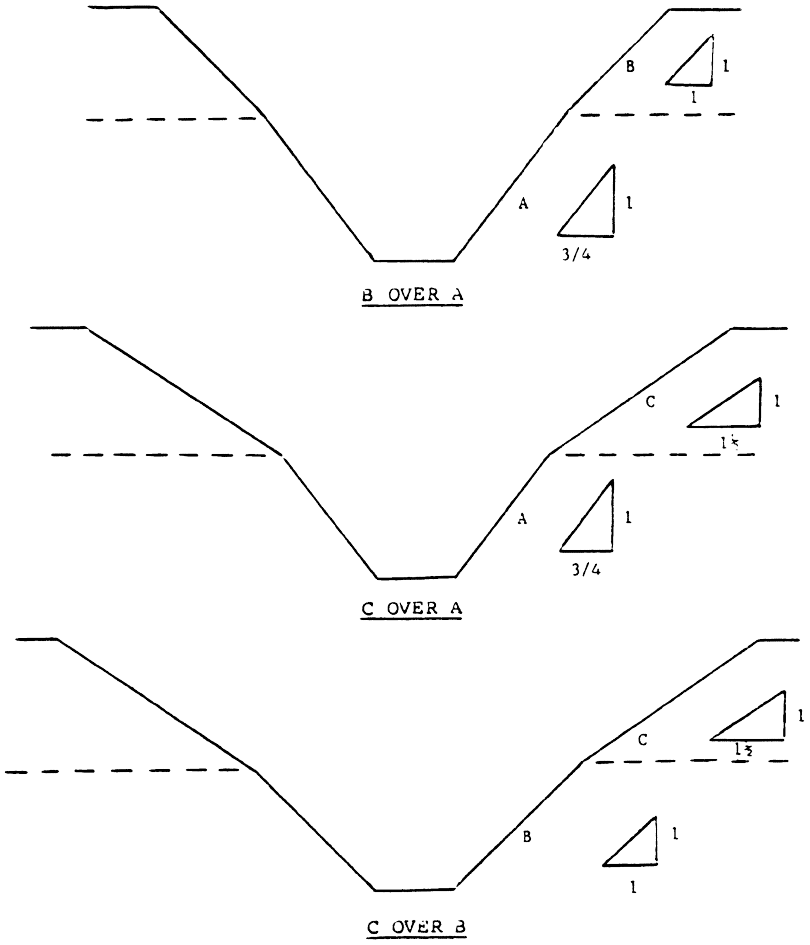


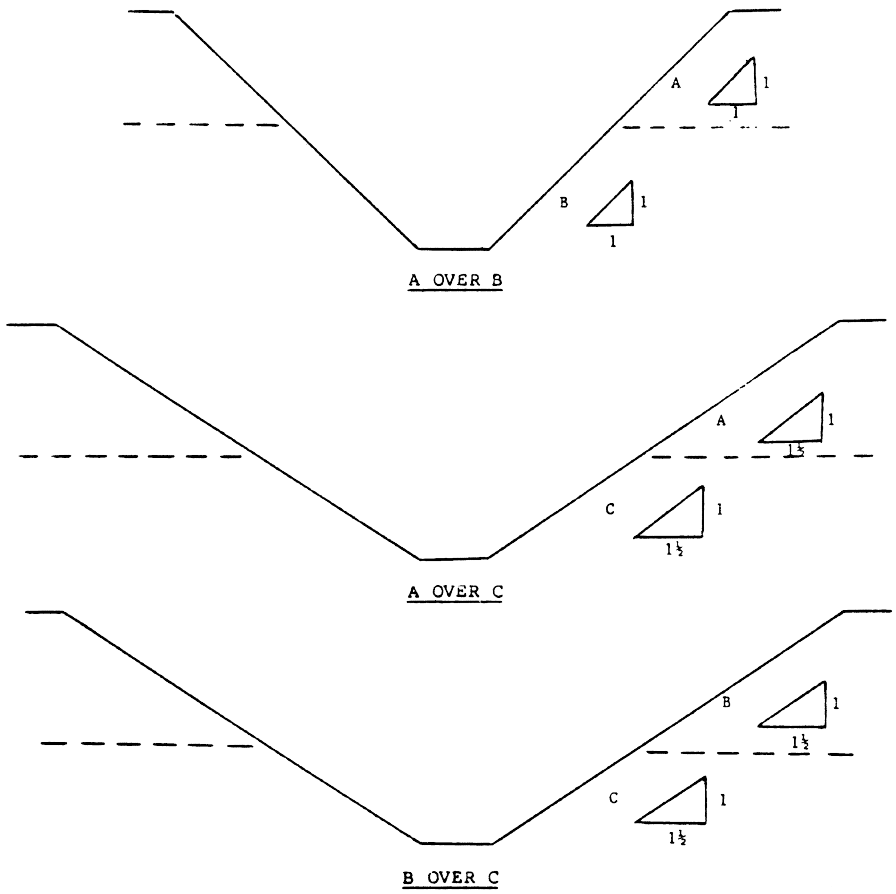
VERTICAL SIDED LOWER PORTION

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
1
1
A
1
3/4
B OVER A
C
1
1½
A
1
3/4
C OVER A
C
1
1½
B
1
1
C OVER B



2. All other sloped excavations shall be in accordance with the other options permitted in §1926.652(b).

APPENDIX C TO SUBPART P OF PART 1926—TIMBER SHORING FOR TRENCHES

(a) *Scope.* This appendix contains information that can be used timber shoring is provided as a method of protection from cave-ins 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 cf 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	8X8	5	3X6				
	UP TO 8	6X6	6X6	6X6	8X8	8X8	10X10	5	3X6				
	UP TO 10	6X6	6X6	8X8	8X8	8X8	10X12	5	3X6				
	See Note 1												
10 TO 15	UP TO 6	6X8	6X8	6X8	8X8	8X8	10X10	5	4X6				
	UP TO 8	8X8	8X8	8X8	8X8	8X8	12X12	5	4X6				
	See Note 1												
	See Note 1												
15 TO 20	UP TO 6	8X8	8X8	8X8	8X10	8X10	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 OF PART 1926—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. 3×12 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. 3×12 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 (3.5×3.5×0.1875) 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)

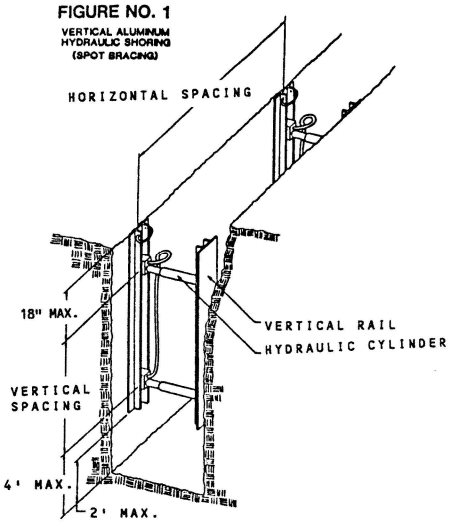


FIGURE NO. 2
VERTICAL ALUMINUM HYDRAULIC SHORING (WITH PLYWOOD)

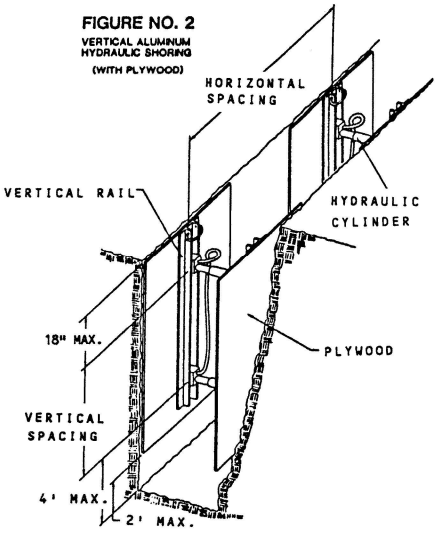


FIGURE NO. 3
VERTICAL ALUMINUM HYDRAULIC SHORING (STACKED)

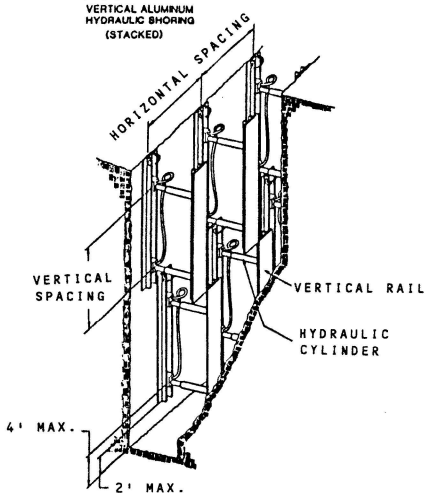


FIGURE NO. 4
ALUMINUM HYDRAULIC SHORING WALER SYSTEM (TYPICAL)

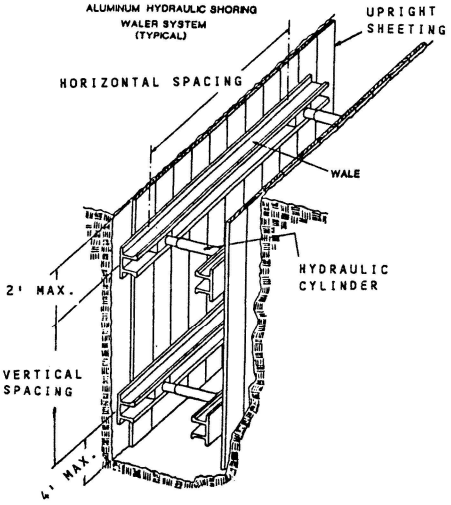


TABLE D - 1.1
ALUMINUM HYDRAULIC SHORING
VERTICAL SHORES
FOR SOIL TYPE A

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		
	VERTICAL SPACING (FEET)	* SECTION MODULUS (IN^3)	WIDTH OF TRENCH (FEET)						MAX.HORIZ.SPACING (ON CENTER)		
			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			
		7.0	9.0	2 IN	9.0	2 IN NOTE(2)	9.0	3 IN	—	—	3x12
		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			
		7.0	8.0	3 IN	8.0	3 IN	8.0	3 IN	—	3x12	—
		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			
		7.0	6.0	3 IN	6.0	3 IN	6.0	3 IN	3x12	—	—
		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.

Figure 1. Aluminum Hydraulic Shoring

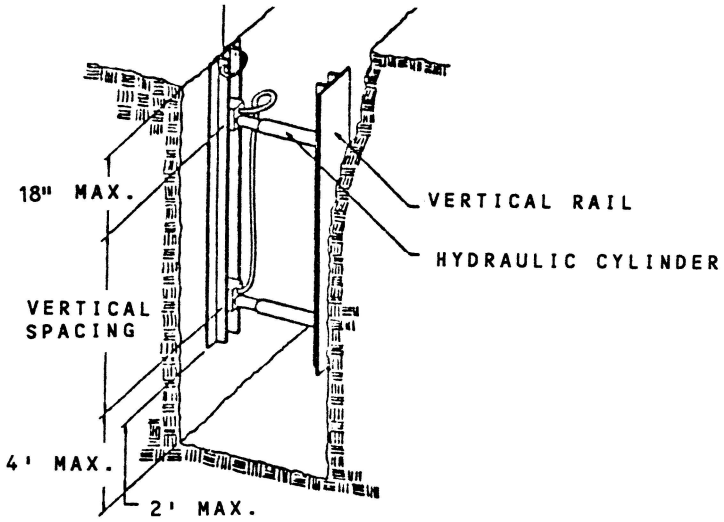


Figure 2. Pneumatic/hydraulic Shoring

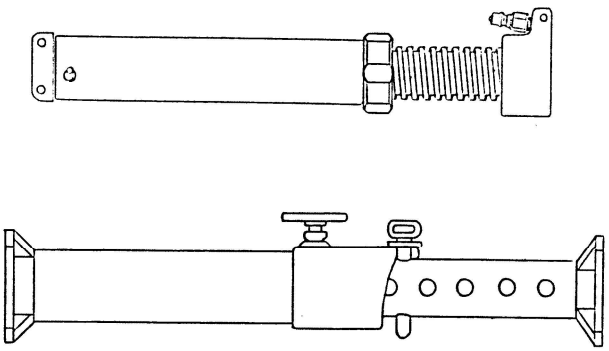


Figure 3. Trench Jacks (Screw Jacks)

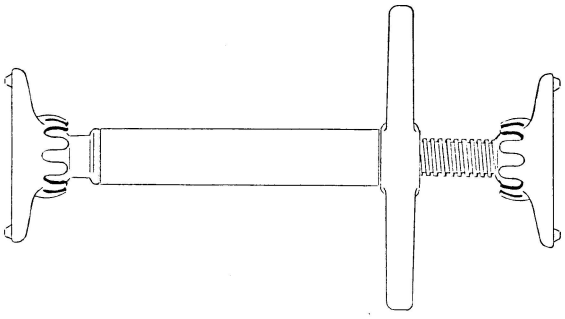
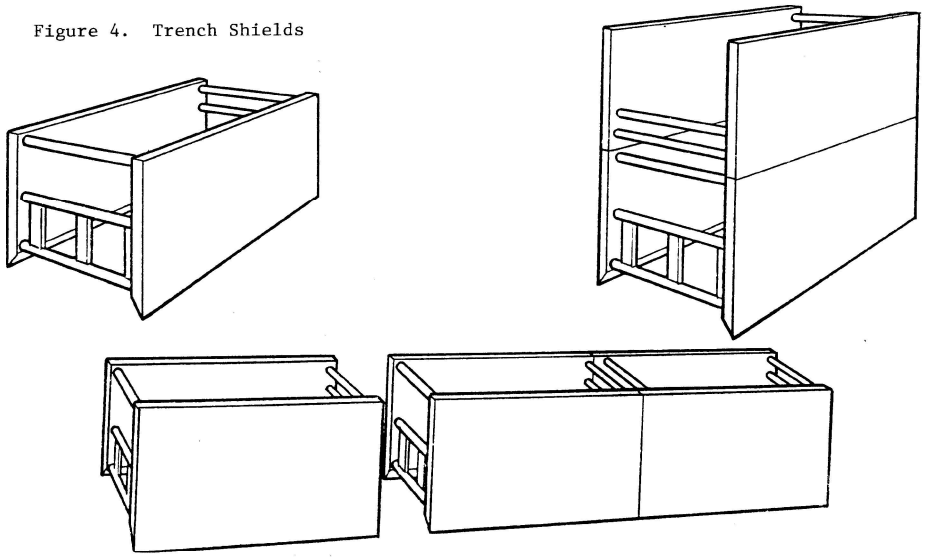


Figure 4. Trench Shields



APPENDIX F TO SUBPART P OF PART 1926—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).

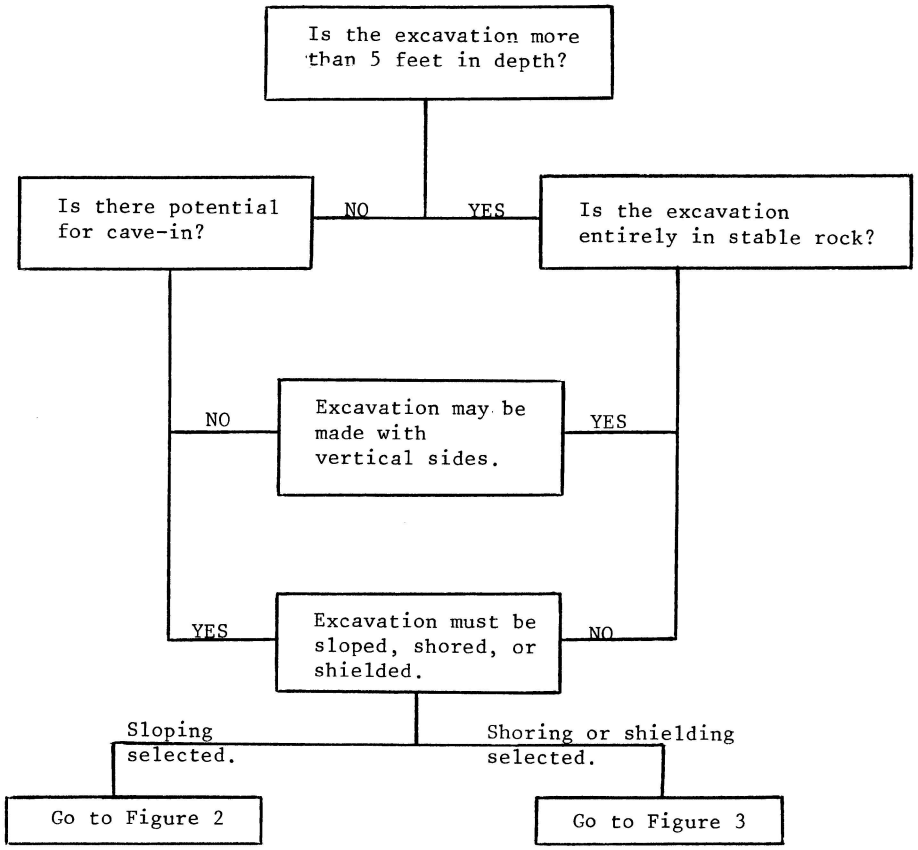


FIGURE 1 - PRELIMINARY DECISIONS

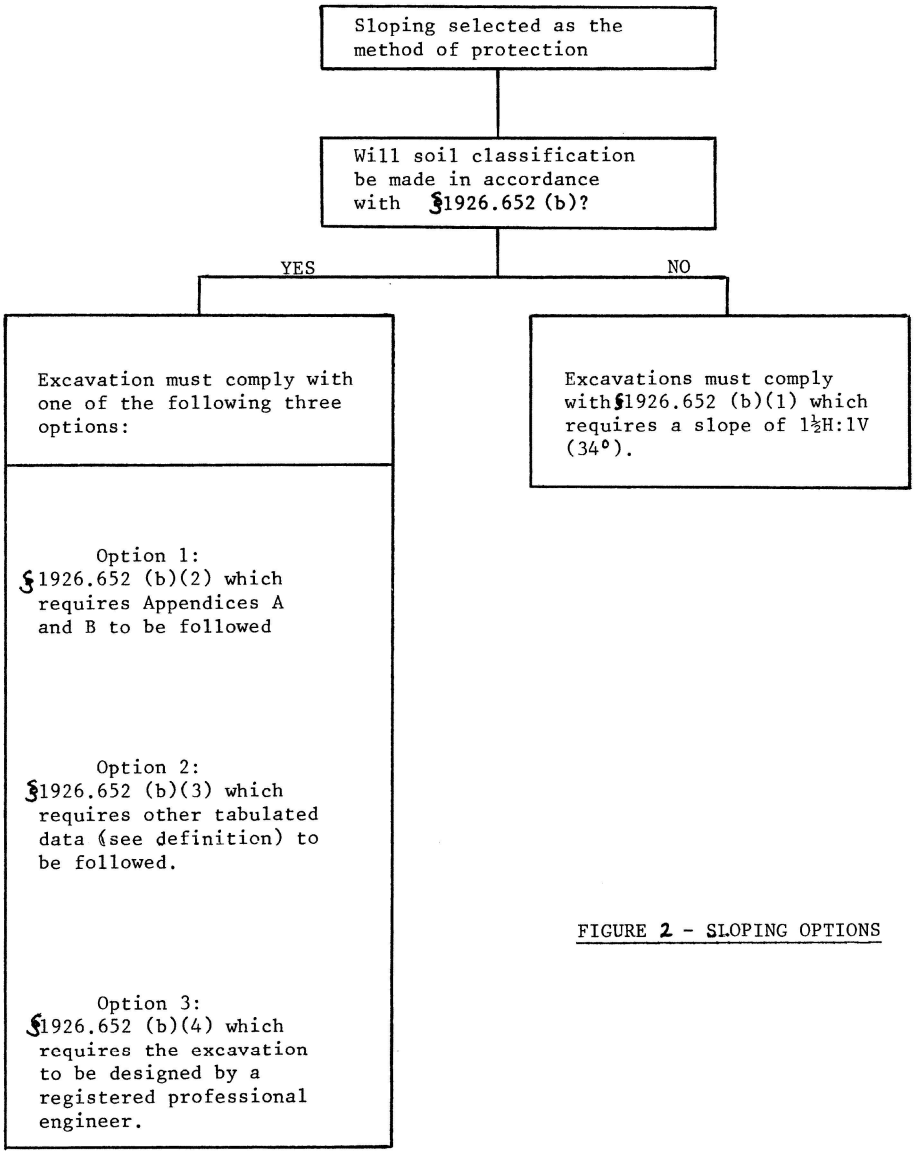


FIGURE 2 - SLOPING OPTIONS

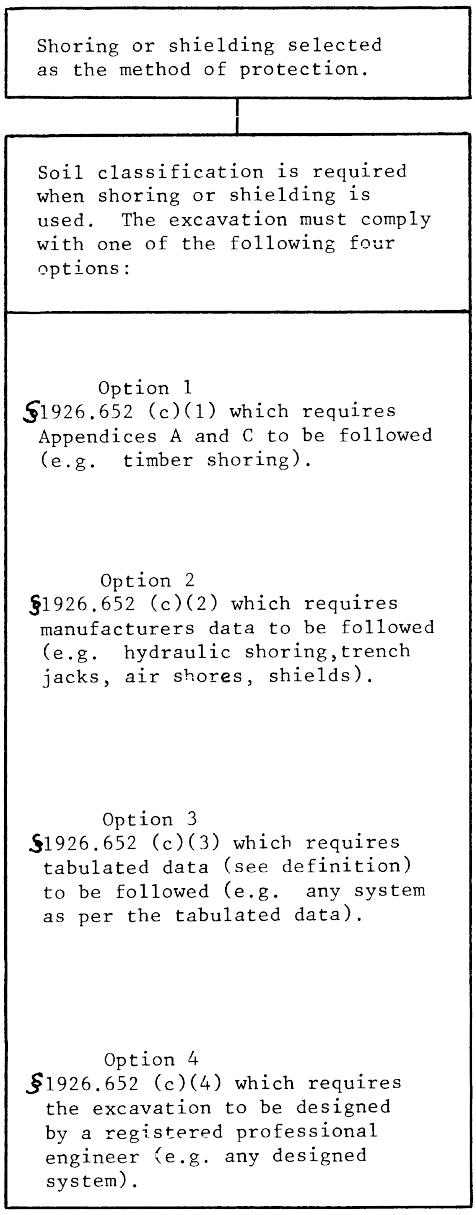


FIGURE 3 - SHORING AND SHIELDING OPTIONS

SECTION 01016

CONTROL MATERIALS

PART 1 GENERAL

1.1 APPROVAL OF MATERIALS

A. Unless otherwise specified, only new materials and equipment shall be incorporated into the Work. All materials and equipment furnished by the Contractor shall be subject to the inspection and approval of the Engineer. No material shall be delivered to the work without prior approval of the Engineer.

B. As specified in Section 01300, the Contractor shall submit to the Engineer, data relating to materials and equipment he proposes to furnish for the Work. Such data shall be in sufficient detail to enable the Engineer to identify the particular product and to form an opinion as to its conformity to the Specifications.

C. Facilities and labor for handling and inspection of all materials and equipment shall be furnished by the Contractor. If the Engineer requires, either prior to beginning or during the progress of the Work, the Contractor shall submit additional samples or materials for such special tests as may be necessary to demonstrate that they conform to the Specifications. Such samples shall be furnished, stored, packed, and shipped as directed at the Contractor's expense.

D. Any delay of approval resulting from the Contractor's failure to submit samples or data promptly shall not be used as the basis for a claim against the Owner or the Engineer.

E. In order to demonstrate the proficiency of workmen or to facilitate the choice among several textures, types, finishes, and surfaces, the Contractor shall provide such samples of workmanship or finish as may be required.

F. The materials and equipment used on the work shall correspond to the approved samples or other data.

1.2 HANDLING AND STORAGE OF MATERIALS

A. All materials and equipment to be incorporated into the Work shall be handled and stored by the Contractor in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft or damage of any kind whatsoever to the material or equipment.

B. All mechanical equipment subject to corrosive damage from exposure shall be stored in a building. The building may be a temporary structure on the site or elsewhere, but it must be satisfactory to the Engineer.

C. All materials which, in the opinion of the Engineer, have become so damaged as to be unfit for the use intended or specified shall be promptly removed from the site of the Work, and the Contractor shall receive no compensation for the damaged material or its removal.

D. All pipe and other materials delivered to the job shall be unloaded and placed in a manner which will not hamper the normal operation of the Work or interfere with the flow of traffic.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01020

TPDES REQUIREMENTS

PART 1 GENERAL

1.1 GENERAL

A. The Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit No. TXR 150000, was issued March 5, 2018 (Construction General Permit). The Construction General Permit allows operators to obtain permit coverage for stormwater conveyance from Small and Large Construction Activities. The TPDES program implements the federal National Pollutant Discharge Elimination System (NPDES) program in the state of Texas, which requires that operators of Small or Large Construction Activities obtain permit coverage prior to the commencement of construction activities.

B. The engineer has estimated that the project will disturb approximately 1.33 acres of land for the length of the pipeline being installed throughout the Hillcrest Center. The Contractor is responsible to prepare a Storm Water Pollution Prevention Plan (SW3P) at no additional cost to the Owner for construction disturbing 1-acre or more; construction occurring outside of periods of low erosion potential for El Paso, and for construction activity not meeting the minimum erosive R-factor.

1.2 SECTION INCLUDES

A. Documentation to be prepared and signed by Contractor before conducting construction operations, in accordance with the Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit Number TXR 150000, issued on March 5, 2018 (Construction General Permit).

B. Implementation, maintenance inspection, and termination of stormwater pollution prevention control measures including, but not limited to, erosion and sediment controls, stormwater management plans, waste collection and disposal, and other applicable practices as shown in Contractor prepared SW3P.

1.3 DEFINITIONS

A. Commencement of Construction Activities: The exposure of soil resulting from activities such as clearing, grading, and excavating.

B. Large Construction Activity is defined as a project that:

1. Disturbs five acres or more, or

2. Disturbs less than five acres but is part of a large common plan of development that will disturb five acres or more of land.

C. Small Construction Activity is a project that:

1. Disturbs one or more acres but less than five acres, or

2. Disturbs less than one acre but is part of a larger common plan of development that will ultimately disturb one or more acres but less than five acres.

D. An operator is a person or persons who have day-to-day operation control of the construction activities, which are necessary to ensure compliance with the SW3P for the site.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 STORMWATER POLLUTION PREVENTION PLAN (SW3P)

A. The Contractor shall have an SW3P prepared in accordance with Part III of the Construction General Permit for Small or Large Construction Activities if applicable. A professional engineer licensed in the state of Texas shall prepare the SW3P, in accordance with City of El Paso ordinance.

B. Support Activities within a 1-mile distance of project boundary of the permitted construction site, which directly supports the project, should be included in the Storm Water Pollution Prevention Plan prepared for the Contractor. These activities include but are not limited to:

1. Equipment Staging Areas
2. Material Storage Yards
3. Material Borrow areas
4. Excavated material disposal areas
5. Concrete batch plants
6. Asphalt batch plants

Refer to Part II, Section A of the Construction General Permit for a description of Discharges Eligible for Authorization under the Construction General Permit.

C. The SW3P will be updated as needed during construction following Part III, Section E of the Construction General Permit.

D. The SW3P shall be submitted to the engineer 15 days after award of the contract. Any comments provided shall be addressed prior to commencing construction activities.

E. The SW3P shall be submitted to the City of El Paso Municipal Services for Review and Approval seven (7) days prior to the commencement of construction activities. Refer to Part 3.1, Section E and Part 3.2, Section B for additional submittal requirements for Large and Small Construction Activities, respectively.

F. The SW3P shall be implemented prior to the commencement of construction activities and maintained through the duration of construction.

3.2 SMALL CONSTRUCTION ACTIVITY

A. Construction Site Notice

1. Fill out, sign, and date the Construction Site Notice, included at the end of this Section. Submit the signed copy of the Construction Site Notice to the Engineer at least two days before commencement of construction activities.
2. Post a signed copy of the Construction Site Notice near the main entrance of a construction site in a prominent place for viewing by the general public and local, state, and federal authorities prior to commencing construction activities, and maintain it in that location until completion of the construction. Post name and telephone number of Contractor's local contact person, brief project description and location of SW3P.

   If Project is a linear construction project (e.g.: road, utilities, etc.), post notice in a publicly accessible location near active construction. Move notice as necessary.
3. The Contractor shall submit a signed copy of the Construction Site Notice to the City of El Paso Municipal Services Department.

B. Storm Water Pollution Prevention Plan Application

1. Fill out and sign the City of El Paso Municipal Services Department Storm Water Pollution Prevention Plan Application.

2. Provide the engineer with a copy of the signed application 10 days prior to commencing construction activities.

3. Submit the original signed application along with a $100 fee and two copies of the SW3P to Municipal Services for review and approval seven (7) days prior to commencing construction activities.

The Municipal Services point of contact is Mr. Robert Rivera (915) 564-2015.

3.3 LARGE CONSTRUCTION ACTIVITY

A. Notice of Intent (NOI)

1. Prepare and submit NOI with required documentation and fees as required by the City of El Paso and TCEQ.

B. City Of El Paso Permit Application

C. Storm Water Pollution Prevention Plan Application

1. Fill out and sign the City of El Paso Municipal Services Department Storm Water Pollution Prevention Plan Application.

2. Provide the engineer with a copy of the signed application 10 days prior to commencing construction activities.

3. Submit the original signed application along with a $100 fee and two copies of the SW3P to Municipal Services for review and approval seven (7) days prior to commencing construction activities.

The Municipal Services point of contact is Mr. Tony Bustillos (541-4662).

3.4 CERTIFICATION REQUIREMENTS

A. Fill out the Pollution Prevention Plan Certification Form to include the Operator's signature, name, title, and organization.

B. Contractor and Subcontractors shall sign and date Contractor's / Subcontractor's Certification for TPDES Permitting included at the end of this Section including Contractor's name, address, and telephone number, and the names of persons or firms responsible for maintenance and inspection of erosion and sediment control measures. Use multiple copies as required to document full information. Include this certification with other Project certification forms.

C. Submit properly completed certification forms to the engineer for review before commencing construction.

D. Conduct inspections in accordance with TCEQ requirements. Ensure persons or firms responsible for the maintenance and inspection of erosion and sediment control measure read, fill out, sign, and date the Erosion Control Contractor's Certification for Inspection and maintenance. Use EPA's NPDES Construction Inspection Form included at the end of this Section. Controls must be inspected once every fourteen (14) calendar days and within twenty-four (24) hours of the end of a storm event of 0.5 inches or greater, in accordance with Part III, Section F, of the Construction General Permit.

3.5 RETENTION OF RECORDS

A. Keep a copy of this document and the SW3P in a readily accessible location at the construction site from Commencement of Construction Activity and maintain it in that location until completion of the construction. Contractors with day-to-day operational control over SWP3 implementation shall have a copy of the SW3P available at a central location, on-site, for the use of all operators and those identified as having responsibilities under the SW3P.

3.6 ON-SITE WASTE MATERIAL STORAGE

A. On-site waste, material storage shall be self-contained and shall satisfy appropriate local, state, and federal rules and regulations.

B. Prepare a list of waste material to be stored on-site. Update list as necessary to include up-to-date information. Keep a copy of the updated list with the SW3P.

C. Prepare a description of controls to reduce pollutants generated from on-site storage. Include storage practices necessary to minimize exposure of materials to stormwater, and spill prevention and response measures consistent with best management practices. Keep a copy of the description with the SW3P.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 GENERAL

A. The unit price or lump sum price bid on each item as stated in the Proposal shall include furnishing all labor, superintendence, incidentals, machinery, supplies, equipment, and materials necessary to complete the various items of work in accordance with the Design Drawings and Specifications. Cost of work or materials shown on the Design drawings, called for in the Specifications and on which no separate payment is made shall be included in the bid price on the various pay items for which they are associated.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

PIPELINE AND APPURTENANCES

4.1 INSURANCE, BONDS, AND MOVE-IN RELATED EXPENSES (Bid Items No. 1 and 14)

A. Measurement: Mobilization and demobilization activities shall be measured will be paid on a lump-sum basis occurrence.

B. Payment: This price is full compensation for mobilization, demobilization, insurance, bonds, all activities and associated costs for transportation of contractor's personnel, equipment, operating supplies to the site, the establishment of offices, buildings, job trailers, or other necessary general facilities for the contractor's operations at the site, utilities to the office, building, or job trailers including power, construction permits, and fees, site administration expenses, temporary fencing, potholing of utilities, telephone, videotaping requirements, TPDES requirements, and TPDES fees. Payment shall also include all activities and costs for demobilization to include transportation of personnel, equipment, and supplies from the site, disassembly, removal, and site cleanup of offices, buildings, job trailers, or other facilities assembled on the site, contract closeout, as-built drawings and specifications, and all other incidentals associated with contractor's demobilization from the site. This item shall be limited to five (5) percent of the total bid price for Base Bid A USDA Project Limits, Items 2-13, and five (5) percent of the total bid for Base Bid B EPA Project Limits, Items 15-27. Both Base Bids A and B shall be paid 50% at the beginning of the project and 50% at closeout on a lump sum basis.

4.2 PROVIDE AND IMPLEMENT TRENCH SAFETY SYSTEM (Bid Items No. 2 and 15)

A. Measurement: Furnishing, installing, and implementing the trench safety system shall be measured by the linear foot.

B. Payment: This price is full compensation for furnishing, installing, and implementing the trench safety system where necessary (deeper than 5-feet) to include excavation, backfill required for excavation protection, furnishing, placing and removing shoring, sheeting, bracing, diversion or water, jacking and jacking removal, proper disposal of spoil material, equipment, labor, materials, tools, testing, inspection, and incidentals. The Contractor shall be responsible for repairing damages or distress to adjacent properties, structures, and utilities caused by these operations. It shall also cover the design of the trench safety system prepared by a Texas Licensed Professional Engineer.

4.3 VIDEOTAPING OF PROJECT SITE (Bid Items No. 3 and 16)

A. Measurement: All costs for this work shall be compensated under this pay item and will be paid on a lump-sum basis.

B. Payment: Project site shall be videotaped prior to any construction and be accompanied by the Engineer or his/her representative to show the existing conditions of the roadways, adjacent properties, easements, structures, utilities, drainage structures, culverts, channels, and any other existing improvements. Following substantial completion and site cleanup/ demobilization activities, the Contractor shall videotape the post-construction conditions of the entire project site. The Contractor shall provide two (2) copies in DVD format to the Engineer documenting the before and after construction conditions. The DVD's must include labels, including project title, bid number, and date recorded.

4.4 PROVIDE AND IMPLEMENT APPROVED TRAFFIC CONTROL PLAN (TCP) (Bid Items No. 4 and 17)

A. Measurement: Furnishing, installing, and implementing the Traffic Control Plan (TCP) shall be paid on a lump-sum basis occurrence.

B. Payment: This price is full compensation for the TCP and shall include preparation of a formal TCP by a Texas Licensed Professional Engineer, submitting and obtaining approval of the formal TCP from the required governing agencies (El Paso Street and Maintenance Department), furnishing, installing and maintaining the approved TCP in conformance to the specifications and principles given in the "*Texas Manual on Uniform Traffic Control Devices*" over the entire project area, and all other incidentals required for the Contractor to complete, implement and maintain the TCP requirements. Conflicting pavement marking/signs must be removed/covered for a long-term project. Work-zone markings must be installed where needed. Original markings/signs that are removed must be replaced upon completion. All costs for installation, maintenance, adjustments, replacements, removal, materials, equipment, labor, tools, traffic mounted attenuators, and incidentals shall be compensated under this bid item. Payment shall include daily, overnight, and long-term traffic control.

4.5 REMOVE AND REPLACE PAVEMENT AND INSTAL 2-INCH (TYPE-C) HMAC (Bid Items No. 5 and 18)

A. Measurement: Furnishing and installing 2-inch HMAC asphalt pavement (Type C) will be measured in square yards of surface area in place.

B. Payment: Price is full compensation for furnishing and installing 2-inch HMAC asphalt pavement (Type C) preparation and shall include asphalt, materials, application of seal coat, adjustment of existing valves, meters, and manholes, joints to existing pavements, concrete aprons/collars at the manhole and valve frames, equipment, labor, tools, and incidentals. The Contractor shall be responsible for the repair of damages or distress to adjacent properties, structures, and utilities caused by these operations. All costs for this work shall be compensated under this pay item.

4.6 FURNISH AND INSTALL 8-INCH, 12-INCH, AND 16-INCH PVC PIPE (Bid Items No. 6, 7 19, 20, and 21)

A. Measurement: Furnishing and install an 8-inch, 12-inch, and 16-inch PVC pipeline and shall measure by the linear foot.

B. Payment: Work under this item shall include all costs associated with the cutting and capping of existing water lines, bonnet box, cover, lid and all other appurtenances as detailed in the contract documents; potholing of all existing utilities; connection of new water line to existing water lines; coordination; excavation, to include additional excavation and labor for vertical and/or horizontal adjustment of the main to clear existing utility lines

and/or other structures; backfilling and embedment; compaction and compaction testing for utilities; removal and disposal of existing utility lines when in conflict with new water mains (including AC, CI, and VC pipe removal and disposal work), all pipe, fittings, and accessories; removal of abandoned utility mains (per governing agency requirements based on material disposal requirements) as needed for water line installation; mechanical joint restraints; disinfection; testing; dewatering and disposal of water where required; and all appurtenances defined herein to include, but not limited to the following items: bypass temporary services as required, concrete thrust blocks, marking tape, landscaping & irrigation system repair, and traffic control systems, and all other items of the project not indicated as being covered under the other specific bid items shown on 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.

4.7 FURNISH AND INSTALL 8-IN, 12-INCH AND 16-INCH GATE VALVES AND BONNET BOXES (Bid Item No. 8, 9, 22, 23, and 24)

A. Measurement: Furnishing and installing the 8-inch gate valves shall be measured on each basis.

B. Payment: This price is full compensation for the furnishing and installation of the gate valves and bonnet box, including but not limited to the connection of the gate valves, the bonnet box, the excavation, backfill, compaction, testing of the valves, concrete supports, join restrains, labor and incidentals. The Contractor shall be responsible for repairing damages or distress to adjacent structures, properties, and utilities caused by the operations.

4.8 FURNISH AND CONNECT ¾-INCH WATER SERVICE LINES (Bid Item No. 10 and 25)

A. Measurement: Furnishing and installing the ¾-inch water service lines shall be measured on each basis.

B. Payment: Work under this item shall include all costs associated with furnishing labor, tie in from the main distribution line in the street, the piping to the meter box, backflow preventer and piping inside the yard for connection to the house, tie in point shall be noted before the connection is made, property yards shall be restored to original condition after installation, new materials, equipment, and; coordination; location of existing service; temporary service; and all appurtenances define herein to include, but not limited to, the following items: meter boxes service pipe, valves, and fittings. The Contractor shall, at their expense, completely restore to its original condition any disturbed area associated with the installation of the new water services. Water services shall be wet tapped with the line under pressure. No dry or direct taps are authorized.

4.9 FURNISH AND INSTALL STUB-OUT CONNECTION (Bid Item No. 11 and 26)

A. Measurement: Furnishing and installing the water service stub-out connection shall be measured on each basis.

B. Payment: Work under this item shall include all costs associated with furnishing labor, tie in shall extend from the main distribution line in the street to the property line, the stub-out shall be capped with a marker only, new materials, equipment, and; coordination; location of existing service; temporary service; and all appurtenances define herein to include, but not limited to, the following items: service line pipe, valves, and fittings. The Contractor shall, at their expense, completely restore area to original condition any disturbed area associated with the installation of the water service stub-out services. Water services shall be wet tapped with the line under pressure. No dry or direct taps are authorized. Service stub-outs shall be installed in accordance with the specifications and drawings.

4.10 FURNISH AND INSTALL NEW FIRE HYDRANTS (Bid Item No. 12 and 27)

A. Measurement: Furnishing and installing the new fire hydrant shall be measured on each basis.

B. Payment: Work under this item shall include all costs associated with furnishing labor, materials, equipment, and incidents to replace and install new fire hydrants, piping, and valve as indicated on the drawings in accordance with EPW's requirements and according to typical fire hydrant installations, including Davidson Anti-Terrorism Corrosion Resistant Valve Kit (DATV), but not limited to, any spool extension, as needed.

4.11 FURNISH AND INSTALL MASTER METER (Bid Item No. 13)

A. Measurement: Furnishing and installing the new master meter shall be measured on each basis.

B. Payment: Work under this item shall include all costs associated with furnishing the master meter (refer to drawing plans for more details) in accordance with EPWater's requirements, the backflow preventer and insulated box, concrete thrust blocks, rock wall protection, marking tape, demolition and replacement of landscaping to original condition or better, curb and gutter, concrete sidewalk, ADA ramp, material, equipment, labor, excavation, compaction, testing, disposal of demolished material, and all other items of the project not indicated as being covered under the other specific bid items shown on the drawings. Refer to the backflow preventer detail drawings for more details.

END OF SECTION

SECTION 01041

PROJECT COORDINATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Project coordination

B. Construction mobilization

C. Schedules

D. Submittals

E. Closeout procedures

1.2 RELATED SECTIONS

A. General Conditions

B. Section 01710 Contract Closeout: Contract Closeout Procedures

1.3 PROJECT COORDINATION

A. Prior to the commencement of work, coordination must be completed. Coordination shall include the preparation and distribution of pre-approved flyers that include the Contractor's Name with telephone number, name of the project, construction period, and location of work. Coordination shall be done with the following:

1. Residences within the Hillcrest Center Project Site
2. El Paso Water (EPWater)
3. City of El Paso Traffic Division
4. All Utility companies impacted by the project
5. City of El Paso Engineering Department

B. Improvements to the area infrastructure in the project area may be conducted concurrently with this project by others. The Contractor shall be responsible for ascertaining the nature and extent of any collateral work done by others or work by other trades. The Contractor shall include in his bid all costs associated with coordinating with others or work by other trades. The Contractor shall not be entitled to additional compensation from the Owner resulting from such simultaneous or collateral work, nor shall concurrent work be the reason extension to the contract time. The Contractor shall be aware of any and all concurrent work in the area that will require coordination for tie-ins of his work. If necessary, to avoid or minimize damage or delay, the Contractor shall redeploy his workforce to other areas of the Work, at no cost to the Owner. The Contractor shall be responsible for the coordination with all utility companies as necessary for the timely completion of the project.

The Contractor shall be required to notify in person and by flyer all adjacent commercial and residential property owners of the proposed work prior to commencing construction. The flyer shall be submitted to the Engineer for review and approval. The notification and flyer shall include the anticipated construction schedule and a brief description of the scope of work.

1.4 CONSTRUCTION MOBILIZATION

A. Cooperate with the Owner and Engineer in the allocation of mobilization areas of the site for access, traffic, and parking facilities.

B. During construction, coordinate the use of site and facilities through the Owner.

C. Comply with the Owner's procedures for project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

D. Comply with instructions of the Owner and Engineer for use of temporary utilities and facilities and construction facilities.

1.5 SCHEDULES

A. Submit preliminary progress schedule.

B. After review and approval, revise and resubmit the schedule to comply with the revised Project Schedule.

C. During the progress of work, revise and resubmit with Applications for Payment.

D. Contractor shall update the Project Schedule monthly

1.6 SUBMITTALS

A. Submit shop drawings, product data, and samples in accordance with Section 01300 for review and compliance with Contract Documents, for field dimensions and clearances, for relation to available space, and relation to work of separate contracts. Revise and resubmit as required.

B. Submit requests for interpretation of Contract Documents and obtain instructions through the Owner.

C. Process requests for substitutions, and change orders, through the Owner.

D. Deliver closeout submittals for review and preliminary inspection reports.

1.7 CLOSEOUT PROCEDURES

A Notify Owner and Engineer when Work is considered ready for Substantial Completion. Accompany the Owner and Engineer on preliminary inspection to determine items to be listed for completion or correction in Contractor's Notice of Substantial Completion.

B. Comply with the Owner's instructions to correct items of work listed in executed Certificates of Substantial Completion.

C. Notify the Owner and Engineer when Work is considered finally complete.

D. Comply with the Owner's and Engineer's instructions for completion of items of Work determined by the Owner's and Engineer's final inspection.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01090

REFERENCE STANDARDS

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. Abbreviations and acronyms used in Contract Documents to identify reference standards.

1.2 QUALITY ASSURANCE

A. Application: When a standard is specified by reference, comply with requirements and recommendations stated in that standard, except when requirements are modified by the Contract Documents or applicable codes establish stricter standards.

B. Publication Date: The publication in effect on the date of issue of Contract Documents, except when a specific publication date is specified.

1.3 ABBREVIATIONS, NAMES, AND ADDRESSES OF ORGANIZATIONS

A. Obtain copies of referenced standards direct from publication source when needed for the performance of Work, or when required for submittal by Contract Documents.

AA	Aluminum Association 818 Connecticut Avenue, N.W. Washington, DC 20006
AABC	Associated Air Balance Council 1000 Vermont Avenue, N.W. Washington, DC 20005
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W. Washington, DC 20001
ACI	American Concrete Institute Box 19150 Reford Station Detroit, MI 48219
ADC	Air Diffusion Council Box 19150 Reford Station Detroit, MI 48219
AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
AISC	American Institute of Steel Construction 1221 Avenue of the Americas New York, NY 10020
AISI	American Iron and Steel Institute 1000 16th Street, N.W.

	Washington, DC 20036
AMCA	Air Movement and Control Association 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
ARI	Air-Conditioning and Refrigeration Institute 1815 North Fort Meyer Drive Arlington, VA 22209
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers 1791 Tullie Circle, N.E. Atlanta GA 30329
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWWA	American Water Works Association 6666 W. Quincy Avenue Denver, CO 80235
AWPA	American Wood-Preservers' Association 7735 Old Georgetown Road Bethesda, MD 33125
AWS	American Welding Society 2501 NW 7th Street Miami, FL 33125
CRSI	Concrete Reinforcing Steel Institute 180 North LaSalle Street, Suite 2110 Chicago, IL 60601
FM	Factory Mutual System 1151 Boston-Providence Turnpike Norwood, MA 02062
FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Bldg. 197 Washington, DC 20407
GA	Gypsum Association 1603 Orrington Avenue

	Evanston, IL 60201
MIL	Military Specification Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
MLSFA	Metal Lath/Steel Framing Association 221 North LaSalle Street Chicago, IL 60601
NAAMM	National Association of Architectural Metal Manufacturers 221 North LaSalle Street Chicago, IL 60601
NEBB	National Environmental Balancing Bureau 8224 Old Courthouse Road Vienna, VA 22180
NEMA	National Electrical Manufacturers' Association 2101 L. Street, N.W. Washington, DC 20037
NFPA	National Forest Products Association 1619 Massachusetts Avenue, N.W. Washington, DC 20036
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 20076
PCI	Prestressed Concrete Institute 20 North Wacker Drive Chicago, IL 60606
PS	Product Standard U.S. Department of Commerce Washington, DC 20203
SDI	Steel Deck Institute Box 3812 St. Louis, MO 63122
SIGMA	Sealed Insulation Glass Manufacturers Association 111 East Wacker Drive Chicago, IL 60601
SJI	Steel Joist Institute 1703 Parham Road Suite 204 Richmond, VA 23229
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association 8224 Old Court House Road Vienna, VA 22180

TCA	Tile Council of America, Inc. Box 326 Princeton, NJ 08540
UL	Underwriters' Laboratories, Inc. 333 Pfingsten Road Northbrook, IL 60062

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01110

ENVIRONMENTAL PROTECTION PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

A. The work covered by this Section consists of furnishing all labor, materials, and equipment and performing all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man, or degrade the utility of the environment for aesthetic and/or recreational purposes.

B. The control of environmental pollution requires consideration of air, water, and land, and involves the management of noise and solid waste, as well as other pollutants.

C. Schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, stacked hay bales, seeding, mulching, or other special surface treatments as are required to prevent silting and muddying of streams, rivers, impoundments, lakes, etc. All erosion control measures shall be in place in an area prior to any construction activity in that area.

D. These Specifications are intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and its surroundings. These are general guidelines. It is the Contractor's responsibility to determine the specific construction techniques to meet these guidelines.

E. All phases of sedimentation and erosion control shall comply with the City of El Paso's Storm Drain Pollution Control Plan Ordinance. These regulations require the preparation of a Stormwater Pollution Prevention Plan (SW3P) if total disturbed areas exceed 1 acre. This project may exceed this requirement. It is the Contractor's responsibility to ensure that if disturbed areas exceed this requirement, they will be required to prepare and submit a plan at no additional cost to the Owner.

1.2 APPLICABLE REGULATIONS

A. Comply with all applicable federal, state, and local laws and regulations concerning environmental pollution control and abatement.

1.3 NOTIFICATIONS

A. The Engineer may notify the Contractor in writing of any noncompliance with the foregoing provisions or of any environmentally objectional acts and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements shall notify the Contractor in writing, of any noncompliance with state or local requirements. The Contractor shall, after receipt of such notice from the Engineer or the regulatory agency immediately take corrective action. Such notice, when delivered to the Contractor or his/her authorized representative at the site of the work, shall be deemed sufficient for the purpose.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EROSION CONTROL

A. Provide positive means of erosion control such as shallow ditches around construction to carry off surface water. Erosion control measures, such as siltation basins, hay check dams, mulching, jute netting, and other equivalent techniques, shall be used as appropriate. Flow of surface water into excavated areas shall be prevented. At the completion of the work, any disturbed ditches shall be backfilled, and the ground surface restored to original condition.

3.2 PROTECTION OF STREAMS

A. Care shall be taken to prevent any damage to any stream drain or canal from pollution by debris, sediment, or other material, or from the manipulation of equipment and/or materials in or near such stream drains or canals. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in the stream drain or canal, shall not be directly returned to the stream drain or canal. Such waters will be diverted through a settling basin or filter before being directed into the stream drains or canals.

B. All preventive measures shall be taken to avoid spillage of petroleum products and other pollutants. In the event of any spillage, prompt remedial action shall be taken in accordance with governing agency requirements.

C. Water being flushed from structures or pipelines after disinfection, with Cl2 residue greater than 0.099 mg/L, shall be collected and removed from the site. Contractor shall obtain Engineer's approval for a method of disposal.

3.3 PROTECTION OF LAND RESOURCES

A. Land resources within the project boundaries and outside the limits of permanent work shall be restored to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to existing public rights-of-way, permanent and temporary easements.

B. Outside of areas requiring earthwork and/or facilities for drainage for the construction of the new facilities, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the Engineer. Where such special emergency use is permitted, first wrap the trunk with sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall, in any event, be responsible for any damage resulting from such use.

C. Where trees not noted to be removed may be defaced, bruised, injured, or otherwise damaged by the Contractor's operations, protect such trees by placing boards, planks, or poles around them. Monuments and permanent markers shall be protected similarly before beginning operations near them.

D. Any tree or other landscape feature noted to remain or left undisturbed that is scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition. The Engineer will decide what method of restoration shall be used and whether damaged trees shall be treated or healed or removed and disposed of. Damaged trees so removed shall be replaced at the Contractor's expense.

All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1-inch in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by

experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.

Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside construction limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Engineer, shall be immediately removed and replaced.

E. The locations of the Contractor's staging area, storage, and other construction buildings, required temporarily in the performance of the work, shall be cleared portions of the job site. The preservation of the landscape shall be an imperative consideration in the Contractor's use of these sites and the construction of temporary facilities.

F. For temporary roads or embankments and excavations for work areas, the Contractor shall submit the following for approval at least 10 days prior to the start of such temporary work.

1. A layout of all temporary roads, excavations, and embankments to be constructed within the work area.

2. Details of temporary road construction.

3. Drawings and cross-sections of proposed embankments and their foundations, including a description of proposed materials.

G. Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess waste materials, or any other vestiges of construction, in an environmentally sound manner.

3.4 PROTECTION OF AIR QUALITY

A. Burning - The use of burning for the disposal of refuse and debris will not be permitted.

B. Dust Control - The Contractor will be required to maintain all excavations, embankment, stockpiles, access roads, plant sites, waste areas, borrow areas, and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded and which would cause a hazard or nuisance to others. See Section 01500.

C. Sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides is not permitted.

D. Sprinkling must be repeated at such intervals as to satisfactorily prevent dust and the Contractor must have sufficient competent equipment on the job to accomplish this at all times. The Contractor shall inhibit the creation of dust to the complete satisfaction of the Engineer.

3.5 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

A. During the life of this Contract, maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created. See Section 01500.

3.6 NOISE CONTROL

A. The Contractor shall make every effort to minimize the noises caused by his/her operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with local, state, and federal regulations.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 GENERAL

1.1 PRECONSTRUCTION MEETING

A. A Preconstruction meeting shall be held in accordance with the General and Supplemental Conditions.

1.2 PROGRESS AND SPECIAL MEETINGS

A. The Owner may request meetings with the Contractor and its Subcontractors at any time during the progress of the Contract. It will be the Contractor's responsibility to provide to Owner whatever information is requested by Engineer.

B. The Contractor shall attend bi-weekly meetings called by Engineer. The Owner's representatives will be invited to attend meetings.

1. It is generally intended that meetings will be complete within 2 hours; however, the Contractor shall attend the meeting until completion of all pertinent discussions.

2. The Engineer will chair all project meetings.

3. Agenda of project meetings:

a. Varies to include, but is not limited to, general progress discussions of work to be performed and maintenance of overall progress schedule.

b. The Engineer will provide project meeting minutes to all meeting participants.

4. Construction work requiring shutdowns or major utility tie-ins shall be discussed by the Contractor at the meeting preceding such construction.

5. The Contractor shall provide a written 2-week look-ahead schedule showing planned activities and locations of planned work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

A. This Section specifies the general methods and requirements of submissions applicable to the following work-related submittals: Shop Drawings, product Fmildata, samples, videotapes, construction, and submittal schedules and work plans as required under specific sections of the Specifications. Detailed submittal requirements will be specified in the individual Technical Specification sections.

B. All submittals shall be clearly identified by reference to Specification Section, Paragraph, Drawing Number, or Detail as applicable. Submittals shall be clear and legible and of sufficient size for adequate presentation of data.

1.2 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, TEST REPORTS AND CERTIFICATIONS

A. Shop drawings

1. Shop Drawings, as specified in individual work sections include, but are not necessarily limited to, custom-prepared data such as laying schedules, fabrication and erection/ installation (working) drawings, schedule information, setting diagrams, actual shop work manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection, and test reports including performance curves and certifications, as applicable to the Work.

2. All Shop Drawings submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time to prevent delays in the delivery of materials.

3. The Contractor shall check all subcontractor's Shop Drawings regarding measurements, size of members, materials, and details to determine to the Contractor's satisfaction that they conform to the intent of the Drawings and Specifications. Shop Drawings found to be inaccurate or otherwise in error shall be returned by the Contractor to the subcontractors for correction before submission thereof.

4. All details on Shop Drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before submitted for approval.

B. Product Data

1. Product data, as specified in individual sections include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, and printed product warranties, as applicable to the work.

C. Samples

1. Samples specified in individual sections include but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated

work, small cuts or containers of materials, complete units of repetitively-used products, graphic symbols and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the work.

D. Test Reports and Certifications

1. Test reports and certifications submitted by the Contractor to the Engineer shall be as specified in individual sections. These shall include, but not necessarily limited to products, materials, compaction, Professional Engineer certification.

1.3 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall review Shop Drawings, product data, and samples, including those by subcontractors, prior to submission to determine and verify the following:

1. Field measurements

2. Field construction criteria

3. Catalog numbers and similar data

4. Conformance with the specifications

B. Each Shop Drawing, sample, and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor:

"Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers, and similar data, and I have checked and coordinated each item with other applicable approved Shop Drawings and all Contract requirements."

Shop Drawings and product data sheets 11-inches x 17-inches and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Provide to the Engineer a copy of each submittal transmittal sheet for Shop Drawings, product data, and samples at the time of submittal of said drawings, product data, and samples to the Engineer. Any submittal not having the above-signed Certification Statement attached to the submittal will be returned to the Contractor without review by the Engineer.

C. The Contractor shall utilize a submittal identification numbering system.

D. Notify the Engineer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents, and the reason for the deviation.

E. The review and approval of Shop Drawings, samples, or product data by the Engineer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility thereof.

F. No portion of the work requiring a Shop Drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased, or onsite construction accomplished which does not conform to approved Shop Drawings and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity with Shop Drawings, the Plans or Specifications.

G. Project work, materials, fabrication, and installation shall conform with approved Shop Drawings, applicable samples, and product data.

H. Prior to the first submittal of any item the Contractor shall supply the Engineer with a Schedule of Anticipated Submittals. The schedule will include all the anticipated submittals, an approximate date that the submittal will be made, and reference numbers as described in Paragraph 1.3C of this section. The Contractor shall adhere to the submittal schedule as reviewed/ approved/ modified by the Engineer.

1.4 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with an approved schedule and such sequence as to cause no delay in the Work or the work of any subcontractor.

B. Each submittal, appropriately coded, will be returned within 15 working days following receipt of submittal by the Engineer.

C. Number of submittals required:

1. Shop Drawings as defined in Paragraph 1.2A: Contractors requirement plus 3 sets.
2. Product Data as defined in Paragraph 1.2B: Contractors requirement plus 3 sets.
3. Samples: Submit the number stated in the respective Specification Sections, but no less than 1.
4. Test Reports, Certifications, and Working Drawings: Contractor's requirement plus 3 sets.

D. Submittal shall contain:

1. The date of submission and the dates of any previous submissions.
2. The project title and number.
3. Contractor identification.
4. The names of:
   a. Contractor
   b. Supplier
   c. Manufacturer
5. Identification of the product, with the Specification Section Number, page, and paragraph(s).
6. Field dimensions clearly identified as such.
7. Relation to adjacent or critical features of the work or materials.
8. Applicable standards, such as ASTM or Federal Specification numbers.
9. Identification of deviations from Contract Documents and reason for said deviation.
10. Identification of revisions or re-submittals.
11. Each copy or set of each submittal shall include a blank space suitably sized for Contractor and Engineer stamps (min. of 5 ½ " x 8 ½ ").

1.5 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS, AND SAMPLES

A. The review of Shop Drawings, data, and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed:

1. As permitting any departure from the Contract requirements.

2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials.

3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.

B. The Contractor remains responsible for details and accuracy for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques or assembly, and for safely performing work.

C. If the Shop Drawings, data, or samples as submitted describe variations and show a departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

D. Submittals will be returned to the Contractor within 15 working days, marked with one or more of the following codes:

Code 1: "REVIEWED" is assigned when there are no notations or comments on the submittal. When returned under this code, the Contractor may release the equipment and/or material for manufacture.

Code 2: "FURNISH AS CORRECTED." This code is assigned when confirmation of the notations and comments is required from the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and a nonconforming item that was noted. Confirmation is to be received by the Engineer within 21 calendar days of the date of the Engineer's transmittal requiring confirmation.

Code 3: "REVISE AND RESUBMIT." This code is assigned when notations and comments are extensive enough to require a re-submittal of the package. The Contractor may release the equipment or materials for manufacture; however, all notations and comments must be incorporated into the final product. Installation and payment for equipment or materials will not be approved until re-submittal is received, reviewed, and approved. This re-submittal is to address all comments, omissions, and non-conforming items that were noted. Resubmittal is to be received by the Engineer within 21 calendar days of the date of the Engineer's transmittal requiring the re-submittal.

Code 4: "REJECTED" is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.

E. Re-submittals will be handled in the same manner as first submittals. On re-submittals, the Contractor shall direct specific attention, in writing on the letter of transmittal and resubmitted Shop Drawings, by use of revision triangles or other similar methods, to revisions other than the correction requested by the Engineer, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of this type of revision that is not in accordance with the Contract Documents as may be required by the Engineer.

F. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor and will be considered "Not Approved" until resubmitted. The Engineer may at his/her option provide a list or make the submittal directing the Contractor to the areas that are incomplete.

G. Repetitive Review

1. Shop Drawings and other submittals will be reviewed no more than twice at the Owner's expense. All subsequent reviews will be performed at times convenient to the Engineer and at the Contractor's expense, based on the reviewing Engineer's current billing rate. The Contractor shall reimburse the Owner for all such fees invoiced to the Owner by the Engineer via change order to the Contract. Submittals are required until approved.

2. Any need for more than one re-submission, or any other delay in obtaining the Engineer's review of submittals, will not entitle the Contractor to an extension of the Contract Time.

H. If the Contractor considers any correction indicated on the Shop Drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least 14 working days prior to release for manufacture.

I. When the Shop Drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

1.6 DISTRIBUTION

A. Distribute reproductions of approved Shop Drawings and copies of approved product data and samples, where required, to the job site file and elsewhere as directed by the Engineer. The number of copies shall be directed by the Engineer but shall not exceed six.

1.7 PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

A. If specifically required in other sections of these Specifications, the Contractor shall submit a P.E. Certification for each item required, in the form attached to this Section, completely filled in and stamped.

1.8 GENERAL PROCEDURES FOR SUBMITTALS

A. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of product ordering and manufacturing and of performing the related work or other applicable activities, or within the time specified in the individual work sections of the Specifications, so that the installation will not be delayed by processing times, including disapproval and re-submittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step-in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.2 TESTS

A. Where tests of materials or any portions of the Work are required by Law/Ordinance or public authority, the Contractor shall bear all costs of such tests, shall give timely notice of readiness thereof and shall furnish to the Engineer the required certification of testing or approval.

Tests specified in the Technical Specifications shall fall into four categories:

Those required for approval of materials prior to use, which serves the same purpose as shop drawings or samples;

Those required by law;

Those necessary for acceptance of equipment, or facilities; and,

Those made during the progress of the Work to check compliance with the requirements of the Contract Documents.

The Contractor shall bear all the costs of the tests in the first three categories.

Tests conducted in the fourth category shall be carried out at the discretion of the Engineer. The cost of testing materials in this category shall be paid for by the Owner, with the following guidelines:

The Contractor shall furnish the materials for any samples and shall fully cooperate with the Engineer or Testing Laboratory in securing such samples.

Employment of the laboratory shall in no way relieve the Contractor's obligations to perform the Work of the Contract.

At the option of the Engineer, the source of supply of each of the materials shall be accepted by him before the delivery is started and before such material is used in the work. Representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer of all materials to be used in the work for testing

or examination as desired by the Engineer.

The Owner will pay all testing invoices which have met the specifications. The Contractor will pay for all test failures and erroneous job site visits. No time extension for delays will be considered by the Owner.

1.3 RELATED REQUIREMENTS

A. Conditions of the Contract: Inspections and testing required by-laws, ordinances, rules, regulations, orders, or approvals of public authorities.

B. Respective Sections of Specifications: Certification of products

C. Testing Laboratory inspection, sampling, and testing is required for

1. Section 02221: Trench Excavation, Embedment, and Backfill

2. Section 03300: Concrete Work

1.4 LABORATORY DUTIES

A. Cooperate with Engineer and Contractor; provide qualified personnel after due notice

B. Perform specified inspections, sampling, and testing of materials and methods of construction:

1. Comply with specified standards

2. Ascertain compliance of materials with requirements of Contract Documents

C. Promptly notify Engineer and Contractor of observed irregularities or deficiencies of work or products.

D. Promptly submit five copies of the written report of each test and inspection to the Engineer. Each report shall include:

1. Date report issued.

2. Project title and number.

3. Testing laboratory name, address, and telephone number.

4. Name and signature of laboratory inspector.

5. Date and time of sampling or inspection.

6. Record of temperature and weather conditions.

7. Date of the laboratory test.

8. Identification of product and specification section.

9. Location of sample or test in the Project.

10. Type of inspection or test.

11. Results of tests and compliance with Contract Documents.

12. Interpretation of test results, when requested by Engineer.

Perform additional tests as required by the Engineer or the Owner.

1.5 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. The laboratory is not authorized to:

1. Release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Approve or accept any portion of the Work.

3. Perform any duties of the Contractor.

1.6 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel, provide access to Work, and to Manufacturer's operations.

B. Secure and deliver to the laboratory adequate quantities of representative samples of materials proposed to be used and which require testing.

C. Provide to the Engineer the preliminary design mix proposed to be used for concrete, and other materials and mixes which require control by the testing laboratory.

D. Furnish copies of Product test reports.

E. Furnish incidental labor and facilities:

1. To provide access to Work to be tested.

2. To obtain and handle samples at the Project site or at the source of the product to be tested.

3. To facilitate inspections and tests.

4. For storage and curing of test samples.

F. Notify Engineer sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

1. When tests or inspections cannot be performed after such notice, reimburse the Owner for laboratory personnel and travel expenses incurred due to the Contractor's negligence.

G. Make arrangements with Engineer and pay for additional inspections, sampling and testing required:

1. For the Contractor's convenience.

2. When initial tests indicate Work does not comply with Contract Documents.

1.7 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that the existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Natural subgrades to support structural fill or pavement shall be stripped of organic matter or any unsuitable particles. The exposed subgrade shall be sacrificed just prior to fill placement to a minimum depth of 8-inches and recompacted according to Contract Drawings of the maximum density as determined by ASTM D1557 laboratory procedures. The moisture content of the subgrade shall be maintained within 3 percentage points above or below optimum moisture content until permanently covered.

C. Select structural fill shall be placed in loose lifts not exceeding 8-inches in loose thickness and compacted according to Contract Drawings of maximum density as determined by ASTM D1557 laboratory procedures. The moisture content of the fill shall be maintained within plus or minus 3 percent of the optimum moisture content until final compaction.

D. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01410

TESTING LABORATORIES SERVICES

PART 1 GENERAL

1.1 TESTS

A. Where tests of materials or any portions of the Work are required by Law/Ordinance or public authority, the Contractor shall bear all costs of such tests, shall give timely notice of readiness therefore and shall furnish to the Engineer the required certification of testing or approval.

B. Tests specified in the Technical Specifications shall fall into four categories:

1. Those required for approval of materials prior to use, which serves the same purpose as shop drawings or samples;

2. Those required by law;

3. Those necessary for acceptance of equipment, or facilities; and,

4. Those made during the progress of the Work to check compliance with the requirements of the Contract Documents. The Contractor shall bear all the costs of the tests in the first three categories.

C. Tests conducted in the fourth category shall be carried out at the discretion of the Engineer. The cost of testing materials in this category shall be paid for by the Owner, with the following exceptions:

1. The Contractor shall furnish the materials for any samples and shall fully cooperate with the Engineer or Testing Laboratory in securing such samples.

2. Employment of the laboratory shall in no way relieve the Contractor's obligations to perform the Work of the Contract.

3. At the option of the Engineer, the source of supply of each of the materials shall be accepted by him before the delivery is started and before such material is used in the work. Representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer of all materials to be used in the work for testing or examination as desired by the Engineer.

4. The Owner will pay all testing invoices which have met the specifications. The Contractor will pay for all test failures and erroneous job site visits. No time extension for delays will be considered by the Owner.

1.2 RELATED REQUIREMENTS

A. Conditions of the Contract: Inspections and testing required by-laws, ordinances, rules, regulations, orders, or approvals of public authorities.

B. Respective Sections of Specifications: Certification of products.

C. Testing Laboratory inspection, sampling, and testing are required for:

1. Section 02221: Excavating, Backfilling and Compacting for Utilities

2. Section 03300: Concrete

1.3 LABORATORY DUTIES

A. Cooperate with Engineer and Contractor; provide qualified personnel after due notice.

B. Perform specified inspections, sampling, and testing of materials and methods of construction:

1. Comply with specified standards.

2. Ascertain compliance of materials with requirements of Contract Documents.

C. Promptly notify Engineer and Contractor of observed irregularities or deficiencies of work or products.

D. Promptly submit five copies of the written report of each test and inspection to the Engineer. Each report shall include:

1. Date report issued.

2. Project title and number.

3. Testing laboratory name, address, and telephone number.

4. Name and signature of laboratory inspector.

5. Date and time of sampling or inspection.

6. Record of temperature and weather conditions.

7. Date of the laboratory test.

8. Identification of product and specification section.

9. Location of sample or test in the Project.

10. Type of inspection or test.

11. Results of tests and compliance with Contract Documents.

12. Interpretation of test results, when requested by Engineer.

E. Perform additional tests as required by the Engineer or the Owner.

1.4 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:

1. Release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Approve or accept any portion of the Work.

3. Perform any duties of the Contractor.

1.5 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel, provide access to Work, and Manufacturer's operations.

B. Secure and deliver to the laboratory adequate quantities of representative samples of materials proposed to be used and which require testing.

C. Provide to the Engineer the preliminary design mix proposed to be used for concrete, and other materials and mixes which require control by the testing laboratory.

D. Furnish copies of Product test reports.

E. Furnish incidental labor and facilities:

1. To provide access to Work to be tested.

2. To obtain and handle samples at the Project site or at the source of the product to be tested.

3. To facilitate inspections and tests.

4. For storage and curing of test samples.

F. Notify Engineer sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

G. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.

H. Make arrangements with Engineer and pay for additional inspections, sampling and testing required:

I. For the Contractor's convenience.

J. When initial tests indicate Work does not comply with Contract Documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 WATER FOR CONSTRUCTION

A. The Contractor shall make their own arrangement for the supply of potable drinking water for his employees and shall keep such supply available at all times. If the Contractor desires, they may request a domestic water service to provide potable drinking water to the office trailers. The Contractor will be required to pay a security deposit on water meter furnished by the Owner as well as any installation taps. The Contractor shall contact the EPWater at (915) 594-5635 for estimation of those fees or EPWater Business Center, new installation, FH construction water app.

B. Water to be used for construction shall be furnished to the Contractor by the Owner under the conditions set out herein and in the Utilities Rules and Regulations. The Contractor shall obtain information from the EPW on the installation of a Construction meter. EPW will provide, at locations mutually agreed upon, not more than two (2) supply points, at one time. Supply points will be located adjacent to existing water mains and such locations are, therefore, limited by the locations of these mains. The Contractor will be required to pay a security deposit on the water meter furnished by the Owner as well as an installation charge for the taps. The Contractor shall not obtain water from the EPW water system at any other point than the designated supply points. Water from designated supply points will be metered and charged for, and a waste of water will not be permitted. Should the contractor carelessly wastewater in his operations and fail to change his methods, in order to prevent waste, after due warning by the Engineer, furnishing of water will be discontinued. The contractor also has the option of utilizing reclaimed water for construction provided obtainment procedures are in conformance of EPW's standards and regulations.

C. Reclaimed Water is available. Contractors are exhorted to use reclaimed water for dust control, earth processing, etc., wherever possible. Contact El Paso Water – Reclaimed Water Section at (915) 594-5772 for more information.

INSTRUCTIONS TO CONTRACTORS REQUESTING FIRE HYDRANT METER

1. The Contractor must complete a Fire Hydrant Meter Application for a fire hydrant meter with the Engineering Developer Services Section of El Paso Water, located on the third floor of the El Paso Water Building, 1154 Hawkins Blvd. For information, please contact (915) 594-5635. Deposit and Set-up/Removal Fee are due at application.

2. The Engineering Developer Services Section will forward the application form to the Fire Department for approval. The Fire Department will approve within 48-hrs. of receipt of the application.

3. Water Distribution Section will have the meter installed within 48 hours after approval by the Fire Department and Engineering Developer Services Section. The Contractor must coordinate with the Water Supply Section at 594-5782 to have a Contractor's Representative at the specified fire hydrant for the installation of the meter. The Contractor shall be responsible to secure the valve on the meter to ensure unauthorized use.

4. 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.

5. 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.

6. 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.

Notes to Contractors:

1. Fire hydrant meters will not be issued within a 2000-ft radius of a wastewater treatment plant, reclaimed water dispensing station, or reclaimed water post-hydrant.

2. Additional fire hydrant meters will not be issued for other fire hydrants within a 2000-foot radius of the fire hydrant requested. Deposits and Set-up/Removal fees are due for each meter on a project.

3. 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 the Engineering Developer Services Section at 594-5635 to apply for another fire hydrant meter. Fire Department approval for the new meter location is also required.

4. 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.

5. 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.

D. The Contractor may, with the approval of the Engineer, make other arrangements and secure water for construction purposes from a source of their own choosing. Said water will be potable.

1.2 ELECTRIC POWER FOR CONSTRUCTION

A. The Contractor shall furnish and install, at his own expense, all temporary electrical facilities required for construction and safe operation. Separate electrical metering shall be provided, and power used shall be paid for by the Contractor, regardless of the source of the power.

1.3 SANITARY FACILITIES

A. The Contractor shall provide adequate toilet facilities for use by his personnel and the Engineer 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.

1.4 TRAFFIC PLAN

A. Traffic control plans will be required for areas where disruption of the normal flow of traffic within the Hillcrest Center, City streets, and TxDOT highways is inevitable. This includes, but is not limited to, the tapping of existing lines, installation of water lines in the public right

of ways. Traffic control and planning for the control of traffic in all areas of the project shall be the responsibility of the Contractor and subject to approval by the City of El Paso. Seven days prior to commencing any work on the project the Contractor shall prepare and submit for Engineer's review and comment, a Traffic Control plan for that particular work area. The traffic control plans, devices, signage, and record-keeping shall conform with the specifications and principles given in the "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", PART VI, 1980 edition, Version 5 (1994), issued by the Texas Department of Transportation. Work within any specific area must be phased so that the traffic controls for the work in that particular area do not conflict with traffic flows in any other control area.

1.5 DUST CONTROL

A. The Contractor shall furnish and maintain at all times the equipment necessary for effective dust control over the entire working area.

1.6 DRAINAGE CONTROL

A. The Contractor shall have the responsibility to comply with all the requirements for the Federal Register dated, September 9, 1992, Volume 57, No. 175 - FINAL NPDES GENERAL PERMITS FOR STORM DISCHARGES FROM CONSTRUCTION SITES (or latest revision thereof). The Contractor shall file the Notice of Intent (NOI) as required, a minimum of 2 days prior to the commencement of any construction. The required STORMWATER POLLUTION PREVENTION PLAN (SW3P) shall be developed for the project by the Contractor as required in the above-mentioned document. The SW3P shall be kept at the worksite and updated as work progresses.

B. The Contractor shall maintain adequate drainage within and through work areas. Earth dam drainage will not be permitted in paved areas. Temporary dams of sandbags, asphaltic concrete, or other acceptable materials will be permitted when necessary to protect the work and/or the public, provided such use does not create a hazard or nuisance to the public. Such dams shall be removed from the site as soon as their use is no longer necessary.

1.7 CONSTRUCTION STAGING AREA

A. The OWNER will not provide any construction staging area outside the project site. The Contractor shall be responsible for obtaining at his cost a construction staging area for equipment and materials storage, construction offices, etc., that the Contractor feels is necessary for the project.

1.8 SECURITY

A. Coordinate with the Owner's security program.

B. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights, and other means to prevent accidents to persons and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access during construction shall be removed when no longer required. The length or size of excavation will be controlled by the particular surrounding conditions but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of the open trench, prohibiting the stacking of excavated material in the street, and requiring that the trench shall not remain open overnight.

C. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles that could be dangerous

to the public shall be protected with barricades having flashing warning lights at all times when appropriate to ensure safety and when construction is not in progress.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01600

PROGRESS SCHEDULES

PART 1 GENERAL

1.1 REQUIREMENTS

A. The schedule of Work shall be based on the period of time within which this Contract is to be completed (Contract Completion Time).

B. Within 15 calendar days following Notice of Award, the Contractor shall provide a statement to the Engineer describing his computerized schedule 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 scheduling staff.

2. The name and description of the project management software and computer hardware to be utilized on this Contract.

3. See General Conditions.

C. Within 15 calendar days following Notice of Award, the Contractor shall prepare and submit to Engineer his proposed Schedule of Work, as described in this Section, with sub-schedules of related activities that are essential to its progress. These include, but are not limited to: submittals, fabrication, delivery, installation, testing, and start-up schedules.

D. Included with the Schedule of Work, the Contractor shall submit a written Traffic Control Plan, which shall identify how heavy equipment shall be routed through the construction areas throughout the construction period, as required in these Specifications. The Traffic Control Plan shall specify the timing of road and street closures as required to perform the Work under this Contract. In addition, the Contractor shall submit at this time an "S-curve" type of schedule noting early start and late finish dates, being weighted based on the value of the scheduled completion of the various tasks.

E. Contractor shall submit an updated Schedule of Work and "S-curve" schedule monthly, or more frequently when required and acceptable to the Engineer.

F. The Contractor shall also prepare a 2-week look-ahead schedule showing planned activities and locations of planned work. This schedule shall be updated and distributed at the specified bi-weekly progress meetings.

G. All schedules and Traffic Control Plan shall be submitted to Engineer for acceptance and shall be subject to coordination with requirements of work performed under other projects which may be in progress.

H. Contractor's Schedule is to be considered and used as a working tool.

1.2 FORM OF SCHEDULES

A. The Schedule of Work shall utilize the Gantt Chart: Contractor shall prepare, maintain, and furnish current detailed progress and schedule charts using the Gantt Chart supporting Contract performance dates. The Schedule shall identify Work in Contract in sufficient detail to ensure compliance with Contract dates, schedules, and sequences of construction.

B. The Gantt Chart shall be maintained throughout the life of the Contract. The Contractor shall designate an authorized representative within its firm who will be responsible for the preparation of the Gantt Chart network plan and schedule and for monitoring the progress of the project.

C. Contractor shall develop a network plan and schedule demonstrating fulfillment of all Contract requirements, keep network up-to-date in accordance with requirements of this Section and shall utilize network plan for scheduling, coordinating, and performing Work under this Contract (including all activities of Subcontractors, equipment vendors, and suppliers). The Gantt Chart techniques will be utilized to satisfy both time and cost applications. Principles and definitions of terms used herein shall be as outlined in Associated General Contractors of America (AGC) publications.

D. The Contractor is deemed to have included in the Total Bid Price a sum of money sufficient to pay for all cost's attendant to the scheduling requirements of this Section, throughout the Contract completion time. The Owner shall have the right to withhold progress payments due Contractor if the schedules are not maintained current or submitted as specified. Preparation, content, submittal, review, and use of the network plan and schedule are as set forth below.

1. Schedule submittal: Within 15 calendar days following Award of Contract, the Contractor shall submit to the Engineer complete Gantt Chart network plan. Size of network plan sheet or sheets shall be limited to 24-inch x 36-inch. A schedule of estimated monthly progress payments shall be developed by the Contractor and submitted with the Gantt Chart network plan. A schedule of Shop Drawing submittals and reviews shall also be included.

2. Within 7 calendar days after receipt of Schedule, the Engineer will meet with the Contractor for joint review and any necessary correction or adjustment of the proposed network plan. Within five calendar days after the joint review, the Contractor shall submit three copies of the revised schedule to Engineer. Resubmittal will be reviewed by Engineer and if found to be as previously agreed upon, will be accepted. The accepted schedule shall constitute Project Schedule of Work until subsequently updated in accordance with requirements of this Section. The submission of schedules by Contractor, as required herein is not only required for the verification of progress payments, but also informing Owner and Engineer of the status of the Project so that Owner and Engineer may evaluate project progress, Contractor change order requests, or other proposed changes to the Project.

3. Acceptance of Contractor's Schedule by Engineer will not relieve the Contractor from compliance with all conditions of the Contract. Errors and omissions in accepted Contractor's Schedule will not be cause for future claims by Contractor for extra costs or increased Contract Time. Comments made by the Engineer on the Contractor's Construction Schedule during the 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.

4. The Network plan shall show the sequence and interdependence of activities required for the complete performance of all items of Work under this Contract. The Contractor shall exercise sufficient care to produce a clear, legible, and accurate network plan. Network plan shall show the following for each work activity:

    a. A concise description of the work represented by activity.

    b. Duration (in workdays).

    c. Early and late start dates, and early and late finish dates.

    d. Percent complete.

5. Work activities in-network plan shall be sufficiently detailed to identify all major items of Work included in this Contract, including procurement and delivery of materials, and including shutdowns and restarts.

6. Contractor shall also submit with network plan:

   a. Proposed number of working days per week.

   b. Holidays to be observed during the duration of the Contract (by day and month).

   c. Planned number of shifts per day.

   d. The number of hours per shift.

   e. Average manpower usage planned monthly by major trades. Trades shall include as a minimum: carpenters, laborers, operators, ironworkers, electricians, pipefitters, masons, and painters.

7. All schedules are Contractor's schedules, prepared by him and he remains solely responsible for adherence thereto.

8. Project control: Every 2 weeks or more frequently if warranted, the Contractor shall review the progress of Work to that date. He shall collect information, with aid of field superintendents for all Subcontractors, on all jobs scheduled to be worked on during the previous 2-week period including Shop Drawings, material procurement, and Change Orders that may have been issued in this period. The information shall be evaluated and compared with the original plan and schedule. Project problems will be reviewed, and the Contractor shall take necessary measures to keep the Project on schedule. Any changes shall be incorporated into the schedule.

9. If latest completion time for any significant job does not come within the time allowed by Contract, including all extensions, sequence of jobs, and performance of jobs shall be revised by Contractor through either concurrent operations, additional manpower, additional shifts, and significant Contract completion and occupancy times will be met. No additional cost will be allowed by Owner to Contractor or any Subcontractor for overtime, additional manpower, equipment, or additional shifts if such expediting procedures are necessary.

10. Each month, the Contractor shall update the Project Schedule of Work and "S-curve" schedule and shall submit to Engineer three copies for review and acceptance. Updates shall include all revisions required under item 9 above, percentage completion by work activity, as well as any revisions to Shop Drawing schedule and information included under item 6 above.

11. Changes to Schedule: the Contractor may at any time make changes to his current plan and schedule upon notification to Engineer. Contractor shall submit changes to network plan and schedule for any of the following reasons:

    a. When a delay in completion of any activity or group of activities indicates an extension of scheduled Project completion including delays which may be involved with change orders, unusual weather, etc.

    b. Delays in submittals or deliveries or work stoppages are encountered which make replanning or rescheduling of Work necessary.

    c. The Schedule does not represent the actual prosecution and progress of the Project.

12. Engineer's acceptance of changes to Schedule and all relevant data is contingent upon compliance with all other paragraphs of this Section and any other previous agreements or requirements by Engineer.

13. The Contractor's cost of revisions to Schedule due to any cause shall be the responsibility of the Contractor.

14. Adjustment of Contract completion: Contract Time will be adjusted only by Change Order for causes specified in this Contract. In the event Contractor requests an extension of Contract Time, he shall furnish such justification, the Gantt Chart data, and supporting evidence as follows for a determination as to whether or not Contractor is entitled to an extension of Time under provisions of Contract: all Gantt Chart logic revisions, duration changes, and cost changes for Work in question and its relationship to other activities on accepted, current network plan. Submission of proof based on network activity logic and durations is obligatory with any Contractor request for an extension of time. The Schedule must display that Contractor has used, in full, all float time available for Work involved in this request. For other than critical path work, the Contractor shall use available float times for Owner requested changes. The Contractor shall not reserve float time for subsequent contracted requested changes. Engineer's determination as to a total number of days of Contract extension shall be based upon current Schedule at the time of alleged delay and all other relevant information and provisions of Contract. Schedule data shall be included in the next monthly updating of Schedule. Actual delays in activities which according to network plan and schedule do not affect Contract Completion Date will not be the basis for a change of Contract Completion Date. Engineer shall review facts within a reasonable time after receipt of Contractor request for an extension of Time and supporting evidence and shall advise Contractor in writing thereof.

15. The Contractor shall submit a brief narrative report as part of the monthly update. The narrative report shall include a description of problem areas; current and anticipated delaying factors and their estimated impact on the performance of other activities and completion dates; and an explanation of corrective action taken or proposed.

E. The initial Contractor's payment request will be evaluated by the Engineer if the initial schedule submittal has been made. Subsequent payment requests made by the Contractor will not be evaluated by the Engineer until the revised Contractor's schedule (as defined in paragraph 1.2.D.2) has been accepted by the Engineer.

F. All "float time" i.e. the time indicated on the Contractor's Progress schedule between the early start time and late start time, and early finish time and late finish time is owned by the Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01666

TESTING OF PIPELINES

PART 1 GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, tools, equipment, and related items required to test piping systems.

B. All pipe installed in this Contract, including piping which is installed between or connected to the existing pipe, shall be tested.

C. Work shall include furnishing all pumps, meters, gauges, and other appurtenances, including taps to expel air, required for conducting tests. The Contractor shall furnish equipment, piping, and appurtenances required to transport water used in testing from source to test location.

D. The Contractor shall provide adequate labor, tools, and equipment to operate valves and to locate and repair any leaks discovered during the initial filling of a piping system and testing.

E. All pipes shall be tested with Potable Water or Water approved by the Engineer. Refer to Section 01500 for acquiring water for testing.

1.2 JOB CONDITIONS

A. Leakage testing shall be performed on all pipelines installed in this Contract.

B. Test pressure shall be as specified in this section of the Specifications.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

A. Time and sequence of testing shall be scheduled by the Contractor, subject to observation, and approval by the Owner or Engineer.

B. Conduct tests on buried piping that is to be hydrostatically tested after the trench has been completely backfilled. The Contractor may if field conditions permit and if approved by the Engineer, partially backfill the trench and leave the joints open for inspection and conduct an initial service leak test. The acceptance test shall not, however, be conducted until all backfilling has been completed.

C. Buried piping that is to be pneumatically tested shall have all joints exposed for the acceptance test.

D. Conduct the test on exposed piping after the piping has been completely installed, including all supports, hangers, and anchors, but prior to insulation.

E. Testing of pipe with concrete thrust blocking shall not be performed until the concrete has cured at least five days.

F. If any pipe fails to meet the specified requirements for water or airtightness, the cause of the excessive leakage shall be determined and remedied at the expense of the Contractor, including retesting if required by the Engineer.

G. No pipe installation will be accepted until all known leaks have been repaired whether or not leakage is within allowable limits. Locating and repairing leaks shall be performed by the Contractor at no additional cost to the Owner.

H. The Contractor shall certify that all required tests have been successfully completed before the piping is accepted.

3.2 PRESSURE AND LEAKAGE TESTS OF UNDERGROUND PRESSURE PIPING

A. Hydrostatic pressure and leakage tests shall conform with Section 4 of AWWA C600 Specification with the exception that the Contractor shall furnish all gauges, meters, pressure pumps, and other equipment needed to test the line.

B. The pressure required for the field hydrostatic pressure test shall be as presented in the schedule below:

1. 8-inch and 12-inch, - 150 psig as measured at the lowest point of the section being tested.

   The Contractor shall provide temporary plugs and blocking necessary to maintain the required test pressure. Corporation cocks at least ¾-inches in diameter, pipe riser, and angle globe valves shall be provided at high points and each pipe dead-end in order to bleed air from the line. The duration of the pressure test shall be at least 2 hours. The cost of these items shall be included as part of testing.

C. The leakage test shall be at the test pressures presented above and shall be of not less than 4 hours duration. All leaks evident shall be repaired and leakage eliminated regardless of total leakage shown by test. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipes, valves, and accessories shall be removed and replaced. The pipelines shall be tested in such sections as may be directed by the Engineer by shutting valves or installing temporary plugs as required. The line shall be filled with potable water and all air removed and the test pressure shall be maintained in the pipe for the entire test period by means of a force pump to be furnished by the Contractor. Accurate means shall be provided for measuring the water required to maintain this pressure. The amount of water required is a measure of the leakage.

D. The amount of leakage which will be permitted shall be in accordance with AWWA C600 Standards for all pressure. No pipe installation shall be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{ND\sqrt{P}}{7{,}400}$$

In which L is the allowable leakage in gallons per hour; N is the number of pipe joints in the segment of pipe tested, in feet; D is the nominal diameter of the pipe, in inches; and P is the test pressure the leakage test, in pounds per square inch gauge.

E. The Contractor must submit his plan for testing to the Engineer for review at least ten (10) days before starting the test. The Contractor shall remove and adequately dispose of all blocking material and equipment after completion and acceptance of the field hydrostatic test unless otherwise directed by the Engineer. Any damage to the pipe coating shall be repaired by the Contractor. Lines shall be totally free of objectionable material, clean and flushed prior to final acceptance.

F. All pressure and leakage tests shall be observed by the Engineer. The Contractor shall schedule tests and notify the Engineer so that the Engineer can be present.

3.3 TEST RECORDS

A. The Contractor shall maintain records of each test. These records shall include:

1. Date of test
2. Description and identification of piping tested
3. Test fluid
4. Test pressure
5. Remarks, to include such items as:
   a. Leaks (type, location)
   b. Repairs made on leaks
6. Certification by Contractor and initialed acknowledgment by Engineer

3.4 FINAL ACCEPTANCE

A. No pipe installation will be accepted until all known leaks have been repaired whether or not leakage is within allowable limits. Locating and repairing of leaks shall be performed by the Contractor at no additional cost to the Owner.

B. The Engineer will certify that all required leakage tests have been successfully completed before the pipeline is accepted.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01710

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Additional closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 and 3, and the General Conditions.

1.2 SUBSTANTIAL COMPLETION

A. Before requesting an inspection for certification of Substantial Completion, complete the following:

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the Work claimed as substantially complete.

    a. Include supporting documentation for completion and accounting of changes to the Contract Sum.

2. Advise the Owner of pending insurance changeover requirements, if any.

3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

4. Submit record drawings and specifications, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.

5. Deliver tools, spare parts, extra stock, and similar items.

6. Complete final cleanup requirements.

7. Touch up, repair, and restore marred exposed finishes.

8. Ensure final payrolls, including all Subcontractors, are submitted.

1.3 INSPECTION PROCEDURES

A. On receipt of a request for inspection, the Engineer will proceed or advise the Contractor of unfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following an inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Engineer will repeat inspection when requested and assure that the Work is substantially complete. Once the Engineer is assured the work is substantially complete, the Engineer will issue a Certificate of Substantial Completion with an effective date and a list of items required for closeout.

2. The results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL COMPLETION

A. Before requesting an inspection for certification of final completion and final payment, complete the following:

1. Final payment request with releases and supporting documentation from Contractor, Subcontractors, and Suppliers. Include insurance certificates where required.

2. Submit a statement, accounting for changes to the Contract Sum.

3. Submit a copy of the final inspection list stating that each item has been completed or otherwise resolved for acceptance.

4. Submit evidence of payment of Final Water Bill and return of Water Meter.

5. Submit the consent of surety to the final payment.

6. Submit Final Report of Total Payments to Subcontractors and Suppliers.

7. Submit evidence of continuing insurance coverage complying with insurance requirements.

8. Submit to Engineer all Operating & Maintenance Manuals, Guarantees, As-builts, and Record Drawings (6C 14.12).

9. Any other documentation required by the Program Manager, Owner, or funding agencies.

1.5 REINSPECTION PROCEDURE

A. The Engineer will reinspect the Work upon receipt of notice that the Work has been completed, except for items whose completion is delayed under circumstances acceptable to the Engineer.

1. Upon completion of reinspection and submittal of all closeout requirements, the Engineer will prepare a Certificate of Final Completion. If the Work is incomplete, the Engineer will advise the Contractor of Work that is incomplete or obligations that have not been fulfilled but are required.

2. If necessary, the inspection will be repeated.

1.6 RECORD DOCUMENT SUBMITTALS

A. Do not use record documents for construction. Protect from a loss in a secure location. Provide access to record documents for the Engineer's reference.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 FINAL CLEANING

A. Clean the site of rubbish, litter, and foreign substances. Sweep paved areas; remove stains, spills, and foreign deposits. Rake grounds to a smooth, even-textured surface.

3.2 REMOVAL OF PROTECTION

A. Remove temporary protection and facilities.

3.3 COMPLIANCE

A. Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Remove waste materials and dispose of lawfully.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENT

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. Contractor shall maintain at Site for the Engineer and Owner:

One record copy of:

1. Specifications
2. Addenda
3. Change Orders and other Modifications to Agreement
4. Reviewed Shop Drawings and Samples
5. Field test records

B. Two copies of Record Drawings marked and updated each working day.

1.2 RELATED REQUIREMENTS

A. Section 01300: Submittals.

1.3 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. The Contractor shall store documents in the Contractor's field office apart from documents used for construction.

1. Provide files and racks for the storage of Documents and Samples.

B. The Contractor shall file Documents and Samples in accordance with the Construction Specifications Institute (CSI) format.

C. The Contractor shall maintain Documents in a clean, dry, legible condition, and good order. Do not use Record documents for construction purposes.

D. The Contractor shall make Documents available at all times for reference by Engineer or Owner.

1.4 MARKING PENS

A. The Contractor shall provide felt tip marking pens for recording information in color code designated by Engineer.

1.5 RECORD DRAWINGS AND SPECIFICATIONS

A. The Contractor shall label each of the two sets of Record Drawings with "PROJECT RECORD" in neat large printed letters.

B. The Contractor shall record information concurrently with construction progress. Do not cover any Work until the required information is recorded.

C. Drawings shall be legibly marked by the Contractor to record actual construction (As-Built). Use symbols acceptable to the Engineer.

D. During the progress of the Project, the Contractor shall keep a careful record at Site of all changes and corrections from layouts shown, on two separate sets of drawings. The Contractor shall enter such changes and corrections on prints of Contract Drawings (marked "PROJECT RECORD") within a day of the times the changes are made. Record

Drawings shall also indicate in addition to changes and corrections, the actual location of all subsurface utility lines encountered. So that location of these lines and appurtenances may be determined in the event of surface openings or indicators become covered over or obscured, Record Drawings shall show, by installation elevation and offset dimension to two permanently fixed surface features, end of each run including each change in direction. Manholes shall be located by stationing along utility run from the reference point. At the time of Substantial Completion of each facility involved under Contract, Contractor shall submit to Engineer, Record Drawings, Specifications, and Addenda showing the aforementioned data. The Engineer will not recommend interim payment or final payments for Project until the above requirements have been fulfilled by the Contractor.

E. Specifications and Addenda shall be legibly marked by Contractor to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item or equipment installed.

2. Changes made by field order or by Change Order.

3. Changes made to the text of the specifications due to change orders, selection of options, substitutions, and information on concealed construction.

4. Follow procedures similar to those noted above for Record Drawings.

1.6 SUBMITTAL

A. At Substantial Completion, the Contractor shall deliver Record Drawings and Specifications to Engineer for Owner. If material changes occur prior to Final Completion, Record Drawings shall be updated.

B. Accompany submittal with transmittal letter in duplicate, containing:

1. Date

2. Project title and number

3. Contractor’s name and address

4. Title and number of each Record Document

5. Signature of Contractor or his/her authorized representative

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 01740

GUARANTEES AND WARRANTIES

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

A. General - Section 01010: Warranty; tests.

1.2 PROJECT MAINTENANCE AND GUARANTEE

A. The Contractor shall maintain and keep in good repair, the Work covered by these Contract Documents during the life of this Contract.

1. The Contractor shall indemnify the Owner against any repairs which may become necessary to any part of the Work performed and to items of equipment, and systems procured for or furnished under this Contract, arising from defective workmanship or materials used therein, for a period as described in the General Conditions of the Specifications.

2. All equipment, spare parts, supplies, materials, special tools, and any other item installed or supplied by the Contractor shall be warrantied by the Contractor for 1 year from the date of Substantial Completion.

3. The Contractor shall, at his own expense, furnish all labor, materials, tools, and equipment required and shall make such repairs and removals or shall perform such work of reconstruction, as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship, or faulty materials, in any part of the Work performed by him. Such repair shall also include refilling of trenches, roadways, excavations, or embankments which show undue settlement or erosion after backfilling or placement.

4. Except as noted on the Drawings or as specified, all structures such as embankments, levees, fences, etc., shall be returned to their original condition prior to the completion of the Contract. Any and all damage to any facility, not designated for removal, resulting from the Contractor's operations shall be promptly repaired by the Contractor at no cost to the Owner.

5. The Contractor shall be responsible for all new and reconstructed/repaired work including the reconstruction or repair of any road, street, and/or entrance damaged as a consequence of his operations, and or repairs and maintenance of same for a period of one year from the date of Substantial Completion. In the event, the repairs and maintenance are not made immediately to the satisfaction of the Engineer, and it becomes necessary for the owner of the road or street to make such repairs, the Contractor shall reimburse the owner of the road or street for the cost of such repairs.

6. In the event the Contractor fails to proceed to remedy the defects of which he has been notified within 7 days of the date of such notice, The Owner reserves the right to cause the required materials to be procured and the work to be done, as described in the General Conditions and to hold the Contractor and his sureties liable for the cost and expense thereof.

7. All equipment warranties for periods of longer than one year shall be assigned to the Owner after the one-year warranty period specified herein and in the General Conditions.

1.3 PROCESS WARRANTIES

A. Certain items of construction are specified as to performance. Should these items fail to perform as specified, the Contractor shall make all required modifications or replacement necessary to achieve the specified results at no additional cost to the Owner.

1.4 SUBMITTAL REQUIREMENTS

A. Assemble warranties and certificates executed by each of the respective manufacturers, suppliers, and subcontractors.

B. The number of original signed copies required: 2 each.

C. Table of Contents: Neatly typed, using Table of Contents of Project Manual as a format.

D. Provide complete information for each item.

1. Name and location of the project.
2. Name and address of Contractor.
3. Product, equipment, or system.
4. The firm, with name and principal, address and telephone number.
5. Scope.
6. Date of beginning and duration of the warranty.
7. Provide information for the Owner's personnel:
    a. The proper procedure in case of failure.
    b. Instances which might affect the validity of a warranty.

1.5 FORM OF SUBMITTALS

A. Assemble warranties and certificates in two separate 3-ring binders.

B. Format:

1. Size: 8-1/2 in. x 11 in., fold larger sheets to fit into binders.
2. Indexing: Tabbed fly-leaf for each separate product or system.
3. Identification: Each binder cover and spine printed with title "WARRANTIES" and project title and bid number.

C. Binders: Commercial quality, 3-ring, with durable and cleanable plastic covers, custom printed.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 02010

SUBSURFACE INVESTIGATION

PART 1 GENERAL

1.1 GENERAL

A. Soil borings were taken in February 2021 throughout the area of Hillcrest Center project site to determine the physical properties of the soil underlying the pipeline routes. The soil borings were not made for the design of the trench system. The boring locations are shown in the drawings by a boring number. These borings represent the conditions encountered in the base holes on the date of the test, determined by normal geotechnical techniques.

B. Any interpretations or conclusions drawn from the information present in the reports for the borings are done at the Contractor's sole risk. The geotechnical reports are available for prospective bidders to review at the El Paso Water website: www.epwu.org/bids/. If the Contractor requires additional or more precise information concerning soil conditions or groundwater, the Contractor shall obtain it at his own expense.

C. The Contractor is solely responsible for the success of any trench system or any other subsurface operation as shown on the drawings. The Contractor is encouraged to obtain any and all information necessary to enable the efficient and successful completion of this work without damage to existing facilities. The cost of any additional information shall be the sole responsibility of the Contractor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 02110

SITE CLEARING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal of surface debris.

B. Removal of pavement, curbs, and other site improvements as indicated on Drawings.

C. Topsoil excavation.

1.2 RELATED SECTIONS

A. Section 02200-Earthwork

B. Section 02211-Rough Grading

C. Section 02222-Excavating and Compaction for Pavement

1.3 REGULATORY REQUIREMENTS

A. Conform to applicable code for environmental requirements, and disposal of debris.

B. Coordinate site clearing with utility companies.

PART 2 PRODUCTS

2.1 MATERIALS

A. Herbicide: Approved by an applicable regulatory agency. Commercial chemical for weed control, registered by Environmental Protection Agency. Provide granular, liquid, or wettable powder form.

PART 3 EXECUTION

3.1 PREPARATION

A. Identify a temporary waste area and a salvage area for placing removed materials.

B. Verify that existing plant life designated to remain is tagged or identified.

3.2 PROTECTION

A. Locate, identify, and protect utilities that remain, from damage.

B. Protect trees, plant growth, and features designated to remain, as final landscaping.

C. Protect benchmarks, survey control points, and existing structures from damage or displacement.

3.3 CLEARING

A. Clear areas required for access to site and execution of Work.

B. Remove paving, curbs, and other site improvements on Drawings.

C. Apply appropriate herbicide.

3.4 REMOVAL

A. Remove debris, rock, and extracted plant life from the site.

B. Remove paving, concrete, and curbs as required.

3.5 EXCAVATION

A. Excavate subsoils from areas to be re-graded for the entire site, without mixing with foreign materials.

B. Do not excavate wet subsoil.

C. Stockpile in an area designated on-site to a depth not exceeding 8 feet and protect from erosion.

D. Remove subsoil from the site.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Subgrade preparation.

B. Final Grading.

1.2 RELATED SECTIONS

A. General Conditions.

B. Section 01500-Construction Facilities and Temporary Controls.

C. Section 02221-Trenching, Backfilling, and Compaction for Utilities.

1.3 REGULATORY REQUIREMENTS

A. Obtain required permits from authorities

B. Conform to applicable codes for grading.

1.4 DEFINITIONS

A. Excavation consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Owner or Engineer. Unauthorized excavation, as well as remedial work directed by Owner or Engineer, shall be at Contractor's expense.

1. Under footings, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to the proper position, when acceptable to Engineer.

2. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by Owner or Engineer.

C. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular subbase, drainage fill, or topsoil materials.

D. Structure: Buildings, foundations, slabs, curbs, or other man-made stationary features occurring above or below ground surface.

1.5 QUALITY ASSURANCE

A. Codes and Standards: Perform excavation work in compliance with the applicable requirements of authorities having jurisdiction.

B. Testing and Inspection Service: A qualified independent geotechnical testing and inspection laboratory will perform soil testing and inspection service during earthwork operations as described in Section 01400.

1.6 PROJECT CONDITIONS

A. Site Information: Data in subsurface investigation reports was used for the basis of the design and are available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The Owner will not be responsible for interpretations or conclusions are drawn from this data by the Contractor. The subsurface investigation reports are not part of the Contract Documents.

1. Additional test borings and other exploratory operations may be performed by the Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.

B. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are indicated to remain in place, provide adequate means of protection during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with the Owner and utility companies in keeping respective services and facilities in operation. Damaged utilities shall be repaired to satisfaction of utility Owners at no additional expense to the Owner.

2. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Owner or Engineer, and then only after acceptable temporary utility services have been provided.

3. Provide a minimum of 48-hour notice to the Owner and receive written notice to proceed before interrupting any utility.

C. Use of Explosives: The use of explosives is not permitted.

D. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

1. Operate warning lights as recommended by authorities having jurisdiction.

2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GC, GM, GC-GM, GP-GM, GP-GC, SM, SW, SP, SC, SC-SM, SP-SM, SP-SC.

B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups PT, OL, OH, ML, MH, CL, CH, or where the plasticity index exceeds 18.

C. Subgrade Material: As specified in Section 02205.

D. Backfill and Fill Materials: As specified in Section 02205.

E. Topsoil Material: As specified in Section 02205.

PART 3 EXECUTION

3.1 EXCAVATION

A. Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of the character of materials and obstructions encountered.

3.2 STABILITY OF EXCAVATIONS

A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.

B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

3.3 DEWATERING

A. Prevent surface water and subsurface or groundwater from flowing into excavations and from the flooding project site and the surrounding area.

B. Do not allow water to accumulate in excavations. Remove water to prevent the softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

C. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.4 STORAGE OF EXCAVATED MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage.

B. Locate and retain soil materials away from the edge of excavations.

C. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

3.5 EXCAVATION FOR STRUCTURES

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.

B. Excavations for footings and foundations: Do not disturb the bottom of the excavation. Excavate by hand to final grade trim bottoms to required lines and prior to placement of reinforcement and concrete, the base shall be compacted as herein specified.

3.6 EXCAVATION FOR PAVEMENTS

A. Cut surface under pavements to comply with cross-sections, elevations, and grades as shown on drawings. All pavement shall be neatly sawed cut.

3.7 TRENCH EXCAVATION FOR PIPES AND CONDUIT

A. Excavate trenches to a uniform width, sufficiently wide to provide ample working room, and a minimum of 6 to 9 inches of clearance on both sides of pipe or conduit. Provide a Trench Safety System for trench depth greater than 5 feet.

B. Excavate trenches and conduit to the depth indicated or required to establish indicated slope and invert elevations and to support the bottom of the pipe or conduit on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below the frost line.

C. Where rock is encountered, carry excavation 6 inches below required elevation and backfill with a 6-inch layer of crushed stone or gravel prior to installation of pipe.

D. For pipes or conduit less than 6 inches in nominal size, and flat bottomed, multiple duct conduit units, do not excavate beyond indicated depths. Hand-excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.

E. For pipes and equipment 6 inches or larger in nominal size, shape the bottom of the trench to fit the bottom of the pipe for 90 degrees (bottom 1/4 of the circumference). Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve the pipe bell of loads ensure continuous bearing of pipe barrel on bearing surface.

3.8 COLD WEATHER PROTECTION

A. Protect excavation bottoms against freezing when the atmospheric temperature is less than 35 degrees F.

3.9 BACKFILL AND FILL

A. General: Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified in Part 2 of this Section.

1. In landscaped areas, use satisfactory excavated or borrow material to the top of the subgrade.

2. Under walks and pavements, use subbase material, satisfactory excavated, or borrow material or a combination.

3. Under piping, conduit, and equipment use subbase materials where required for correction of unauthorized excavation. Shape excavation bottom to fit the bottom 90 degrees of the cylinder.

B. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and that are carried below the bottom of such footings or that pass under wall footings. Place concrete to the level of the bottom of the adjacent footing.

C. Concrete is specified in Sections 03300.

1. Do not backfill trenches until tests and inspections have been made and backfilling is authorized by the Owner or Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.

2. Provide 4-inch-thick concrete base slab support for piping or conduit less than 2' 6" below the surface of roadways. After installation and testing of piping or conduit, provide minimum 4-inch-thick encasement (sides and top) of concrete prior to backfilling or placement of roadway subbase.

D. Backfill excavations as promptly as work permits, but not until the completion of the following:

1. Acceptance of construction below finish grade including, where applicable, damp proofing, waterproofing, and perimeter insulation.

2. Inspection, testing, approval, and recording locations of underground utilities.

3. Removal of concrete formwork.

4. Removal of trash and debris from the excavation.

3.10 PLACEMENT AND COMPACTION

A. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from the ground surface prior to placement of fills. Plow strip or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with the existing surface.

B. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up the ground surface, pulverize, moisture condition to optimum moisture content, and compact to required depth and percentage of maximum density.

C. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

D. Before compaction, moisten, or aerate each layer as necessary to provide optimum moisture content. Compact each layer to the required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

E. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately the same elevation in each lift.

F. Control soil and fill compaction, providing a minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts as directed by the Owner or Engineer if soil density tests indicate inadequate compaction.

G. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density, in accordance with ASTM D 1557:

1. Under structures, sidewalks, concrete slabs/aprons, and pavements, compact top 6 inches of subgrade and each layer of backfill or fill material at 95 percent maximum density.

2. Under landscaped areas, compact top 6 inches of subgrade and each layer of backfill or fill material at 95 percent maximum density.

H. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to the surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on the surface during or subsequent to compaction operations. The moisture content of the materials shall be uniform and within plus or minus three percent of the optimum value.

I. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to the specified density.

J. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by disking, harrowing, or pulverizing until the moisture content is reduced to a satisfactory value.

K. Place topsoil materials evenly over entire landscape area to finish grade or sufficient topsoil which allows for chat, gravel mulch or other landscaping material to be added later which will bring other material to its finish grade. Water topsoil thoroughly allows for settlement and apply additional as needed.

3.11 GRADING

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. The smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:

C. Landscaped Areas: Finish areas to receive topsoil to within not more than 0.10 feet above or below required subgrade elevations.

D. Walks: Shape surface of areas under walks to the line, grade, and cross-section, with finish surface not more than 0.10 foot above or below required subgrade elevation.

E. Pavements: Shape surface of areas under the pavement to the line, grade, and cross-section, with finish surface not more than ½ inch above or below required subgrade elevation.

F. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to the required elevation. Provide final grades within a tolerance of ½ inch when tested with a 10-foot straightedge.

G. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.12 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.

B. Perform field density tests in accordance with ASTM D 1557.

C. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1557. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D 3017.

D. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Owner or Engineer.

E. Footing Subgrade: For each strata of soil on which footings will be placed, perform at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata acceptable to the Owner and Engineer.

F. Paved Areas and Concrete Slab Subgrade: Perform at least one field density test of subgrade for every 2,500 sq. ft. of the paved area or building slab, but in no case fewer

than three tests. In each compacted fill layer, perform one field density test for every 2,500 sq. ft. of overlaying building slab or paved area, but in no case fewer than three tests.

G. If in the opinion of Owner or Engineer, based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until the specified density is obtained.

3.13 EROSION CONTROL

A. Provide erosion control methods in accordance with the City of El Paso requirements.

3.14 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

D. Settling: Where settling is measurable or observable at excavated areas during the general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of the surface or finish to match adjacent work and eliminate evidence of restoration to the greatest extent possible.

3.15 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Remove excess excavated material, trash, debris, and waste materials and dispose of it off the Owner's property.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 02205

SOIL MATERIALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Subsoil materials

B. Topsoil materials

1.2 RELATED SECTIONS

A. General Conditions

B. Section 02211 - Rough Grading

1.3 REFERENCES

A. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18-inch (457 mm) Drop

B. ASTM D2487 - Classification of Soils for Engineering Purposes

C. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D. ASTM D3017 - Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

1.4 SUBMITTALS FOR INFORMATION

A. Section 01300 Submittals: Procedures for submittals

B. Materials Source: Submit the name of imported materials source

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with the Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges, 1993

PART 2 PRODUCTS

2.1 SUBSOIL MATERIALS

A. Topsoil shall be fertile soil, be easily cultivated, be free from objectionable material, have a relatively high erosion resistance and be readily able to support the growth of planting, seeding, or sodding

B. Subsoil Subgrade (shall be verified by site-specific geotechnical investigation):

1. Imported borrow

2. For site grading and backfill

3. Free of lumps larger than 3 inches, rocks larger than 3 inches, and debris

4. Free of deleterious material

5. Compacted to at least 95 percent of maximum density as determined by ASTM D1557 laboratory compaction procedures

C. Subsoil Structural Fill/Backfill (shall be verified by site-specific geotechnical investigation):

1. Imported fill
2. For structural fill
3. Free of deleterious material and cobbles over 3 inches in greatest dimension
4. The structural fill shall have a liquid limit of less than 40 and a plasticity index less than 18
5. Conforming to the USCS soil classifications: SW, SP, SM, SC, SW-SM, SW-SC, SP-SM, SP-SC, SC-SM, GW, GP, GM, GC, GW-GM, GW-GC, GP-GM, and GP-GC
6. Structural fill shall be placed in loose lifts not exceeding 8 inches in loose thickness and compacted to at least 95 percent of maximum density as determined by ASTM D1557 laboratory procedures
7. The moisture content of the fill shall be maintained within plus or minus 3 percent of the optimum moisture content until the final compaction

2.2 SOURCE QUALITY CONTROL

A. Section 01400 Quality Control

B. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D1557, ASTM D2922, and ASTM D3017

C. If tests indicate materials do not meet specified requirements, change material and retest

D. Provide materials of each type from the same source throughout the Work

PART 3 EXECUTION

3.1 SOIL REMOVAL

A. Excavate subsoil and subgrade from areas designated

B. Remove lumped soil, boulders, and rock

C. Remove excavated material from the site

3.2 STOCKPILING

A. Stockpile materials on-site at locations indicated by the Owner or Engineer

B. Stockpile in sufficient quantities to meet Project schedule and requirements

C. Separate differing materials with dividers or stockpile apart to prevent mixing

D. Prevent intermixing of soil types or contamination

E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave the area in a clean and neat condition. Grade site surface to prevent free-standing surface water.

B. If a borrow area is indicated, leave the area in a clean and neat condition. Grade site surface to prevent free-standing surface water.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 02211

ROUGH GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal of topsoil, subsoil, and subgrade.

B. Cutting, grading, filling, rough contouring, and compacting the site for site structures.

1.2 RELATED SECTIONS

A. Section 01400 Quality Control: Testing fill compaction.

B. Section 02110 Site Clearing.

C. Section 02205 Soil Materials.

D. Section 02200 Earthwork.

E. Section 02222 Excavation and Compaction for Pavement

1.3 REGULATORY REQUIREMENTS

A. Obtain required permits from authorities.

B. Conform to applicable codes for grading.

1.4 REFERENCES

A. ASTM D1557: Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18-inch (457 mm) Drop.

B. ASTM D2922: Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

C. ASTM D3017: Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with the Texas Department of Transportation (TxDOT) Standard Specifications for Construction of Highways, Streets, and Bridges, LATEST VERSION.

1.6 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil: As specified in Section 02205.

B. Subsoil Fill: As specified in Section 02205.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions under provisions of Section 01400.

B. Verify that survey benchmark and intended elevations for the Work are as indicated.

3.2 PREPARATION

A. Identify the required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect utilities that remain, from damage.

D. Notify utility field locators to identify existing utilities and depths.

E. Protect above and below-grade utilities that remain.

F. Protect plant life, lawns, and other features remaining as a portion of final landscaping.

G. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 SUBSOIL EXCAVATION

A. Excavate subsoil from areas to be further excavated or regraded.

B. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.

C. When excavating through roots, perform work by hand and cut roots with a sharp ax.

D. Remove subsoil from the site.

E. Stability: Replace damaged or displaced subsoil to the same requirements as for specified fill.

3.4 FILLING

A. Installed fill shall be in accordance with Section 02205.

B. Fill areas to contours and elevations with unfrozen materials.

C. Place fill material on continuous layers and compact with Section 02205.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Slope grade away from pump building to avoid site ponding as noted on Drawings.

F. Make grade changes gradual. Blend slope into level areas.

G. Remove surplus fill materials from the site.

3.5 TOLERANCES

A. Top Surface of Subgrade: Plus, or minus 1/10 foot from required elevation.

3.6 FIELD QUALITY CONTROL

A. Section 01400 Quality Assurance: Field inspection and testing.

B. Testing: In accordance with ASTM D1557, ASTM D2922, and ASTM D3017.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

D. Frequency of Tests:

1. One field density test for every 2,500 square feet of subgrade prior to placing fill.

2. Four field density tests for each lift or one per 2,500 square of fill for each work area, whichever is a greater number of tests.

3. One moisture-density curve for each type of material used, as indicated by the sieve.

4. One sieve analysis and one plasticity index for each type of imported material used.

3.7 SCHEDULES

A. Subgrade Preparation (shall be verified by site-specific geotechnical investigation):

1. Scarify surface to a minimum depth of 8 inches, prior to filling placement

2. Maintain optimum moisture condition of subgrade shall be maintained within 3 percentage points above or below optimum moisture content until permanently covered.

3. Compact to a minimum 95 percent of maximum density for non-cohesive or 90 percent for cohesive soils, of the maximum density as determined by ASTM D1557.

B. Structural Fill (shall be verified by site-specific geotechnical investigation):

1. Maximum lift not exceeding 8 inches in loose thickness.

2. Compact to a minimum 95 percent of maximum density.

3. The moisture content of the fill shall be maintained within plus or minus 3 percent of the optimum content until final compaction.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 02221

EXCAVATING, BACKFILLING AND COMPACTING FOR UTILITIES

PART 1 GENERAL

STATUTORY REQUIREMENTS

A. All excavation, trenching, and related sheeting, bracing, etc. shall comply with the requirements of OSHA excavation safety standards (29 CFR part 1926.650 Subpart P) and any State or local requirements. Where conflicts between OSHA, State, and local regulations exist, the most stringent requirements shall apply.

B. INDEMNIFICATION: The Contractor shall indemnify and hold harmless the Owner, its employees, and consultants, and the Texas Water Development Board, its personnel and representatives, 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/excavations constructed under this contract. The Owner 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.

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, superintendence, tools, and incidentals necessary to perform trenching for pipelines and appurtenances, including drainage, filling, backfilling, disposal of surplus material, and restoration of trench surfaces and easements.

B. Excavation shall extend to the width and depth shown on the drawings or as specified and shall provide a suitable room for placing shoring, pipe embedment, and installing pipe, structures, and appurtenances.

C. Furnish and place all sheeting, bracing, and supports and remove from the excavation all materials that the Engineer may deem unsuitable for backfilling.

D. Whatever the requirement for any percentage of compaction is referred to herein shall mean "at least that percentage of maximum density as determined by ASTM D1557."

1.2 RELATED WORK

A. Environmental Protection Procedures is included in Section 01110.

B. Granular Fill Materials are included in Section 02235.

C. Schedule of Pipelines are included in Sections 02610.

1.3 SUBMITTALS

A. Trench excavation support system designs shall be prepared by a licensed Professional Engineer, registered in the State of Texas, having a minimum of five years of professional experience in the design and construction of excavation support systems. Submit an original and a minimum of three (3) copies of the licensed Professional Engineer's certification, on the P.E. form included in Section 01300, stating that the excavation support systems designs have been prepared by the Professional Engineer and that the Professional Engineer will be responsible for their execution. Also, see Section 01300.

1.4 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D698 Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregates Mixtures Using 5.5 lbs. (2.49 kg) Rammer and 12-inch (305 mm) Drop (also known as Standard Proctor Analysis)

2. ASTM D1557 Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54 kg) Rammer and 18-inch (457 mm) Drop (also known as Modified Proctor Analysis)

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.5 QUALITY ASSURANCE

A. At all structures, prior to the placement of bedding material, concrete work mats, structural fill or structural concrete, cooperate with the Engineer and soils testing laboratory for verification of the suitability of the existing subgrade soil and in their performance of in-place soil density tests as required to verify that the bearing capacity of the subgrade is sufficient.

B. Prior to and during the placement of backfill and fill, cooperate with the Engineer and soils testing laboratory in their performance of in-place soil density tests to verify that the backfill/fill material has been compacted in accordance with the compaction requirements specified herein.

1.6 PROJECT/SITE REQUIREMENTS

A. Subsurface Conditions

1. Geotechnical explorations of the site have been performed by CQC Testing and Engineering, L.L.C. This information is available for examination by appointment at the offices of EPW during regular business hours. (1154 Hawkins Blvd, El Paso, Texas 79925; ATTN: Jaime Arriola or Contracts Department).

2. The data and recommendations presented in the report are based on observations at specific boring locations as designated therein. Conditions between or away from the borings may vary from those indicated in the report. No warranty of subsurface conditions, expressed or implied, is intended or made to any reviewer of the report.

1.7 DEFINITIONS

A. Where the phrase "in-the-dry" is used in these specifications, it shall be defined to mean soil conditions such that the in-place moisture content of the soil at that time is no more than 3 percentage points above the optimum moisture content of that soil as determined by the laboratory test of the moisture-density relation appropriate to the specified level of compaction.

PART 2 PRODUCTS

2.1 GENERAL

A. Materials designated for use in this section are specified in Section 02235.

B. The timber used for excavation support systems shall be pressure treated with wood preservative for ground contact.

PART 3 EXECUTION

3.1 TRENCH EXCAVATION SUPPORT

A. This item covers the requirements for the Contractor to provide the design and construction of trench safety for all trenches excavated. Refer to SUPPLEMENTARY CONDITIONS and Section 01014, of these specifications for additional information regarding TRENCH EXCAVATION SAFETY SYSTEM.

B. The Contractor shall furnish, put in place, and maintain a trench safety system to support the sides of the excavations where required, to prevent movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect structures, pipelines, streets, drains, canals and utilities from damage due to lateral movement or settlement of ground.

C. The trench safety system shall be suitable for the 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, sheeting, trench boxes or trench shields, sheet piling, cribbing, bracing, shoring, or diversion of water to provide adequate drainage.

D. 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 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 protection of any person or persons who, as a result of the Contractor's work, maybe injured.

E. No Trenching in excess of five (5) feet below the existing grade will be allowed until the trench excavation plan is reviewed and returned to the Contractor. 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, techniques, and procedures. 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. 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 October 31, 1989. The sections that are incorporated into these specifications by reference include Sections 1926-650 through 1926-652. Legislation that has been enacted by the Texas Legislature (H.B. No. 662 and H.B. 665) with regard to trench safety systems, is hereby also incorporated, by reference, into these specifications following this section.

G. 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.

1. Contractors have the following accepted methods, or combinations thereof, to meet OSHA Standards for Trench Excavation:

    a. Utilization of Trench Box.

b. Shoring, Sheeting, and Bracing Methods.

c. Sloping and Benching Methods per OSHA standards.

2. A 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. No claims for delay will be permitted.

3. A 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. No claims for delay will be permitted.

H. Sheeting and Bracing

1. The Contractor shall furnish, put in place, and maintain such sheeting and bracing as may be required to protect personnel, to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures from undermining or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed, and the cause of such voids investigated. Where soil cannot be properly compacted to fill the void, and where acceptable to the Engineer, lean concrete shall be used to fill the void at no additional cost to the Owner.

2. The Contractor shall leave in place to be embedded in the backfill all sheeting the Engineer may direct him in writing to leave in place at any time during the progress of the work for the purpose of preventing injury to structures, utilities, or property. The Engineer may direct that timber used for sheeting and bracing be cut off at any specified elevation. Excavation supports the lift in place. (1) Excavation supports that are required to remain in place, if applicable, are indicated on the Drawings. (2) The Engineer may direct that certain excavation supports remain in place, or be cut off at a specified elevation, which is not so designated on the drawings or otherwise specified herein to remain in place. If the Contractor believes that such a directive increases Contractor's cost and would thereby entitle Contractor to a change in price, the Contractor shall notify the Engineer in accordance with the applicable article in the General Conditions pertaining to changes in the work. (3) The right of the Engineer to direct that certain excavation supports remain in place shall not be construed as creating any obligation on the Owner or Engineer to give such direction, nor shall failure to give such direction relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the Contractor to leave in place sufficient excavation supports to prevent any movement of the ground or damage to adjacent structures.

3. All sheeting and bracing not left in place shall be carefully removed in such manner as not to cause excessive loading on the installed piping, and to not endanger the construction of other structures, utilities, or property. All voids left or caused by the withdrawal of sheeting shall be immediately refilled with sand by ramming with tools specially adapted for that purpose, or otherwise as may be directed.

4. The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such orders, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of failure on the part of Contractor to leave in

place sufficient sheeting and bracing to prevent any caving in or moving of the ground.

5. No wood sheeting is to be completely withdrawn if driven below mid-diameter of any pipe, and under no circumstances shall any wood sheeting be cut off at a level lower than one (1) foot above the top of any pipe.

6. When movable trench bracing such as trench boxes, moveable sheeting, shoring, or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe or disturbance of the pipe bedding or backfill.

   a. When installing a rigid pipe, any portion of the box extending below mid-diameter shall be raised above this point prior to moving the box ahead to install the next pipe. This is to prevent the separation of installed pipe joints due to the movement of the box.

   b. When installing flexible pipe, trench boxes, moveable sheeting, shoring, or plates shall not be allowed to extend below mid-diameter of the pipe. As trench boxes, moveable sheeting, shoring, or plates are moved, screened gravel shall be placed to fill any voids created, and the screened gravel and backfill shall be re-compacted to provide uniform side support for the pipe.

I. 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 maintain a permanent record of these daily inspections.

J. 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, the Owner's designated representative, or the Engineer to determine the specific applicability of the designed trench safety systems to each field condition encountered on the project.

K. In any emergency situation which may threaten or affect the safety or welfare of persons or property, the Contractor shall act at his 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.

L. OSHA Safety and Health Regulation Part 1926: (As included in Division 0)

3.2 TRENCH EXCAVATION PROCEDURES

A. Existing concrete and asphaltic pavement, sidewalk, curb, or driveway removed in connection with construction shall be replaced to neatly sawed edges. Saw cuts shall be made to a minimum depth of 1½-inches or ¼ the thickness of the concrete, whichever is greater. Cuts shall be neat and to true straight lines with no shatter outside the removal area. If a saw cut would fall within 30-inches of construction joint, cold joint, expansion joint, or edge, the concrete shall be removed and replaced to the joint or edge. A concrete sidewalk and/or driveway may be removed so that a minimum 30-inch square is replaced. If the saw cut would fall within 12 inches of score mark, the concrete shall be removed and replaced to the score mark. Existing bituminous pavement removed in connection with construction shall be cut with a saw, cutting wheel, or other similar and suitable tool. Care shall be taken to assure that the edge of the removed pavement does not vary from a straight line more than 2 inches from the mean. The Contractor shall furnish all material, labor, equipment, and supplies necessary to do the work required in the removal of pavement and disposal of the same where required. Saw cutting is required on all paving.

Saw cutting shall be 1½ -inches minimum depth of cut. The cutting shall be carried in a vertical plane through the pavement along a straight line marking the limits of the cut. Any unnecessarily irregular breakage or cracking caused by the Contractor shall be removed and replaced by the Contractor without added expense to the Owner. Additional pavement replacement that results from excavation beyond the maximum trench widths as shown in the drawings and specified elsewhere in these specifications will be replaced at no cost the Owner. Paving cuts for manholes and valve boxes shall be SQUARE and at adequate distances from outside diameter to manholes and valve boxes to allow installation.

B. Trench digging machinery may be used to make trench excavation except in places where the operation of the 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 locate the elevation of all major damage to any such lines. The Contractor shall locate the elevation of all major utility lines at least 300 feet ahead of pipeline placement operations and notify the Engineer in writing of any conflicts that are found or expected.

C. 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. All excavated material shall be piled along the trench in a manner that will not endanger the work.

D. Excavation for manholes and other appurtenances shall be made as required to provide space for constructing the structure and trench safety system.

E. No explosives will be allowed.

F. Trenches shall be excavated to the depth indicated on the drawings and in widths sufficient for laying and bedding the pipe, constructing concrete easement, bracing, and for pumping and drainage facilities. If the existing subgrade soils are determined to be unsuitable, the direction will be provided by the Engineer regarding removal and replacement with suitable materials. The bottom of the excavations shall be firm and dry and, in all respects, acceptable to the Engineer.

G. Excavation shall be performed in-the-dry by methods that preserve the undisturbed state of subgrade soils. The trench may be excavated by machinery to, or just below the designated subgrade, provided that material remaining in the bottom of the trench is no more than slightly disturbed. Subgrade soils that become soft, loose, "quick," or otherwise unsatisfactory as a result of inadequate excavation, dewatering, or other construction methods shall be removed and replaced by crushed stone fill as required by the Engineer at the Contractor’s expense.

H. The Contractor shall not open up more trench in advance of pipe laying than is necessary to expedite the work, and in no event, shall the length of a continuous open trench at the job site exceed 300 feet; however, trenching shall be done far enough in advance of pipe laying to allow the Engineer to make necessary grade changes without the use of extra fittings.

I. Any excavated areas shall be considered as "open trench" until all pavement replacements have been made, or until all trenches outside of pavement, replacement areas have been backfilled and compacted in accordance with these Contract Documents. Trenches across streets shall be completely backfilled with temporary or permanent pavement in place within 24 hours after laying the pipe.

J. The Contractor shall provide substantial steel plates with adequate trench bracing to support a minimum load of AASHTO H-20 which shall be used to bridge across trenches

at street and alley crossings and at commercial driveways, where trench backfill, and temporary patches have not been completed before the end of the Contractor's regular working hours. A 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, and hospitals shall be maintained at all times.

K. Trench widths from the bottom of the trench to a point 12 inches above the top of the pipe shall be kept to the practical minimum required for proper bedding, laying, aligning, grading, and jointing of the pipe. Trench widths from the bottom of the pipe to a point 12 inches above the top of the pipe shall be as shown on the Drawings.

L. If the maximum recommended trench width must be exceeded or if the pipe is installed in a compacted embankment, then pipe embedment shall be compacted to a point of at least 2½ pipe diameters from the pipe on both sides of the pipe or to the trench walls.

M. Whenever the prescribed maximum trench width is exceeded, the Contractor shall use an embedment or encasement as required by the Engineer for the trench width as actually cut. For trench widths in excess of the prescribed maximum, excavated by the Contractor for his own convenience, the additional cost incurred will be borne by the Contractor.

N. In all cases, any accumulated water in the trench shall be removed before laying pipe, placing concrete, or backfilling.

O. If the Contractor excavates below grade through error or for the Contractor's own convenience, or through failure to properly dewater the trench, or disturbs the subgrade before dewatering is sufficiently complete, he may be directed by the Engineer to excavate below grade as set forth in the following paragraph, in which case the work of excavating below grade and furnishing and placing the refill shall be performed at the Contractor's expense.

P. If the material at the level of trench bottom consists of fine sand, sand, and silt, or soft earth which may work into the pipe embedment material notwithstanding effective drainage, the subgrade material shall be removed to the extent acceptable to the Engineer and the excavation refilled with a 6-inch layer of coarse sand, as approved by the Engineer, to form a filter layer preserving the voids in the pipe embedment material. The composition and gradation of the filter layer shall be approved by the Engineer prior to placement. Pipe embedment material shall then be placed in 6-inch layers thoroughly compacted up to the normal grade of the pipe. If approved by the Engineer, bank-run gravel shall be used for a refill of excavation below grade. Geotextile filter fabric may be substituted for the filter layer if approved by the Engineer. Filter fabric shall be Mirafi 140N, Supac equivalent. In any case, the bottom of the excavated trench shall be compacted by mechanical means to a density of not less than 90% per ASTM D1557.

3.3 PIPE EMBEDMENT AND TRENCH BACKFILL PROCEDURES

A. After completion of the trench excavation, bedding material shall be placed on the trench bottom for support under the pipe. Bell holes and similar excavations for appurtenances shall be hand excavated. All pipe shall be installed in such a manner as to ensure full support of the pipe barrel over its entire length and under appurtenances. Bedding material to be placed under the pipe shall be 6-inches in thickness after 90% compaction has been reached by mechanical means per ASTM D1557.

B. Bedding, laying and joining of pipe shall be as specified for the individual type of pipe. After joining the pipe, it shall be adjusted to the line and grade indicated on the drawings.

C. The compaction of fill material shall be with approved types of pneumatic or tamping equipment. Self-propelled or heavy-duty vibratory compaction equipment should 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 percent of maximum or as shown on the Drawings as determined by ASTM D1557 or D2167.

D. As soon as practicable after the pipe has been installed and joined, bedding material shall be placed and compacted to the top of the pipe. Additional bedding material shall be placed and compacted to at least 12-inches over the top of the pipe. The bedding material and initial backfill shall be hand-packed under the haunches and tamped in 6-inch lifts compacted to 95% per ASTM D1557 paying particular attention to bell holes, sling holes, elimination of voids and to ensure uniform support for the pipe.

E. Backfilling over pipes shall begin as soon as practicable after the pipe has been laid, jointed and inspected and the bedding material placed as specified.

F. Allow three (3) days before placing backfill over concrete encasement.

G. All backfilling shall occur expeditiously and as specified.

H. The remainder of the trench from a point 12 inches above the pipe, or above the concrete encasement, shall be backfilled and thoroughly compacted as herein specified. To prevent longitudinal movement of the pipe, dumping backfill material into the trench and then spreading will not be permitted until the bedding or select fill has been placed and compacted to a level one (1) foot over the pipe.

I. If the soil conditions do not require bedding zone material to the top of the pipe, the first lift of backfill material shall be placed carefully under the haunches and around the pipe and thoroughly compacted in 8-inch lifts by means of mechanical tamps to the top of the pipe. When the first lift above the top of the pipe has been compacted as specified, 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 and compacted with approved mechanical compaction equipment until the required density is obtained. Vibratory rollers may not be used in city streets. The backfill material from the bottom of the trench to finish grade shall be moistened or aerated as necessary to obtain optimum moisture. Compaction shall occur from as close to the pipe as possible to as close to the trench shield as possible. 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 D1557 shall be obtained from the bottom of the subgrade to the top of the bedding in 8-inch lifts.

    2. For all backfill not in paved areas, the density of not less than 90 percent per ASTM D1557 shall be obtained from top of the pipe to ground surface in 8-inch lifts.

    3. The jetting method of water tamping or the water ponding method will not be allowed.

J. 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, digging out, refilling and re-compacting depressions caused by settlement, and other work required to keep the areas and roads in satisfactory condition. Paved streets shall be restored in accordance with Sections 02222 and 02510. Any settlement of the paved surface which occurs before and during the one (1) year warranty period shall be repaired by the Contractor at his expense. This may include saw cutting and removing portions of the affected pavement, removing all unconsolidated material and re-compacting with new material or filling with 2-sack cement stabilized the material. The Engineer shall determine the limits of removal. Upon acceptance by the Engineer, the Contractor shall repave.

K. Backfill around structures shall be selected common fill material and shall be compacted, especially over pipes connected to the structures.

L. When moveable trench bracing such as trench boxes, moveable sheeting, shoring, or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring, or plates shall not be allowed to extend below the top of the pipe. As trench boxes, moveable sheeting, shoring, or plates are moved, pipe bedding shall be placed to fill any voids created and the backfill shall be re-compacted as specified to provide uniform side support for the pipe across the entire trench width.

M. Any relocated sewer, potable water, natural gas, buried telephone, reuse water line, or other utility shall be marked by installing the appropriate marking tape in the trench. Marking tape for water, sewer and reclaimed water pipelines shall be metallic. All other marking tapes 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 pipelines, High Visibility Blue for potable water, High Visibility Green for sanitary sewer pipelines, and High Visibility Purple for reclaimed water.

N. The pipeline shall be marked by concurrently installing the appropriate marking tape in the trench for detecting purposes. The marking tape shall be as manufactured by Alarm-Tapes, Inc. or approved equal. Installation in the trench shall be as recommended by the manufacturer and as shown on the Drawings.

O. CONSTRUCTION TESTS

1. Tests of all the materials shall be made during construction to determine conformity with the specifications. Such tests may include field densities on base course and grading analysis of the material. The frequency and type of testing will be determined by the Engineer. In general, minimum sampling and testing frequencies shall consist of the following:

   At least one (1) moisture-density (Proctor) test, Atterberg limits test and percent finer than #200 sieve test should be performed per soils type for subgrade, backfill, fill, and base materials.

   At least one (1) density and moisture content test per 2,500 square feet of the surface area should be performed on the subgrade soils for each compacted 6-inch thickness of fill. Testing of backfilled trenches should be at least one (1) density and moisture content test per 100 linear feet of trench per 8-inch compacted fill thickness.

2. The Contractor shall cooperate in securing samples and shall furnish materials required for sampling.

3. All construction tests requested by the Engineer will be paid for by the Contractor. Should construction testing reveal that the item tested does not meet the requirements of the Construction Documents, retesting shall be required until the item does meet the requirements. The Contractor may obtain any additional tests that he may require for quality control.

3.4 RESTORING TRENCH SURFACE

A. Where the trench occurs adjacent to a paved street, in shoulders, or in sidewalks, thoroughly consolidate the backfill and maintain the surface as the work progresses. If settlement takes place, immediately deposit additional fill to restore the level of the ground.

B. In and adjacent to streets, the upper portion of trenches shall be backfilled with base material and pavement replaced in accordance with Section 02222 and 02510.

C. In sections where the pipeline passes through grassed areas, the Contractor shall remove and replace the sod, or loam and seed the surface to the satisfaction of the Engineer.

3.5 EXCAVATION AND BACKFILLING FOR PIPES UNDER OR ADJACENT TO STRUCTURES

A. Excavation for all pipelines beneath structures shall be carried out with the excavating equipment operating from the subgrade for the structure. The excavation shall be carried out "in-the-dry" and in a manner, that will preserve the undisturbed state of the subgrade soils.

B. In order to minimize any differential settlement, all pipe within the excavation limits of structures shall be adequately supported on structural fill. The Contractor shall provide a suitable transition zone of this backfill under the pipelines or ducts from the structure wall to the beginning of the normal trench as shown on the drawings and as acceptable to the Engineer.

C. In locations where pipes pass through fill areas, the Contractor shall take the following precautions to consolidate and refill up to an elevation of at least 1 foot above the top of the pipes:

1. Place and compact structural fill in such areas for a distance of not less than 3 feet either side of the centerline of the pipe in level layers not exceeding 6 inches in depth and extending from the structure wall to the end of fill. Compaction shall be as specified for structural fill. Compaction Requirements are:

    a. Beneath structures and slabs on grade (except sidewalks): Scarify and recompact the top 8 inches of existing subgrade and each layer of fill, where required, to a minimum of 95 percent modified proctor (ASTM D1557) at or near its optimum moisture content: (1) Sandy Lean Clays: Optimum to 3 percent above optimum moisture content and (2) Granular Soils: 3 percent below optimum to 3 percent above optimum moisture content.

    b. Backfill adjacent to structures: Compact each lift to 95 percent modified proctor (D1557) at ± 2% of optimum moisture content (per Section 3.7A).

    c. Embankments (except under roadways), lawn, or unimproved areas: Compact the top 6 inches of existing subgrade and each layer of fill or backfill to a minimum of 90 percent standard proctor (ASTM D698) at or near its optimum moisture content (minus 1 to plus 4 percent).

    d. Sidewalks: Compact the top 6 inches of existing subgrade (and each 6-inch layer of fill if applicable) to a minimum of 90 percent standard proctor (ASTM D1557) at or near its optimum moisture content.

    e. Roads, paved areas, and roadway embankments: Compact the top 12 inches of existing subgrade and each layer of fill or backfill to a minimum of 95 percent modified proctor (ASTM D1557) at or near its optimum moisture content: 1. Sandy Lean Clays: Optimum to 3% above optimum moisture content, 2. Granular Soils: 3% below optimum to 3% above optimum moisture content.

2. Excavate for pipe trench and backfill as specified above.

3.6 DISPOSAL OF SURPLUS MATERIAL

A. Excavated material may be stacked without excessive surcharge on the trench bank. Excavated material shall be segregated for use in backfilling.

B. Unsuitable waste and surplus excavated material shall be removed and disposed of offsite in accordance with all applicable regulations. Materials may be temporarily stockpiled in an area within the limits of construction that do not disrupt neighborhood activities, construction activities, create any nuisances or safety hazards, or otherwise restrict access to the site of the work.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement will be made for this work item and payment for all work under this section (except Trench Safety System), will be included as part of the unit price for the installation of pipelines as shown in the Proposal.

END OF SECTION

SECTION 02222

EXCAVATING AND COMPACTION FOR PAVEMENT

PART 1 GENERAL

1.1 SCOPE

A. The work covered by this section of the Specifications consists of all earthwork required to prepare ground surfaces upon which the proposed HMAC roadway will be constructed, and concrete items such as curbs, gutters, sidewalks, and driveways are to be replaced. The work shall include the removal and disposal of any unacceptable or excess materials and any necessary 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. The work shall be performed to prepare the ground surfaces in those areas where roadway pavement or concrete curbs, gutters, sidewalks, and/or similar items are being constructed or have been removed or damaged during construction and must be reconstructed or repaired. Preparation of the ground surface 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. 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.

E. It shall be the responsibility of the Contractor to become familiar with job site conditions, and materials to be encountered prior to submitting his Proposal. The Contractor shall include in the proposal all costs of such preliminary investigations, as well as all costs for performing the work covered by this section, including any necessary rock excavation.

F. Pavement replacement width shall be governed by Table 1 below and in no case shall the Owner pay for additional pavement due to excessively wide trenches caused by the Contractor's failure to take adequate precautions to maintain a narrow trench. The use of the angle of repose method or the benching method for the trench safety system shall not be considered an acceptable method of maintaining a narrow trench. If the Contractor elects to use these methods for the trench safety system, additional pavement replacement shall be at the Contractor's expense. Pavement replacement width shall be measured at the equal distance from the centerline of the pipeline. Payment shall be only for the actual pavement removed and replaced within the limits of the pavement width as shown in Table 1. If the entire roadway is required to be removed and replaced as called out on the Plan & Profile sheets of the Contract Drawings the measured width of the replaced pavement shall be paid at the unit price.

Table 1 Maximum Pavement Width for Payment Purposes

Trench Depth	Pipe Size	Pavement Width
0' through 6.9'	12" and smaller	5'
0' through 6.9'	Larger than 12"	6'
7' through 9.9'	12" and smaller	6'
7' through 9.9'	Larger than 12"	7'
10' and Deeper	12" and smaller	7'

10’ and Deeper	Larger than 12”	8’

G. If pavement cut is within 3-feet from the curb or gutter, the pavement must be replaced up to the curb or gutter.

1.2 SUBMITTALS

A. Imported materials must have prior approval by the Engineer in the form of accepted certification from the material supplier that the proposed material meets all the requirements of this Section.

1.3 RELATED WORK

A. Granular Fill Material is included in Section 02235.

B. Asphaltic Concrete Paving is included in Section 02510.

PART 2 PRODUCTS

2.1 IMPORTED MATERIAL

A. Imported backfill and subgrade materials shall conform with Section 02235 of these Specifications.

PART 3 EXECUTION

3.1 GRADING AND EXCAVATION

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 and acceptance of the work by the Owner.

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 to a depth of one (1) foot below the required excavation. 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 will be required in any area of the construction.

D. Unauthorized excavation consists of removal of materials beyond indicated elevations or dimensions without the 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 corrected at the expense of the Contractor.

E. Excavation walls should be suitably sloped at no more than 1 to1 during construction and protected such that the slope will be stable. The Contractor shall be responsible for maintaining, at all times, safe embankment slopes during the work.

F. Prior to the 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 be undesirable soil materials or clay soils.

G. After excavation to the required elevation and/or prior to the placement of fill, the upper 6 inches of the excavated area shall be scarified and compacted to the density required by this Section. Fill materials, if required, shall be incorporated into the scarified surface during the compaction operation.

3.2 BORROW MATERIAL

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 fill 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 borrowed 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. Borrow material shall conform with Section 02235.

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.

B. Fill and backfill material shall be free of any organic or deleterious substances and shall not contain cobbles or lumps over four inches in the greatest dimension. It shall not contain more than 20% by 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 12.

C. Suitability of potential fill material shall be determined by grain size analysis and tests for the liquid limit, plastic limit, and shrinkage performed in accordance with ASTM D522, D423, D424, and D427, respectively.

D. 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 removed from the job site and disposed of at the Contractors expense. All excess excavation which cannot be reused as backfill shall be disposed of at the Contractors expense.

E. 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.

3.4 INSTALLATION OF FILL AND BASE MATERIALS

A. The base of excavations shall be moistened and shall be compacted to a dry density, which is not less than 95 % of maximum as determined by ASTM D1556 or D2167. 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, 3% of optimum, as determined by ASTM D1557. Water shall not be pooled or jetted onto the in-place fill but shall be distributed uniformly over its surface.

B. The compaction of fill material shall be with approved types of pneumatic or tamping equipment. Self-propelled or heavy-duty vibratory compaction equipment should 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 95 % of maximum or as shown on the Drawings as determined by ASTM D1557 or D2167.

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, if necessary, then re-compacted until the required density is attained. If the Contractor is unable to attain the required compaction with the material in place, the material shall be removed, replaced with new material, and the site recompacted until the required density is attained.

D. Where fill or backfill is required to be compacted to a specified density, tests for compliance will be made by the Contractor's testing laboratory and as directed by the Engineer. The frequency of testing will be approximately one test for every 2,500 square feet for each 6-inch thickness of fill and testing of backfilled trenches should be at least one (1) density and moisture content test per 100 linear feet of trench per 8-inch compacted fill thickness, or as directed by the Engineer. See Section 02221-10.3.3-O. The costs for this testing shall be paid for by the Contractor per Section 01410.

E. It is understood and agreed that the performance of tests shall not constitute acceptance of any portion of the work or relieve the Contractor from compliance with the terms of the Contract Documents.

3.5 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, for the construction of concrete items or the placement of the pavement. The subgrade shall be the thicknesses shown on the drawings. Any clay encountered within two feet of the wearing course 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 % is attained. The testing will be as outlined in ASTM D1557; the 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 remaining courses are constructed. Periodic wetting of the subgrade may be required to maintain density and to control dust. Upon commencement of the base course, 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 maintenance of the subgrade shall also apply to the base course upon commencement of the Paving (HMAC) replacement.

D. Where subgrade is required to be compacted to a specified density, tests for compliance will be made by the Contractor's testing laboratory and as directed by the Engineer. The frequency of testing will be approximately one test for every 2,500 square feet for each compacted 6-inch thickness of fill and testing of backfilled trenches should be at least one (1) density and moisture content test per 100 linear feet of trench per 8-inch compacted fill thickness or directed by the Engineer. The costs for this testing shall be paid for as specified in Section 01410.

E. It is understood and agreed that the performance of tests shall not constitute acceptance of any portion of the work or relieve the Contractor from compliance with the terms of the Contract Documents.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement or payment shall be made for the work under this section, but it shall be included in the unit price bid for removal and replacement of HMAC.

END OF SECTION

SECTION 02235

GRANULAR FILL MATERIAL

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals necessary to obtain materials for filling and backfilling, grading, and miscellaneous site work, for the uses shown on the drawings and as specified herein.

1.2 RELATED WORK

A. Excavating, Backfilling, and Compacting for Utilities is included in Section 02221.

B. Excavating and Compaction for Pavement is included in Section 02222.

C. Schedule of Pipe is included in Sections 02610.

1.3 SUBMITTALS

A. Submit in accordance with Section 01300, complete product data, for materials specified in this Section.

B. Laboratory Test Reports for each proposed material as follows:

1. Grain size analyses, and plasticity index and liquid limit where applicable, to determine suitability for use as backfill or fill material in conformance with the requirements specified herein. Grain size analyses shall be determined in accordance with ASTM C136 and soils shall be classified in accordance with ASTM D2487.

2. Moisture-density relations to determine the maximum dry densities and optimum moisture content required for compaction testing as specified elsewhere in the Contract Documents.

1.4 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C33 Standard Specification for Concrete Aggregates

2. ASTM D75 Methods for Sampling Aggregates

3. ASTM C136 Method for Sieve Analyses for Fine and Coarse Aggregates

4. ASTM D4318 Liquid Limit, Plastic Limit and Plasticity Index of Soils

5. ASTM D698 Standard Test Method for Moisture-Density Relations for Soils and Soil-Aggregate Mixtures, Using 5.5-pound (2.49-kg) Rammer and 12-inches (305 mm) Drop.

6. ASTM C131 Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

7. ASTM D2487 Classification of Soils for Engineering Purposes

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.5 QUALITY ASSURANCE

A. Laboratory Testing:

1. At least 14 days prior to the placement of any backfill and fill materials, deliver a representative sample of the proposed materials weighing at least 50 pounds to the Engineer for testing by the testing laboratory.

2. The soils testing laboratory will perform:

a. Grain-size analyses and soil classification of the samples to determine their suitability for use as backfill or fill material in conformance to the material requirements specified hereinafter.

b. The appropriate Proctor analyses to determine the moisture-density relationship curve for the material submitted.

3. Test results shall be delivered to the Engineer and to the Contractor no later than three days prior to the placement of backfill or fill materials.

4. The Contractor will pay for all tests necessary to determine the suitability of off-site or on-site excavation material being proposed for use as backfill or fill.

1.6 DELIVERY, STOCKPILING, AND HANDLING

A. The Engineer shall be notified of all deliveries of granular material a minimum of 72 hours in advance of the scheduled delivery time.

B. Stockpile granular material within areas allowed for construction and at locations acceptable to the Engineer. The Contractor shall construct a pad of the stockpile material at the stockpile location(s) and shall utilize equipment capable of properly stacking each stockpile in a neat and regular shape. Contaminated or unsatisfactory stockpile material shall be replaced at no additional cost to the Owner. The Engineer shall be the sole authority determining the acceptability of stockpiled material.

C. Limit the handling of stockpiled material to prevent segregation and unnecessary material loss. Material to be stockpiled shall be covered with a waterproof tarp secured to the ground with weights or snaps, in the event of wet weather.

PART 2 PRODUCTS

2.1 MATERIALS

A. Backfill and fill materials shall be suitable on-site excavated materials, natural or processed mineral soils obtained from off-site sources, or graded crushed stone or gravel. Backfill embankment fill and common fill materials shall be free of all organic material, trash, snow, ice, frozen soil, or other objectionable materials which may be compressible, or which cannot be properly compacted. Backfill and fill materials shall not contain any granite blocks, broken concrete, masonry rubble or asphalt pavement. Soft, wet, plastic soils which may be expansive clay soils, having a natural in-place water content in excess of 30 %, soils containing more than 5 % (by weight) fibrous organic materials, and soils having a plasticity index greater than 15 (per ASTM D4318) shall be considered unsuitable for use as backfill, fill or common fill. Backfill, embankment fill, and common fill materials shall have a maximum of 1.5 % expansion when testing is performed on a sample remolded to 95 % of maximum dry density (per ASTM D698) at 3% below optimum moisture content under a 100 pounds/square foot surcharge. Onsite sands may be used as fill materials provided, they meet the requirements specified for the class of fill, and test results are submitted and approved.

B. Structural fill shall be unfrozen, sandy gravel, or gravelly sand free of organic material, loam, trash, snow, ice, or other objectionable material. It shall have a plasticity index of less than 15 (per ASTM D4318) and shall be graded within the following limits when sampled and tested in accordance with ASTM D75 and ASTM D136:

Sieve No. or Size	Total percent Passing by Weight
2 inches	100
1 inch	90 to 100
#4	70 to 100
#200	0 to 20

C. Common fill shall consist of mineral soil substantially free from organic materials, loam, wood, trash, and other objectionable materials which may be compressible, or which cannot be compacted. Common fill shall not contain stones larger than six inches in the largest diameter, granite blocks, broken concrete, masonry rubble, or other similar materials. It shall have physical properties such that it can be readily spread and compacted during filling. Snow, ice, or trash shall not be permitted. It shall have a plasticity index of less than 15 (per ASTM D4318). Native material (excluding sandy, lean clays) conforming to these requirements may be used as common fill. Common fill shall conform to the following gradation limits:

Sieve No. or Size	Total percent Passing by Weight
6 inches	100
No. 30	75 to 100
No.200	0 to 20

D. Select fill shall conform to the requirements of common fill except that the material shall not contain any materials larger than 3 inches in the largest dimension and shall have a liquid limit less than 40.

E. Crushed rock shall be sound, durable stone, angular in shape, and free of any foreign material, structural defects, and chemical decay. Crushed rock shall have a percentage of wear of no greater than 50, when tested in accordance with ASTM C131, and shall conform to the following gradation limits:

Sieve No. or Size	Total percent Passing by Weight
1 inch	100
¾ inch	90 to 100
½-inch	30 to 60
3/8-inch	0 to 25
No. 4	0 to 5

F. Screened pea gravel shall consist of hard, durable, rounded, or subangular particles of proper size and gradation, and it shall be free from sand, loam, clay, excess fine, and

deleterious material. The size of the particle shall be uniformly-graded within the following limits:

Sieve No. or Size	Total percent Passing by Weight
5/8 inches	100
½-inch	40 to 100
3/8-inch	15 to 45
No. 10	0 to 5

G. Pipe Embedment:

1. Unless otherwise shown on the drawings, as noted, or required by the Engineer or specified herein, the following pipe embedment materials shall be utilized.

   a. For plastic pipe (PVC) and fittings, embedment shall be CLASS II material. CLASS II material shall be coarse sands and gravels per ASTM D-2487 with a maximum particle size of 1-1/2 inches, including variously graded sands and gravels, containing less than 12 percent fines (material passing the #200 sieve) generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class. Native materials meeting or exceeding CLASS II requirements may be used.

   b. For concrete, ductile iron, and metallic pipe bedding shall be Select Native material with <12% passing 200# sieve or CLASS II materials and maximum particle size of 1-1/2 inches.

H. Asphaltic pavement subgrade material shall consist of suitable native or imported material conforming to the gradation specified as follows:

Sieve No. or Size	Total percent Passing by Weight
6 inches	100
3 inches	90 to 100
# 4	50 to 100
# 200	35 max

I. Sand used for fill shall have no more than 5% fines passing the No. 200 sieve.

J. Lean concrete shall be cast-in-place concrete conforming to the requirements of Section 03300. Minimum compressive strength shall be 2,000 pounds per square inch (psi) after 7 days and 2,500 psi after 28 days. SOIL CEMENT: Where cement stabilized backfill is shown on the Drawings or required by governing jurisdiction or utility, it shall consist of a mixture of soil or sand and two sacks of Portland cement per cubic yard. Soil shall be a sandy material, free from lumps, clods, or organic material. If excavated material is not suitable, pit run sand shall be used. Cement stabilized backfill shall be mixed in a concrete mixer or transit mixer.

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement or payment shall be made for the work under this section, but it shall be included in the unit price bid for pipelines or other applicable items, as noted in the Proposal.

END OF SECTION

SECTION 02400

CEMENT STABILIZED BACKFILL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. This Section includes the following:

1. Flowable Fill.

2. “2-Sac” Cement Stabilized Backfill.

1.3 SUBMITTALS

A. Material Certificates: Provide copies of materials certificates, signed by material producer and Contractor, certifying that each material item complies with, or exceeds specified requirements.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with the Texas Department of Transportation and City of El Paso Engineering Department standard specifications, latest edition, and with local governing regulations if more stringent than herein specified.

PART 2 PRODUCTS

2.1 MATERIALS

A. Flowable Fill:

1. Shall consist of cement, graded limestone aggregate, water, and air-entraining admixture.

2. Must be of such consistency after it has cured, that it can be excavated with standard excavation power and/or hand equipment.

3. Not more than 125 lbs. nor less than 75 lbs. of cement per cubic yard of flowable fill.

4. Twenty-eight-day compressive strength of test sample made in standard 6 x 12 concrete cylinder mold to be no more than 150 psi or less than 100 psi.

5. pH shall be greater than 8.

6. No fly ash will be permitted.

7. Stable air content of 20 to 35 percent, admixture for maintaining stable air content shall be designed specifically for cement slurry.

8. Aggregate shall be graded screenings with 3/8" maximum size aggregate.

9. Slump shall be 8 inches.

10. Water-cement ratio shall not exceed 4.5.

11. Field tests must be submitted and approved by Engineer showing the designed mix meets the required properties.

12. Test excavations as directed by the Engineer shall be made to confirm that material can be excavated as described in 2 above. Material that does not comply shall be removed at no cost to the Owner.

B. "2-Sac" Cement Stabilized Backfill:

1. Shall comply with Item 400.6 of the Texas Department of Transportation Standard Specifications for Construction of Highways, Streets, and Bridges.

PART 3 EXECUTION

3.1 CONSTRUCTION

A. Flowable fill shall be allowed to cure sufficiently to prevent displacement prior to placing fill or base course over the cement slurry. Flowable Fill must be of consistency during placement such that mix is highly flowable with no signs of segregation.

B. "2-Sac" Cement Stabilized Backfill shall be placed in accordance with Item 400.6 of the Texas Department of Transportation Standard Specifications for Construction of Highways, Streets, and Bridges.

C. Equipment: All equipment necessary for the proper construction of this work shall be on the project, in first-class working conditions, and approved by the Engineer before construction is permitted to start.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement or payment shall be made for the work under this section. Flowable fill shall be included in the unit price bid for Pipeline and "2-sac" shall be included in the unit price bid for Removal and Replacement of Pavement with HMAC and Cement Stabilized Backfill. The Contractor shall include in their bid an allowance for 100 cubic yards of additional flowable fill that may be used at Owner/Engineer discretion.

END OF SECTION

SECTION 02510

ASPHALTIC CONCRETE PAVING

PART 1 GENERAL

1.1 DESCRIPTION

A. 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, thickness, 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.

C. Pavement replacement width shall be governed by Table 1 below and in no case shall the Owner pay for additional pavement due to excessively wide trenches caused by the Contractor's failure to take adequate precautions to maintain a narrow trench. The use of the angle of repose method or the benching method for the trench safety system shall not be considered an acceptable method of maintaining a narrow trench. If the Contractor elects to use these methods for the trench safety system, additional pavement replacement shall be at the Contractor's expense. Pavement replacement width shall be measured the equal distance from the centerline of the pipeline. Payment shall be only for the actual pavement removed and replaced within the limits of the pavement width as shown in Table 1 or as shown on plans. The Contractor shall coordinate with the City of El Paso Street Department and Engineer for HMAC type to be used for pavement replacement.

Table 1 Maximum Pavement Width for Payment Purposes

Trench Depth	Pipe Size	Pavement Width
0' through 6.9'	12" and smaller	5'
0' through 6.9'	Larger than 12"	6'
7' through 9.9'	12" and smaller	6'
7' through 9.9'	Larger than 12"	7'
10' and Deeper	12" and smaller	7'
10' and Deeper	Larger than 12"	8'

1.2 MATERIALS

A. Aggregate. Aggregates shall consist of crushed stone or crushed gravel with or without sand or another 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.

1. Coarse Aggregate:

a. 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.

b. 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 midsection 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.

c. 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 a thickness greater than five; an elongated particle is one having a ratio of length to width greater than five.

2. Fine Aggregate:

a. 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.

b. 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 the requirements of this specification.

c. Sampling and Testing: 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.

d. Sources of Aggregates: 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 have a satisfactory service record in the bituminous pavement construction for at least five years, samples shall be submitted 14 days prior to the start of production. An inspection of the producer's operation will be made by the Engineer. 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 the 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.

e. Samples of Aggregates: 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. The samples will be the basis of approval of specific lots of aggregates from the standpoint of the quality requirements of this section.

1.3 FILLER

A. If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D242.

1.4 BITUMINOUS MATERIAL

A. Bituminous material shall conform to the following requirements: AC 10 or AC 20 In accordance with ASTM D3381.

B. The Contractor shall furnish the vendor's certified test reports for each tank load of bitumen shipped to the project. The report shall be delivered to the Engineer or his/her representative 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.

1.5 COMPOSITION

A. Composition of Mixture: 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, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula.

B. Job Mix Formula: No bituminous mixture for pavement shall be produced until a job mix formula has been approved by the Engineer. The formula shall be submitted in writing by the Contractor to the Engineer 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/her representative. Should a change in sources of materials be made, a new job mix formula must be established before the new material is used.

C. The bituminous mixture shall be designed using procedures contained in Chapter III, MARSHALL METHOD OF MIX DESIGN, of the Asphalt Institute's Manual Series No. 2 (MS 2), current edition, and shall meet the requirements of Tables 2 and 3. The temperature of the mix immediately prior to compaction shall be 250°±5°F (121°±3°C).

Table 2. Marshall Design Criteria

Test Property	
Number of Blows	75
Stability, minimum pounds	1500
Flow, 0.01 in. (0.25mm)	8-16
Percent air voids	3-5
Percent voids in mineral aggregate	See Table 3

Table 3. Minimum Percent Voids in Mineral Aggregate

Maximum Particle Size	Maximum Particle Size	Minimum Voids in Mineral Aggregate
in.	Mm	Percent
¾	19.0	15
1	25.0	14
1 1/4	31.25	13

1. 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 4 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.

2. The gradations in Table 4 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 4 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.

Table 4. Aggregate Bituminous Pavement Specification Gradation Band

Sieve	Percentage by Weight Passing Sieves		
	GRADE A	GRADE B	GRADE C
Size:	1 1/4" max.	1" max.	
1¼ in. (30.0 mm)	100	---	---
1 in. (24.0 mm)	86-98	100	---
3/4 in. (19.0 mm)	68-93	76-100	100
½ in. (12.5 mm)	57-81	66-86	79-99
3/8" (9.5 mm)	49-69	57-77	68-88
No.4 (4.75 mm)	34-54	40-60	48-68
No.8 (2.36 mm)	22-42	26-46	33-53
No.16 (1.18 mm)	13-33	17-37	20-40
No.30 (0.600 mm)	8-24	11-27	14-30
No.50 (0.300 mm)	6-18	7-19	9-21
No.100 (0.150 mm)	4-12	6-16	6-16
No.200 (0.075 mm)	3-6	3-6	3-6
Bitumen Percent Stone	4.5 - 7.0	4.5-7.0	4.8-5.5
Gravel	5.0 - 7.5	5.0-9.0	-----

3. The job mix tolerances shown in Table 5 shall be applied to the job mix formula to establish a job control grading band. The full tolerances still will apply if the application of the job mix tolerances results in a job control grading band outside the master grading band.

Table 5. Job Mix Formula Tolerances
(Based on a Single Test)

Material	Tolerance Plus or Minus
Aggregate Passing No.4 Sieve or Larger	7 %
Aggregate Passing Nos. 8 and 16 sieves	6 %
Aggregate Passing Nos. 30 and 50 sieves	5 %
Aggregate Passing Nos. 100 and 200 sieves	3 %
Bitumen	0.45 %
Temperature of Mix	20°F (11°C)

4. 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.

5. The completed mixture shall be sampled at the plant to retain job control. One sample shall be taken from each subplot 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.

6. The Engineer may halt production if the Marshall test criteria are not met and not allow it to resume until the problem is corrected.

7. If the index of retained strength of the specimens of a 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.

D. Test Section. 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-foot-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 the 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.

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's approval.

E. Testing Laboratory. 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.

1.6 CONSTRUCTION METHODS

A. Weather Limitations: 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 6.

Table 6. Base Temperature Limitations

Mat Thickness	Base Temperature
	(Minimum)
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)

B. Bituminous Mixing Plant: Plants used for the preparation of bituminous mixtures shall conform to the requirements of ASTM D995 with the following changes:

1. Requirements for All Plants:

   a. Truck scales. The bituminous mixture shall be weighed on approved scales furnished by the Contractor, or on public scales at the Contractor's expense. Such scales shall be inspected and sealed as often as the Engineer 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 a plant. The Engineer shall have access, at all times, to all parts of the plant for checking the adequacy of equipment; inspecting the 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 the temporary storage of hot bituminous mixtures will be permitted as follows:

2. The bituminous mixture may be stored in surge bins for a period of time not to exceed 3 hours, provided all specifications, temperature, and segregation, requirements are fully met.

3. 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.

a. The bins shall be such that mix drawn from them meets the same requirements as mix loaded directly into trucks. If the Engineer 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.

C. Hauling Equipment:

1. 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.

D. Bituminous Pavers:

1. Bituminous pavers shall be self-contained, power propelled units with an activated screed 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 described in the Plans and Specifications.

   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 screen. 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.

2. The paver shall be capable of operating at forwarding speeds consistent with the satisfactory laying of the mixture.

3. If an automatic grade control device is used, 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.

4. The controls shall be capable of working in conjunction with any of the following attachments:

   a. The ski-type device of not less than 30 feet (9.14 m) in length or as directed by the Engineer.

   b. Taut string line (wire) set to grade.

   c. Short ski or shoe.

E. Rollers:

1. Rollers of the steel wheel or pneumatic tired type may be used. Vibratory rollers may be used subject to the approval of the Engineer. 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 that causes excessive crushing of the aggregate will not be permitted.

F. Preparation of Bituminous Material:

1. 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).

G. Preparation of Mineral Aggregate:

1. 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.

H. Preparation of Bituminous Mixture:

1. 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.

2. 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 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 the 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.

I. Transporting, Spreading, and Finishing:

1. The mixture shall be transported from the mixing plant to the point of use in vehicles conforming to the requirements of Section 4.3. 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.

2. 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.

3. 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.

4. 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 an inverted crown, no joint will be placed at the invert of the street. The mixture shall be placed in

consecutive adjacent strips having a minimum width to complete the area in accordance with these specifications.

5. 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 centerline of the street.

6. 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).

J. Compaction of Mixture:

1. 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. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor with approval from the Engineer.

2. 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.

3. 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.

4. To prevent adhesion of the mixture to the roller, the wheels shall be kept properly moistened, but excessive water will not be permitted.

5. In areas not accessible to the roller, the mixture shall be thoroughly compacted with hot hand tampers.

6. 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.

7. A minimum prime coat coverage of 0.25 gallons per square yard shall be placed on all new asphaltic pavement surfaces.

K. Joints:

1. 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.

2. 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.

3. Longitudinal joints that 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.

L. Acceptance Sampling and Testing of Bituminous Mixture (Density) Pavement density will be determined by comparing the density of cores 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 day's production is expected to consist of between 500 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 this section.

   a. 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°). The sample of the 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.

3. Core Density. Cores for determining the density of the compacted pavement shall be taken as indicated in this section the cores shall be taken in accordance with the requirements of this section. The density of each core shall be determined in accordance with ASTM D 2726 or D1188, whichever is applicable.

4. Pavement Density. The target density (percent compaction) of each lot of in-place pavement shall be 98% of the average density of the laboratory-prepared specimens. The pavement density shall be determined by dividing the core density of one day's production by the average density of the laboratory-prepared specimens.

M. Acceptance Criteria.

1. Surface / Smoothness Tests. 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.

   The finished surface shall not vary more than [¼ inch] for the surface course when tested with a 16-foot (4.8 m) straightedge applied parallel with, or at right angles to, the centerline.

   After the completion of final rolling, the smoothness of the course shall be tested by the Deputy Director for Engineering or his/her designated representative; humps or depressions exceeding the specified tolerances shall be immediately corrected by removing the defective work and replacing with new material, as directed by the Deputy Director for Engineering or his/her designated representative. This shall be done at the Contractor's expense.

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.

Segregation and/or exposed aggregate will not be accepted, failure to comply with this requirement will result in complete removal and replacement of pavement at the contractor's expense. Patching will not be accepted.

2. Sampling Pavement: Core samples or Nuclear Density Machine for determination of the density of completed pavements shall be obtained by the Contractor. The size, number, and locations of the samples will be as directed by the Deputy Director for Engineering or his/her designated representative. Samples shall be neatly cut with a saw, core drill, or other approved equipment. The Contractor shall patch core locations in accordance with this specification, at no additional cost to the owner.

3. Thickness: Thickness shall be evaluated for compliance with the requirements shown on the plans. At the discretion of the Deputy Director for Engineering or his/her designated representative, the thickness of the pavement course shall be determined by cores taken at locations indicated by the Deputy Director for Engineering or his/her designated representative. The Contractor shall patch, core locations in accordance with this specification, at no additional cost to the owner.

4. Max Density: Shall comply with section 4.12 b., c., and d.

All tests necessary to determine conformance with requirements specified in this item will be performed by the Deputy Director for Engineering or his/her designated representative at the Contractor's expense.

Each lot of bituminous mix shall be accepted for density when the core or nuclear density machine equals or exceeds 98%. Density requirements will be accepted at an adjusted contract price in accordance with Table 7.

TABLE 7. PRICE ADJUSTMENT SCHEDULE

Percentage of Compaction (Core or Nuclear Machine)	Percent of Contract Price to be Paid
98-100	100
95-97.9	90
Below 95	To be removed and replaced

The lot shall be removed and replaced. However, the Deputy Director for Engineering may decide to allow the rejected pavement to remain. In that case, if the Deputy Director for Engineering and Contractor agree in writing that the pavement shall not be removed, it shall be paid for at 50 percent of the contract price, and the total project payment limitation be reduced by the amount withheld for the rejected pavement.

1.7 TESTING REQUIREMENTS

A. ASTM C29 Unit Weight of Aggregate

B. ASTM C88 Soundness of Aggregates by Use of Magnesium Sulfate

C. ASTM C131 Resistance to Abrasion of Small-Size Coarse Aggregate by Use of the Los Angeles Machine

D. ASTM C136 Sieve or Screen Analysis of Fine and Coarse Aggregates

E. ASTM C183 Sampling Hydraulic Cement

F. ASTM D75 Sampling Aggregates

G. ASTM D423 Liquid Limit of Soils

H. ASTM D424 Plastic Limit and Plasticity Index of Soils

I. ASTM D995 Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures

J. ASTM D1075 Effect of Water on Cohesion of Compacted Bituminous Mixtures

K. ASTM D1188 Bulk Specific Gravity of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens

L. ASTM D1461 Moisture of Volatile Distillates in Bituminous Paving Mixtures

M. ASTM D1559 Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus

N. ASTM D2172 Quantitative Extraction of Bitumen from Bituminous Paving Mixtures

O. ASTM D2419 Sand Equivalent Value of Soil and Fine Aggregate

P. ASTM D2489 Degree of Particle Coating of Bituminous-Aggregate Mixtures

Q. ASTM D2726 Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens

R. ASTM D3665 Random Sampling of Paving Materials

S. ASTM D3666 Inspection and Testing Agencies for Bituminous Paving Materials

T. AASHTO T30 Mechanical Analysis of Extracted Aggregate

U. The Asphalt Inst. Model Construction Specifications for Asphalt Concrete and Other Plant Type

V. Series (SS-1) Mixes

W. The Asphalt Inst. Mix Design Methods for Asphalt Concrete Manual No.2 (MS 2)

1.8 MATERIAL REQUIREMENTS

A. ASTM D242 Mineral Filler for Bituminous Paving Mixtures

B. ASTM D490 Tar

C. ASTM D946 Asphalt Cement for Use in Pavement Construction

D. ASTM D3381 Viscosity-Graded Asphalt Cement for Use in Pavement Construction

E. AASHTO M226 Viscosity-Graded Asphalt Cement

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. Measurement and Payment for this work item shall be as specified in this Section and Section 01013 of these specifications. No separate measurement and payment will be made for pavement markings but shall be included in the unit price bid for Asphaltic Concrete Paving as specified herein.

END OF SECTION

SECTION 02603

CONNECTIONS TO AND WORK ON THE EXISTING SYSTEM

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, and equipment required to maintain flow in the existing system, and bypasses, and construct the permanent connections to the new system as shown on the drawings as directed by the Engineer.

B. Furnish all labor, materials, and equipment required to plug existing pipelines and all additional work required.

C. Should damage of any kind occur to any existing system, the Contractor, at the Contractor's own expense, and as part of the work under this Item, shall make repairs to the satisfaction of the Engineer.

D. Notify the Engineer immediately of any discrepancies in elevations of existing facilities between those shown on the drawings and those established during construction in order that the Engineer can make the necessary modifications.

E. All new pipes for connection shall conform to the pipe specifications for this project.

1.2 RELATED WORK

A. Coordination requirements are included in Section 01040

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

SECTION 02610

SCHEDULE OF PIPE

PART 1 GENERAL

1.1 SCOPE OF WORK

A. This section covers the materials, installation, and testing of all piping, including fittings used in the project.

B. Furnish all labor, materials, equipment, tools, superintendence, and incidentals required to install, test, and perform any other specified or drawn work required to construct and install the pipeline systems under this Contract.

C. Only approved pipe shall be used for the construction of all pipelines and connections under this Contract. The only types of pipe that will be considered for use, and the uses specified, are those listed in Part 2 of this Section. All pipe of like use and size shall be the same type, class, and manufacturer.

1.2 PIPE SUBMITTALS

A. Before starting fabrication, the Contractor shall furnish the Engineer with six (6) submittals that shall include a laying plan and details of a standard pipe section, special fittings, restrained joints, and bends. The Engineer shall keep four (4) copies and return two to the Contractor. Dimensions plate size, coating and lining, and other pertinent information shall be shown. Design calculations shall be included. 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 outlets and bends shall be made up of 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 reviewed 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 marking shall be coded to the shop drawings. The drawings shall be furnished in conformance with the 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.

1.3 CERTIFICATION

A. Certifications properly executed by the manufacturer shall be furnished to the Engineer showing compliance to the required specifications. Test data on tests performed shall be provided as requested by the Engineer.

1.4 INSPECTION

A. The Engineer and his representatives shall have access to all phases of work: the manufacturer and Contractor shall provide proper facilities for access and inspection. Material, 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 SCHEDULE OF PIPE

A. 8-inch through 12-inch Diameter Approved Pipe:

1. Polyvinyl Chloride (PVC) Pipe:

a. 8-inch and12-inch: AWWA C900, DR-18. See Section 02630.

b. ¾-inch: K-Type Copper Pipe. See Section 02800.

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. Measurement and payment for pipelines shall be in accordance with Section 01025 of these Specifications.

END OF SECTION

SECTION 02630

POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, tools, superintendence, and incidentals required to install, test, clean, and disinfect polyvinyl chloride (PVC) pipe and fittings, shown on the drawings and as specified herein.

B. Piping shall be located substantially as shown on the drawings. The Engineer reserves the right to make such modifications as may be found desirable to avoid interference between pipes or for other reasons. Pipe fitting notation is for the Contractor's convenience and does not relieve him/her from installing and jointing different or additional items that were required to achieve a complete piping system.

C. Vertical bends shown on the plans may be modified or eliminated by "rolling" the pipe to accomplish the intended profile. Rolling the pipelines will not eliminate the requirement for joint restraint if so, noted on the plans.

D. Where the word "pipe" is used it shall refer to pipe, fittings, and appurtenances unless noted otherwise.

1.2 RELATED WORK

A. Excavating, Backfilling, and Compacting for Utilities are included in Section 02221.

B. Granular Fill Material is included in Section 02235.

C. Valves are included in Section 02640.

D. The Schedule of Pipe is included in Section 02610.

1.3 SUBMITTALS

A. Shop drawings, product data, and all specified calculations shall be submitted in accordance with Section 01300 and this Specification.

B. Submit copies of design calculations in accordance with this Section.

C. Submit the anticipated pipe production and delivery schedule from the manufacturer and supplier.

D. Prior to shipment of pipe, submit a certified affidavit of compliance from the manufacturer stating that the pipe, fittings, gaskets, interior linings, and exterior coatings for this project have been manufactured and tested in accordance with ANSI/AWWA and ASTM Standards and requirements specified herein.

E. Submit calculations, prepared by the manufacturer, for all required lengths of joint restraint, in general, conforming to the locations shown on the drawings. Approval by the Engineer is required prior to the manufacture and shipment of the pipe.

1.4 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D 1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Pipe and Chlorinated Poly (Vinyl Chloride) (PVC) Compounds

2. ASTM D 2122 - Determining Dimensions of Thermoplastic Pipe and Fittings

3. ASTM D 1598 - Time-to-Failure of Plastic Pipe Under Constant Internal Pressure

4. ASTM D 1599 - Short-Time Rupture Strength of Plastic Pipe, Tubing and Fittings

5. ASTM D 2152 - Test Method for Degree of Fusion of Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion

6. ASTM D 2152 - Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)

7. ASTM D 2837 - Standard Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials

8. ASTM F 477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe

9. ASTM D 3139 - Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

10. ASTM C150 - Portland Cement

B. American Water Works Association (AWWA)

1. AWWA C900 AWWA Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch Through 12-inch, for Water Distribution

2. AWWA C905 AWWA Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 14-inch Through 48-inch, for Water Distribution

3. AWWA C651 AWWA Standard for Disinfecting Water Mains

4. AWWA M23 AWWA Manual for PVC Pipe Design and Installation

5. ANSI/AWWA C153/A21.53 – American National Standard for Ductile-Iron Compact Fittings, 3- in through 16-in for Water or Other Liquids

6. ANSI/AWWA C110/A21.10 – American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-In through 48-In (75 mm through 1200 mm) for Water and Other Liquids

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.5 QUALITY ASSURANCE

A. All C905 and C900 polyvinyl chloride (PVC) pipe shall be from a single manufacturer. Each length of PVC pipe supplied for the project shall be hydrostatically tested at the point of manufacture to four times its rating class for a duration of 5 seconds in accordance with AWWA C900 and C905 accordingly. Testing may be performed prior to machining bell and spigot. Failure of polyvinyl chloride (PVC) pipe shall be defined as any rupture of the pipe wall. Certified test results shall be furnished in triplicate to the Engineer prior to the time of shipment.

B. All polyvinyl chloride (PVC) pipe and fittings to be installed under this project shall be inspected and tested at the foundry as required by the Standard Specifications to which the material is manufactured.

C. All polyvinyl chloride (PVC) pipe and fittings to be installed under this Contract may be inspected at the plant for compliance with these Specifications by an independent testing laboratory selected by the Owner at the Owner's expense. The Contractor shall reimburse the Owner for excessive inspection costs, which are defined as the costs of inspection of that amount of pipe which exceeds 125 percent of the aggregate length of pipe under this Section.

D. Inspection of the polyvinyl chloride (PVC) pipe and fittings will also be made by the Engineer or representative of the Owner after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the job.

E. All pipe and fittings shall be permanently marked with the following information:

1. Manufacturer, date.

2. Size, type, class, and wall thickness.

3. Standard produced to (ANSI/AWWA, ASTM, etc.).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe, it's lining, and coating. Under no circumstances shall the pipe be dropped or skidded against each other. Slings, hooks, or pipe tongs shall be used in pipe handling.

B. Materials, if stored, shall be kept safe from damage. The interior of all pipe, fittings, and other appurtenances shall be kept free from dirt or foreign matter at all times.

C. Pipe shall not be stacked higher than the limits recommended by its manufacturer. The bottom tier shall be kept off the ground on timbers, rails, or concrete. Stacking shall conform to the manufacturer’s recommendations.

D. Gaskets for mechanical and push-on joints to be stored shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.

PART 2 PRODUCTS

2.1 MATERIALS

A. PIPE

1. All polyvinyl chloride (PVC) pipe with a diameter 8-inch and 12-inches shall conform to AWWA C900, DR-18, Pressure rating of 235 psi. Pipe with 16-inch dimeter shall conform to AWWA C 905, DR-25, Pressure rating 235 psi.Pipe shall be supplied in standard nominal lengths of 18 or 20 feet.

2. Thickness design shall be in accordance with and AWWA C900.

3. The pipe shall be PVC 1120 made from PVC compounds class 12454-A or class 12454 as defined in ASTM D1734. Each pipe length shall be marked with the manufacturer’s name or trademark, size, material code, pressure class, AWWA designation number and seal of test agency that verified pipe material for potable-water service.

2.2 JOINTS

A. Fittings for PVC water mains shall be Ductile Iron in accordance with ANSI/AWWA C110 or ANSI/AWWA C153. Joints for fittings shall be in accordance with ANSI/AWWA C111. Elastomeric gaskets for pipe joints and fitting shall be manufactured to conform with the requirements of ASTM F477.

B. Thrust restraint shall be provided at all changes in pipe diameter (reducers), or direction (e.g., tees, bends, elbows, and crosses), plugs and valves on all buried piping having flexible joints. Thrust restraint shall be by mechanical means using systems as

manufactured by Uni-Flange®, EBAA Iron, or approved equal. The Contractor shall submit restraining systems to the Engineer, including calculations showing lengths of pipe to be restrained on each side the fitting, for each application (each type and size of fitting or valve) as developed by the manufacturer to withstand the test pressures as required by these specifications. Calculations must be sealed by a Texas Registered Professional Engineer and submitted and approved before starting work (minimum seven days). Additionally, concrete thrust blocks shall be used for all changes in direction for pipes up to 16" diameter or where there is a dead-end or tee connection to an existing pipeline. Restrained joint calculations are subject to Engineer review and approval.

PART 3 EXECUTION

3.1 GENERAL

A. Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying and no piece shall be installed which is found to be defective. Any damage to the pipe linings or coatings shall be repaired as directed by the Engineer. Handling and laying of pipe and fittings shall be in accordance with the manufacturer's instruction and as specified herein.

B. All buried metal surfaces, including nuts and bolts, are to be field coated with Koppers Bitumastic No. 50 or approved equal, per manufacturer's recommendations.

3.2 INSTALLING PIPE AND FITTINGS

A. All pipe and fittings shall be thoroughly cleaned and dried before laying, shall be kept clean and dry until they are used in the work, and when laid, shall conform to the lines and grades required. Polyvinyl chloride (PVC) pipe and fittings shall be installed in accordance with the requirements of AWWA C605 except as otherwise provided herein. A firm, even bearing throughout the length of the pipe shall be constructed by tamping the bedding material at the sides of the pipe up to 1 foot over the top of the pipe. Blocking will not be permitted. If any defective pipe is discovered after it has been laid, it shall be removed and replaced with a sound pipe in a satisfactory manner by the Contractor, at his/her own expense.

B. All pipe shall be sound and clean before laying. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plugs or other approved means. Good alignment shall be preserved in laying. The deflection at joints shall not exceed that recommended by the manufacturer. Fittings, in addition to those shown on the Drawings, shall be provided, if required, for crossing utilities which may be encountered upon opening the trench. Solid sleeve closures shall be installed at locations approved by the Engineer.

C. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of the pipe to be used with a bell shall be beveled to conform to the manufactured spigot end. Field cut ends shall be sealed with an approved potable water epoxy) in accordance with the manufacturer's instructions. Cutting of restrained joint pipe will not be allowed, unless approved at specific joints in conjunction with the use of restrainer glands by EBAA Iron or field adaptable restrained joints.

D. The Contractor shall have on hand at the start of the job, one 1/16 bend for each size of the pipe. These shall be used as job conditions require and shall be resupplied immediately as the bends on hand are used.

E. All drain valves, outlets, control valves, fittings, and other appurtenances required shall be set and jointed as indicated on the drawings in accordance with the manufacturer's instructions.

3.3 PUSH-ON JOINTS

A. Push-on joints shall be made in accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated. The plain end of the pipe to be laid shall then be aligned and inserted in the bell of the pipe to which it is to be joined and pushed home with a jack or come-along. After joining the pipe, a metal feeler shall be used to make certain that the rubber gasket is correctly located.

3.4 MECHANICAL JOINTS

A. Mechanical joints shall be made in accordance with AWWA C605, AWWA M 23, and the manufacturer's instructions. Thoroughly clean and lubricate the joint surfaces and rubber gasket with soapy water before assembly. Bolts shall be tightened to specified torques. Under no conditions shall extension wrenches or pipe over the handle of ordinary ratchet wrench be used to secure greater leverage.

B. Bolts in mechanical joints shall be tightened alternately and evenly.

3.5 CONNECTIONS TO STRUCTURES

A. Wherever a pipe passes from the concrete to earth horizontally, two flexible joints spaced 4-feet apart shall be installed, within 2-feet of the exterior face of the wall, whether or not shown on the drawings.

B. Piping underneath structures shall be concrete encased or as shown on plans.

3.6 TESTING

A. After installation, all pipe shall be tested for compliance with the Specifications. Furnish all necessary equipment and labor for the pressure test and leakage test on the pipelines.

B. Submit detailed test procedures and methods for Engineer's review at least 10 working days before any testing. In general, testing shall be conducted in accordance with AWWA C605.

C. Pressure pipelines shall be subjected to a hydrostatic pressure of 125 psig. This test pressure shall be maintained for a minimum of 2 hours. The leakage rate shall not exceed those indicated in AWWA C605. Provide suitably restrained bulkheads as required to complete the hydrostatic testing specified.

D. All valves and valve boxes shall be properly located and installed and operable prior to testing. Bulkheads shall be provided with a sufficient number of outlets for filling and draining the line and for venting the air.

E. Hydrostatic pressure and leakage tests shall conform with Section 7 of AWWA C605. Furnish gages, meters, pressure pumps, and other equipment needed to fill the line slowly and perform the required hydrostatic pressure leakage tests.

F. The Owner will provide a source of supply from the existing water distribution system for the Contractor's use in filling potable water lines. For potable water, an air brake shall be maintained at all times between the Owner's distribution system and the Contractor's equipment to prevent cross-connection. The line shall be slowly filled with water and specified test pressure shall be maintained in the pipe for the entire test period by means of a pump furnished by the Contractor. The Contractor shall provide an accurate means of measuring the quantity of water required to maintain this pressure. The amount of water required is a measure of the leakage in the pipeline. The Engineer shall be present at all tests and be allowed to observe all procedures as necessary.

G. Duration of the simultaneous pressure and leakage test shall not be less than 2 hours. A separate leakage test may be performed as a separate test following the pressure test and shall not be less than 2 hours duration. All leaks evident at the surface shall be repaired and leakage eliminated regardless of the total leakage as shown by the test. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipes, valves, and accessories shall be removed and replaced, at the Contractor's own expense.

3.7 FLUSHING AND DISINFECTION

A. GENERAL

1. At the conclusion of the work, thoroughly clean the entire pipe to remove all dirt, stones, pieces of wood, or other material, which may have entered during the construction period. All debris shall be removed from the pipeline. The lowest segment outlet shall be flushed last to assure debris removal.

B. DISINFECTION

1. Before being placed in service, all new lines shall be chlorinated using the continuous feed method specified in AWWA C651. The procedure shall be approved by the Engineer in advance of all flushing and disinfection work.

2. The location of the chlorination and sampling points shall be submitted to the Engineer for review and approval together with the Preliminary Flushing Sequence. Taps for chlorination and sampling shall be installed by the Contractor. The Contractor shall uncover and backfill the taps as required.

3. Concentrated chlorine solution shall not enter any part of the existing system. All new work, including mains, valves, and appurtenances shall be disinfected.

4. The method of chlorination shall be the general continuous feed method. The tablet method of chlorination shall not be accepted. The chlorine concentration shall be maintained at a minimum of 50 mg/1 (50 ppm) of available chlorine in all portions of the new work being disinfected during the application period.

5. The retention period shall be 24 hours. At the end of these 24 hours, the disinfection solution shall contain not less than 10 mg/1 (10 ppm) of available chlorine in all portions of the new work being disinfected.

C. Final Flushing. At the end of the retention period, as approved by the Engineer, the heavily chlorinated disinfection solution shall be flushed from all parts of the new work.

1. Final flushing shall be performed with procedures approved by the Engineer.

2. Final flushing shall continue until chlorine concentration of the flushing water being discharged from all points in the new work is equivalent to the chlorine level of the flushing water supply or is less than 1 mg/1 (1 ppm).

D. Microbiological Test. After final flushing and before the new work is accepted, microbiological tests shall be performed and shall show the absence of coliform organisms (no coliform organisms shall be detected in any samples). Microbiological testing of production facilities as well pipelines shall be required.

Samples will be taken by the Owner from taps located at approximately 1,000 feet centers and installed in such a way as to prevent outside contamination. Unless otherwise directed, the sample tap shall be either a hose bib, a disconnected service tap, or a ¾" copper riser (with stop-cock), which shall be provided by the Contractor. Should the initial treatment fail to achieve the satisfactory quality described above, the original chlorination

procedure shall be repeated until satisfactory results are obtained at no additional cost to the Owner.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. Measurement and payment for this work is covered under section 01025.

END OF SECTION

SECTION 02640

GATE VALVES

PART 1 GENERAL

1.1 SCOPE

A. This section covers the materials, installation, and testing of valves used in the project. 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. Unless otherwise indicated on the Plans or specified in other sections of these Specifications, valves shall conform to the requirements as specified herein.

B. Where proper operation and utilization of equipment and facilities requires the installation of valves not indicated or specified, the Contractor shall provide and install, upon acceptance by the Engineer, valves similar and comparable to valves specified for similar and comparable duty in other parts of the project, without additional cost to the Owner.

1.2 QUALITY ASSURANCE

A. All valves installed in this project shall be designed to withstand a minimum of 200 psi test pressure or as herein specified and be fabricated with ends to fit the piping as shown on the Plans.

1.3 SUBMITTALS

A. The Contractor shall submit six (6) copies of each submittal to be reviewed. The Engineer shall keep two copies and return two to the Contractor. Dimensions, coating and lining, and other pertinent information shall be shown. The drawings and product data sheets shall be furnished in conformance with the requirements of the General Conditions. Review of the submittals by the Engineer shall not relieve the Contractor of the responsibility for complying with all requirements of the Contract Documents.

B. The manufacturer shall furnish a complete set of installation, operation, and maintenance instructions for each type of valve furnished. Instructions shall be bound in a cover.

1.4 CERTIFICATION

A. Certifications properly executed by the manufacturer shall be furnished to the Engineer showing compliance to the required specifications. Test data on tests performed shall be provided as requested by the Engineer.

PART 2 PRODUCTS

2.1 GENERAL

A. All valves shall be of the type shown or specified on the drawings and/or as specified herein. All valves shall either be flanged, or mechanical joint as shown on the drawings or as required by the type of joint used in the pipe. All valves shall be complete with the required operator, accessories and extension stem, as shown on the plans or as specified herein.

2.2 GATE VALVES

A. Gate Valves, Non-Rising Stem (NRS) Resilient-Seated, (2" thru 24"): All non-rising stem gate valves larger than 1½-inch shall be iron-body, bronze mounted, resilient seat type with non-rising stem and designed for 250 psi working pressure. NRS gate valves shall comply with AWWA C-509 “Resilient-Seated Gate Valves for Water and Sewer Systems” and AWWA C-550 Standard for Protective Coatings for Valves and Hydrants, latest revision.

The valve design shall not have any recesses or insets in the bottom of the waterway which would promote build-up or collection of residue and debris.

B. NRS resilient-Seated Gate Valves shall preferably conform to the American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61, “Drinking Water System Components-Health Effects”, and be certified by an organization accredited by ANSI. Such compliance shall be evidenced by an affidavit from the manufacturer or vendor.

C. With the valve open, the valve shall provide an unobstructed waterway that has a diameter not less than the full nominal diameter of the valve. The minimum number of turns to open the valve shall be three times the valve diameter in inches. Valves shall be flanged, or mechanical joint as shown on the drawings.

1. Acceptable manufacturers and models shall be:

American Flow Control	Series 500, Series 2500
Clow	F6100, F6102
Mueller	A-2361

2. Submittals: Complete shop drawings and specifications shall be furnished prior to the acceptance and approval of the proposed valve. If requested, the Valve Manufacturer shall also submit a list of similar installations that have been in satisfactory operation for at least three years.

   The manufacturer shall furnish a complete set of installation, operation, and maintenance instructions for each type of valve furnished. Instructions shall be bound in a cover.

   The manufacturer shall provide approved certified test data or an affidavit stating that the valve complies with AWWA C-509 Section 6.1 and the following, in accordance with Section 6.2.

   Hydrostatic Test: The manufacturer shall pressure test each valve of each size and class with 400 psi applied to one side and zero to the other. The test shall be made in each direction across the closed valve.

   Torque Test: The manufacturer shall over-torque a valve of each size to demonstrate that no distortion of the valve stem occurs. The applied torque shall be 250 ft-lb for a 4" valve and 350 ft-lb for the larger valve sizes in both the open and closed position.

   Leakage Test: The manufacturer shall select two valves of each size to be fully opened and closed for 500 complete cycles with 200 psi differential pressure across the gate. The valve shall be drip tight upon completion of the test.

   Pressure Test: One valve of each size shall be tested, with the gate fully open, to a pressure of 500 psi. There shall be no evidence of rupture or cracking of the valve body, bonnet, or seal.

3. Markings: Markings shall be cast on the bonnet or body of each valve. Markings shall include the manufacturer's name or mark, the year the valve casting was made, the size of the valves, and the designated working pressure.

4. Valve Ends: Valve ends shall be mechanical joint or flanged with drilling in compliance with ANSI B61.1. Valve ends, and size shall be as shown in the drawings and listed in the Scope of Work.

5. Valve Bonnet and Body: Shall be cast iron conforming to ASTM A-126 Class B, or ductile iron conforming to ASTM A-395 or ASTM A-536.

6. Bolts: All bonnet and seal plate bolts shall be factory installed and made from stainless steel ASTM A-276 with either regular square or hexagonal heads with dimensions conforming to ASTM B18.2.1.

7. Wedge: The wedge shall be cast iron or ductile iron fully encapsulated with resilient rubber material bonded to the disc. The method for bonding the resilient material shall be confirmed by ASTM D-429 as required by AWWA C-509.

8. Valve Stem: Shall be constructed of low zinc bronze CDA Copper Alloy no. C99500 with a minimum yield strength of 40,000 psi and a minimum elongation in 2-inches of 10%.

9. Stem Seals: Shall consist of two O-rings such that the seal above the stem collar can be replaced with the valve under pressure in the fully open position. O-rings shall meet the requirements of ASTM D-2000 and have physical properties suitable for the application.

10. Valve Operator: Valves installed in pipe trench shall be provided with a cast iron, ASTM A-126 Class B, wrench nut. The nut shall have a 2" square base and shall tapper to a 1-15/16" square at the top, be 1-3/4" high, and shall open counterclockwise (left). The wrench nut shall be painted black and an arrow indicating the direction of opening shall be cast on the nut, according to AWWA C-509. Valves exposed inside of vaults shall be provided with wheels of the appropriate diameter for the valve size.

11. Protective Coating: An epoxy coating shall be applied to all exterior and stationary interior ferrous surfaces including all interior openings in the valve body. The coating shall not be applied to gasket surfaces of the end flanges. An epoxy lining shall be applied to the interior walls of the valve body in contact with the pipeline concentrate.

    Coatings shall be applied in accordance with AWWA C-550 and the manufacturer's instructions. After the coating is completely cured, the coated surfaces shall be tested for porosity, holidays, and pinholes using a holiday detector. All holidays or irregularities shall be repaired, and the coating again tested.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. Measurement or payment for the work under this section shall be included in the unit price bid for each size and type of valve, as specified in Section 01025 of these specifications.

END OF SECTION

SECTION 02645

MASTER METER

PART 1 GENERAL

1.1 SCOPE

A. This section describes the requirements for a flow sensor.

B. Under this item, the contractor shall furnish and install the flow measurement equipment and accessories as indicated on the plans and as herein specified.

1.2 QUALITY ASSURANCE

A. Referenced Standards and Guidelines - Complies with applicable portions of ANSI/AWWA Standards and NSF/ANSI Standard 61, Annex G. There are currently no AWWA standards that specifically address electromagnetic metering.

1. Flow measurement function complies with Industry Standards

a. ANSI B16.5 Class 150 RF

b. AWWA Class B

c. NEMA 4X/6P (IP66/IP67)

d. CSA

e. FM approved for Class 1, division II hazardous environments

f. CE

1.3 SUBMITTALS

A. The following information shall be included in the submittal for this section:

1. Outline dimensions, conduit entry locations and weight

2. Customer connection and power wiring diagrams

3. Data sheets and catalog literature for microprocessor-based transmitter and transducer

4. Interconnection drawings

5. Installation and operations manual

6. List of spare parts

7. Complete technical product description including a complete list of options provided

8. Any portions of this specification not met must be clearly indicated or the supplier and contractor shall be liable to provide all additional components required to meet this specification.

1.4 DEFINITIONS

A. Amplifier – Device used for increasing the power of a signal. It does this by taking energy from a power supply and controlling the output to match the input signal shape but with larger amplitude.

B. ANSI – (American National Standards Institute) A private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States. The organization also coordinates U.S. standards with international standards so that American products can be used worldwide.

C. AWWA – (American Water Works Association) An international non-profit professional organization founded to improve water quality and supply.

D. Detector Coils – Also called an “induction loop”, an electromagnetic communication or detection system which uses a moving magnet to induce an electrical current in a nearby wire.

E. Electrode – An electrical conductor used to make contact with a nonmetallic part of a circuit (e.g. a semiconductor, an electrolyte or a vacuum).

F. Modbus RTU – a serial communications protocol published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs). This is used in serial communication & makes use of a compact, binary representation of the data for protocol communication.

G. NEMA – (National Electrical Manufacturers Association) Is the 'Association of Electrical Equipment and Medical Imaging Manufacturers' in the United States. Its approximately 450 member companies manufacture products used in the generation, transmission, distribution, control, and end use of electricity. These products are used in utility, industrial, commercial, institutional, and residential applications.

H. NSF International – An independent, accredited organization that develops standards, and tests and certifies products and systems. They provide auditing, education and risk management solutions for public health and the environment.

I. PLCs – (Programmable Logic Controller) A digital computer used for automation of electromechanical processes, such as control of machinery on factory assembly lines, amusement rides, or light fixtures. PLCs are used in many industries and machines.

J. PTFE – (Polytetrafluoroethylene) A synthetic flouropolymer of tetrafluoroethylene that finds numerous applications. The best known brand name of PTFE is Teflon by DuPont Co.

K. Serial Communications – In telecommunication and computer science, serial communication is the process of sending data one bit at a time, sequentially, over a communication channel or computer bus. This is in contrast to parallel communication, where several bits are sent as a whole, on a link with several parallel channels.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with specifications provide flow measurement equipment by one of the following:

1. Badger Meter,

2. Or equal

2.2 OPERATING CONDITIONS

A. System Components

1. Metering Tube (Detector)

a. Consists of stainless steel tube lined with a non-conductive material. Energized detector coils around tube create a magnetic field across the diameter of the pipe. As a conductive fluid flows through the magnetic field, a voltage is induced across two electrodes; this voltage is proportional to the average flow velocity of the fluid.

2. Signal Amplifier

a. Consists of unit which receives, amplifies, and processes the detector's analog signal. Signal is converted to both analog and digital signals that are used to display rate of flow and totalization. Processor controls zero-flow stability, analog and frequency outputs, serial communications and a variety of other parameters. Integrated LCD display indicates rate of flow, forward and reverse totalizers and diagnostic messages. Display guides user through programmable routines.

B. Operational Requirements

1. Electromagnetic Flow Meter

a. The flow meter system shall operate with a pulsed DC excitation frequency, and shall produce a signal output that is directly proportional and linear with the volumetric flow rate of the liquid flowing through the metering tube. The metering system shall include a metering sensor tube (detector), a signal amplifier, and the necessary connecting wiring. The metering system shall have the ability to incorporate a meter mounted or remote mounted amplifier.

b. Engineering Units:

1) The signal amplifier shall be program selectable to display the following units of measure: U.S. gallons, imperial gallons, million gallons (U.S.), cubic feet, cubic meters, liters, hector-liters, oil barrels, pounds, ounces or acre feet.

c. Operating Principle: Electromagnetic Induction

d. Metering Tube (Detector)

1) The metering tube (detector) shall be constructed of 316 stainless steel, and rated for a maximum allowable non-shock pressure and temperature for steel pipe flanges, according to ANSI B16.5.

2) The metering tube (detector) shall be available in line size from ¼" [6 mm] to 24" [600mm]

3) The metering tube (detector) end connections shall be carbon steel or 316 stainless steel flanged, according to ANSI B16, Class 150 and AWWA Class B standards.

4) The insulating liner material of the metering tube (detector) shall be made of a hard rubber elastomer and NSF-listed for meter sizes 4" and above, in conformance with manufacturer's recommendation for the intended service or an NSF-listed meter option with PTFE liner.

5) The metering tube (detector) shall include two self-cleaning measuring electrodes. The electrode material shall be corrosion resistant and available in Alloy C or 316 stainless steel.

6) The metering tube (detector) shall include a third "empty pipe detection" electrode located in the upper portion of the inside diameter of the flow tube in order to detect an empty pipe condition when the flow tube is running partially empty. Empty pipe detection that is not activated until the pipe is 50% empty is not acceptable.

7) The metering tube (detector) housing shall be constructed of carbon steel, welded at all joints, and rated to meet NEMA 4X/6P (IP66/IP67) ratings.

8) For remote amplifier applications, the metering tube (detector) junction box enclosure shall be constructed of cast aluminum (powder-coated paint) and shall meet NEMA 4X/6P (IP66/IP67) ratings.

9) When installed in non-metallic or internally lined piping, the metering tube (detector) shall be provided with a pair of corrosion resistant grounding rings. The grounding ring material shall be 316 stainless steel.

10) Fluid Temperature Range

i. For remote amplifier applications, the fluid temperature range shall be -4°F to 248°F [-20°C to 120°C] at a maximum ambient temperature of 122°F [50°C] for the PTFE liner material.

e. Signal Amplifier

1) The signal amplifier shall be microprocessor based, and shall energize the detector coils with a digitally controlled pulsed DC. The excitation frequency shall be program selectable for the following: 1Hz, 3.75Hz, 7.5Hz, or 15Hz. (factory optimized to pipe size and application)

2) The signal amplifier electrical power requirement shall be 85-265VAC, 45-65Hz. The power consumption shall not exceed 20W.

3) The signal amplifier shall have an ambient temperature rating of -4°F to 122°F [-20°C to 50°C].

4) The signal amplifier shall include non-volatile memory capable of storing all programmable data and accumulated totalizer values in the event of a power interruption.

5) Automatic zero stability, low flow cut-off, empty pipe detection and bi-directional flow measurement shall be inherent capabilities of the signal amplifier.

6) All signal amplifier outputs shall be galvanically isolated to 500 volts.

7) The signal amplifier and remote junction enclosures shall be constructed of cast aluminum (powder-coated paint) and shall meet NEMA 4X/6P (IP66/IP67) ratings.

8) Outputs: The signal amplifier shall provide a total of four digital outputs, one analog output and one digital input.

i. Up to two open collector digital outputs, program selectable from the following: Forward pulse, reverse pulse, AMR pulse, flow set point, empty pipe alarm, flow direction, preset output, and error alarm.

ii. Up to two AC solid-state relay outputs, program selectable from the following: Frequency output, flow set point, empty pipe alarm, flow direction, preset amount and error alarm.

iii. One digital input, program selectable from the following: Remote reset and positive return to zero.

iv. One analog output programmable and scalable from the following: 0-10mA, 0-20mA, or 4-20mA. Voltage sourced and isolated. Max. loop resistance = 750 ohms.

f. Control and Programming

1) The signal amplifier shall be programmed via three function buttons. The programming functions shall be available in a user-friendly, menu driven software through the four-line LCD interface. The signal amplifier shall accommodate the following languages: English, German, Czech, French or Spanish.

2) Programmable parameters of the amplifier include, but are not limited to: calibration factors, totalizer resets, unit of measure, analog and pulse output scaling, flow-alarm functions, language selection, low-flow cutoff, noise dampening factor and excitation frequency selection.

3) The signal amplifier shall have a programming option allowing entry of a selected numeric password value for tamper protection.

g. System Performance

1) The metering system shall operate over a flow range of 0.10 to 39.4 ft/s [0.03 to 12.0 m/s].

2) The metering system shall perform to an accuracy ± 0.25 percent of rate for velocities greater than 1.64 ft/s [0.50 m/s], ± 0.004 ft/s [± 0.001 mm/s] for velocities less than 1.64 ft/s [0.50 m/s].

3) The metering system shall be capable of measuring the volumetric flow rate of liquids having an electrical conductivity as low as 5.0 micromhos per centimeter.

4) The system measuring repeatability shall be <0.10% of full scale.

h. Indication

1) The signal amplifier shall include a four-line,16-character, backlit LCD interface to display the following values:

i. Flow rate in selectable rate units

ii. Forward totalizer in selectable volume units

iii. Reverse totalizer in selectable volume units

iv. Net totalizer in selectable volume units

v. Error and/or alarm messages

vi. Output status

PART 3 EXECUTION

3.1 INSTALLATION

A. Follow manufacturer's recommendation for installation. Installation will conform to the guidelines provided by the Installation & Operation Manual.

B. Straight pipe requirement shall be an equivalent of three diameters on the inlet (upstream) side, and two diameters on the outlet (downstream) side.

C. For best performance, place meter vertically, with liquid flowing upward and meter electrodes in a closed, full pipe.

3.2 CALIBRATION

A. Each meter shall be hydraulically calibrated in an ISO 9000-certified testing facility, which utilizes a computerized gravimetric testing method with a measuring uncertainty of 0.1%.

B. Each meter shall be provided with a calibration certificate indicating the measured error (percent deviation) at three different flows, respectively equivalent to 25%, 50% and 75% of the nominal flow rate for each size.

3.3 MANUFACTURER'S WARRANTY

A. Terms

1. The manufacturer of the above specified equipment warrants the Product to be free from defects in materials and workmanship appearing within the earlier of either: One (1) year after installation; or one (1) year and six (6) months after shipment from manufacturer.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. Measurement and payment shall be in accordance with Section 01025 of these specifications.

END OF SECTION

SECTION 02800

WATER SERVICE CONNECTIONS

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, tools, superintendence, and incidentals required to install, test, clean, and disinfect the copper pipe and fitting, shown on the drawings.

B. Piping shall be located substantially as shown on the drawing. The Engineering reserves the right to make such modifications as may be found desirable to avoid interference between pipes or any other reason. Pipe fitting notation is for the Contractor's convenience. It does not relieve them from installing and jointing different or additional items required to achieve a complete connection to the tie in location.

C. The words "pipe/piping" shall refer to pipe, fittings, and appurtenances unless noted otherwise.

1.2 RELATED WORK

A. Section 01666: Testing of Pipelines

B. Section 02610: Schedule of Pipe

C. Section 02221: Excavation, Backfill, and Compaction for Utilities

1.3 SUBMITTALS

A. Shop drawings, product data, and all specified calculations shall be submitted in accordance with Section 01300 and this Specification.

B. Submit copies of design calculations in accordance with this Section.

C. Submit the anticipated pipe production and delivery schedule from the manufacturer and supplier.

D. Prior to shipment of pipe, submit a certified affidavit of compliance from the manufacturer stating that the pipe, fittings, gaskets, interior linings, and exterior coatings for this project have been manufactured and tested in accordance with ANSI/AWWA and ASTM Standards and requirements specified herein.

E. Submit calculations, prepared by the manufacturer, for all required lengths of joint restraint, in general, conforming to the locations shown on the drawings. Approval by the Engineer is required prior to the manufacture and shipment of the pipe.

1.4 REFERENCES

A. American Society of Mechanical Engineers:
   1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.

   2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

B. ASTM International:
   1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.

   2. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.

3. ASTM B88 - Standard Specification for Seamless Copper Water Tube.

4. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures.

5. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

6. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) PressureRated Pipe (SDR Series).

7. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

8. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

D. American Welding Society:

1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

E. American Water Works Association:

1. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

2. AWWA C700 - Cold-Water Meters - Displacement Type, Bronze Main Case.

3. AWWA C701 - Cold-Water Meters - Turbine Type, for Customer Service.

4. AWWA C702 - Cold-Water Meters - Compound Type.

5. AWWA C706 - Direct-Reading, Remote-Registration Systems for Cold-Water Meters.

6. AWWA C800 - Underground Service Line Valves and Fittings.

7. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. through 3 in. for Water Service.

8. AWWA M6 - Water Meters - Selection, Installation, Testing, and Maintenance

1.5 QUALITY ASSURANCE

A. All Type K Copper pipe shall be from a single manufacturer. Each length of copper pipe supplied for the project shall be hydrostatically tested at the point of manufacture to four times its rating class for a duration of 5 seconds in accordance with AWWA. Testing may be performed prior to machining bell and spigot. Failure of copper pipe shall be defined as any rupture of the pipe wall. Certified test results shall be furnished in triplicate to the Engineer prior to the time of shipment.

B. All Type K copper pipe and fittings to be installed under this project shall be inspected and tested at the foundry as required by the Standard Specifications to which the material is manufactured.

C. All copper pipe and fittings to be installed under this Contract may be inspected at the plant for compliance with these Specifications by an independent testing laboratory selected by the Owner at the Owner's expense. The Contractor shall reimburse the Owner for

excessive inspection costs, which are defined as the costs of inspection of that amount of pipe which exceeds 125 percent of the aggregate length of pipe under this Section.

D. Inspection of the copper pipe and fittings will also be made by the Engineer or representative of the Owner after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the job.

E. All pipe and fittings shall be permanently marked with the following information:

1. Manufacturer, date.

2. Size, type, class, and wall thickness.

3. Standard produced to (ANSI/AWWA, ASTM, etc.).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe, it's lining, and coating. Under no circumstances shall the pipe be dropped or skidded against each other. Slings, hooks, or pipe tongs shall be used in pipe handling.

B. Materials, if stored, shall be kept safe from damage. The interior of all pipe, fittings, and other appurtenances shall be kept free from dirt or foreign matter at all times.

C. Pipe shall not be stacked higher than the limits recommended by its manufacturer. The bottom tier shall be kept off the ground on timbers, rails, or concrete. Stacking shall conform to the manufacturer’s recommendations.

D. Gaskets for mechanical and push-on joints to be stored shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.

PART 2 PRODUCTS

2.1 WATER PIPING AND FITTINGS

A. Copper Tubing: ASTM B88, Type K, annealed:

1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper

2. Joints: Compression connection or AWS A5.8, BCuP silver braze

PART 3 EXECUTION

3.1 GENERAL

A. Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying and no piece shall be installed which is found to be defective. Any damage to the pipe linings or coatings shall be repaired as directed by the Engineer. Handling and laying of pipe and fittings shall be in accordance with the manufacturer’s instruction and as specified herein.

3.2 INSTALLATION

A. All pipe and fittings shall be thoroughly cleaned and dried before laying, shall be kept clean and dry until they are used in work, and when laid, shall conform to the lines and grades required. Copper piping and fittings shall be installed in accordance with the requirements of AWWA. Copper and Brass Couplings Mechanical joints/fittings such as flared, threaded, or mechanically crimped/pressed connections shall be required before the meter. The meter is to be placed in a vault in the right of way or in an easement contiguous to the right-of-way. A double-check backflow prevention device is installed in the vault immediately downstream of the meter. The piping from the main to the meter and backflow device and within the meter vault shall be Type K Copper.

1. WATER SERVICE LINE: Where required by the Contract Drawings and Specifications, the Contractor shall extend the ¾-inch service line to the resident's point of connection. The Contractor is responsible for coordinating the water service connection for each resident. Backfill on service line shall be carefully placed and compacted per the requirements of Section 02221 of these specifications.

2. STUB-OUT: Where required by the Contract Drawings and Specifications, the Contract shall extend the 3/4-inch service line up to the property limits. The Stub-out shall be plugged. Backfill on service line shall be carefully placed and compacted per the requirements of Section 02221 of these specifications.

3. LOCATION MARKING AND RECORDING: The Contractor shall maintain as-built records of the horizontal and vertical location of installed water service lines. The plugged ends of risers shall be marked using wooden stacks and metallic marking tape as shown in the Contract drawings.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. Measurement and payment for all pipelines and appurtenances shall be in accordance with Section 01025 of these specifications.

END OF SECTION

SECTION 02831

CHAINLINK FENCES AND GATES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Galvanized steel chain link fence and gates, per typical detail, attached to this section.

2. Related Sections: The following sections contain requirements that relate to this section:

3. Division 2 Section for filling and grading work.

4. Division 3 Section "Concrete Work" for concrete for post footings.

1.3 SUBMITTALS

A. General: Submit the following in accordance with the Conditions of Contract and Division 1 Specification Sections.

B. Product data in the form of manufacturer's technical data, specifications, and installation instructions for fence and gate posts, fabric, gates, and accessories.

C. Shop drawings showing the location of the fence, gates, each post, and details of post-installation, extension arms, gate swing, hardware, and accessories.

1.4 QUALITY ASSURANCE

A. A. Single-Source Responsibility: Obtain chain link fences and gates as complete units, including necessary erection accessories, fittings, and fastenings from a single source or manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Manufacturers: Subject to compliance with requirements, provide products by one of the followings:

Allied Tube and Conduit Corp.

American Chain Link Fence Company

American Tube Company

Anchor Fence, Inc.

Capitol Wire and Fence Co., Inc.

Century Tube Corp.

Cyclone Fence Div./USX Corp.

2.2 CHAINLINK FENCE MATERIALS

A. General

1. Design Standard No. 4-1 and 4-2, on sheets 314 and 315 respectively, of the Subdivision Ordinance, Title 19 of the City of El Paso, Texas governs work of this section and constitutes minimum requirements. The chain-link fence and gates required shall be 8-foot-high fabric with 1 foot of 3-strand barb wire. All posts shall be one continuous piece.

B. Materials:

1. Chain link fencing materials shall conform to the following requirements:

a. Wire Fabric: Width (or height) 8 feet; 1-1/2-inch Chain Link pattern, No. 9 gauge wire having a tensile strength of at least 70,000 pounds per square inch and heavily galvanized by Hot-Dip Process after weaving. Fabric shall extend 1-inch above finish. Expansion joints shall be installed at post locations. Top and bottom selvages shall be twisted and barbed.

b. Tension Wire: Tension wire at bottom offense shall be No. 7 coil spring wire, heavily galvanized.

c. Line Posts: Hot-Dip Galvanized 2 3/8" "nominal" outside diameter pipe weighing a minimum of 3.65 pounds per linear foot.

d. End, Corner, and Gate Posts: 4-inch O.D. pipe weighing 9.11 pounds per linear foot, Hot-dip galvanized, forend, corner, and gate posts.

e. Braces and Truss Rods: Braces at the end, gate and corner posts shall be the same material as the top rail with suitable connections. Truss bars – 3/8" round rod, galvanized.

f. Fittings: All fittings shall be cast iron, wrought iron or pressed steel, hot-dip galvanized of adequate size.

g. Double Swing Cantilever Gate: Double swing gate with an open width of 20 feet shall be furnished as shown on the Plans. Gate frames shall be 2-3/8-inch O.D. hot-dip galvanized tubular steel weighing 3.65 pounds per linear foot. Fittings shall be heavy malleable castings galvanized. The fabric covering the same as a fence. The gates shall interlock when closed and shall have a single drop pole into a cast in place recess. Center pole shall be suitable for either a lockable hasp or for a wrapped chain and lock.

h. Fabricate perimeter frames of gates from metal and finish to match fence framework. Assemble gate frames by welding. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories.

i. Swing Gates: Comply with ASTM F 900.

j. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180-deg gate opening. Provide 1½ pair of hinges for each leaf over 6-foot nominal height.

2. Extension Arms: Extension arms shall be hot-dip galvanized with provisions for three (3) barbed wires.

3. Barbed Wire: Barbed wire shall be a four-point pattern, two strands of No. 12-1/2 gauge with 14-gauge barbs – 3 inches apart.

PART 3 EXECUTION

3.1 INSTALLATION

A. General: Install fence in compliance with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted. The fence shall be installed to the lines and grades as shown on the Plans.

Apply fabric to the outside of the framework.

B. Line posts shall be spaced not over 10-feet apart. Gate posts shall be spaced to fit the gate furnished. All posts shall be set a minimum of three (3) feet deep in holes not less than 8-inches in diameter filled with concrete. Concrete around posts shall be adequate for maintaining the posts truly plumb under the strains imposed and shall contain not less than 4 sacks of cement per cubic yard.

C. Bracing shall be placed at all gate and end posts in accordance with details approved by the Engineer.

D. Fabric shall be stretched taut and securely attached to line posts and top rails with fabric bands spaced approximately 14-inches apart. Suitable stretcher bars and bands shall be used at all end and gate posts. Fabric shall extend 1-inch above finish grade. Tension wire shall be tightly stretched and securely attached to each post. Gates shall be provided with accessories specified. Maximum clearance between gate bottom brace and ground shall be three (3) inches anywhere along its length.

E. Replacement of Chain Link Fence for Repairs: Due to the embedment requirement, if fence sections must be removed after embedment, the affected section, including concrete embedment is to be removed. Adequate provisions to support adjoining fence sections shall be installed prior to the removal of any work. Any damage to the fencing material during this operation shall be replaced by the Contractor at their expense.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement or payment shall be made for the work under this section, but it shall be included in the total Contract Lump Sum prices for the Montana North & Vista Del Sol project site Work as applicable.

END OF SECTION

SECTION 03300

CAST IN PLACE CONCRETE

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials equipment, tools, superintendence, and incidentals required and install cast in place concrete complete as shown on the Drawings and as specified herein.

B. Furnish all sampling and testing of products and materials proposed for use. Testing shall be performed by an independent testing laboratory acceptable to the Engineer but engaged by and at the expense of the Contractor.

1.2 RELATED WORK

A. Grout is included in Section 03600.

B. Modifications and Repair to Concrete are included in Section 03740.

1.3 SUBMITTALS

A. Submit to the Engineer, in accordance with Section 01300, shop drawings, and product data shall include the following:

1. Sources of cement, pozzolan, and aggregates.

2. Material Safety Data Sheets (MSDS) for all concrete components and admixtures.

3. Air entraining admixture. Product data including catalog cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, field testing methods, and conformity to ASTM standards.

4. Water reducing admixture. Product data including catalog cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, and conformity to ASTM standards.

5. High range water reducing admixture (plasticizer). Product data including catalog cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, retarding effect, slump range, and conformity to ASTM standards. Identify the proposed locations of use.

6. Sheet curing material. Product data including catalog cut, technical data, and conformity to ASTM standards.

7. Liquid curing compound. Product data including catalog cut, technical data, storage requirements, product life, application rate, and conformity to ASTM standards. Identify the proposed locations of use.

B. Samples

1. Fine and coarse aggregates, 5 pounds each.

C. Test Reports

1. Sieve analysis, mechanical properties, and deleterious substance content for coarse and fine aggregate.

2. Chemical analysis and physical tests of each type of cement and conformity to ASTM standards.

3. Chemical analysis and physical tests of pozzolan and conformity to ASTM standards, where applicable.

4. Concrete mix for each formulation of concrete proposed for use including constituent quantities per cubic yard, water cementitious ratio, concrete slump, type, and manufacturer of cement.

   a. Standard deviation data for each proposed concrete mix based on statistical records.

   b. Water cementitious ratio curve for concrete mixes based on laboratory tests. Give average cylinder strength test results at 28 days for laboratory concrete mix designs. Provide results of 7- and 14-day tests if available.

D. Certifications

1. Certify admixtures used in the same concrete mix are compatible with each other and the aggregates.

2. Certify the Contractor is not associated with the independent testing laboratory nor does the Contractor, or its officers have a beneficial interest in the laboratory.

E. Qualifications

1. Independent testing laboratory: Name, address, and qualifications. Laboratories affiliated with the Contractor, or in which the Contractor or its officers have a beneficial interest, are not acceptable.

1.4 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C31 Standard Practice for Making and Curing Concrete Test Specimens in the Field

2. ASTM C33 Standard Specification for Concrete Aggregates

3. ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

4. ASTM C42 Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

5. ASTM C94 Standard Specification for Ready Mixed Concrete

6. ASTM C143 Standard Test Method for Slump of Hydraulic Cement Concrete

7. ASTM C150 Standard Specification for Portland Cement

8. ASTM C171 Standard Specification for Sheet Materials for Curing Concrete

9. ASTM C173 Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

10. ASTM C231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

11. ASTM C260 Standard Specification for Air Entraining Admixtures for Concrete

12. ASTM C309 Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete

13. ASTM C311 Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete

14. ASTM C494 Standard Specification for Chemical Admixtures for Concrete

15. ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete

B. American Concrete Institute (ACI)

1. ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete

2. ACI 301 Specification for Structural Concrete

3. ACI 304R Guide for Measuring, Mixing, Transporting and Placing Concrete

4. ACI 304.2R Placing Concrete by Pumping Methods

5. ACI 305R Hot Weather Concreting

6. ACI 306R Cold Weather Concreting

7. ACI 318 Building Code Requirements for Reinforced Concrete

8. ACI 350R Environmental Engineering Concrete Structures

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.5 QUALITY ASSURANCE

A. Only one source of cement and aggregates shall be used on any one structure. Concrete shall be uniform in color and appearance.

B. Well in advance of placing concrete, discuss with the Engineer the sources of individual materials and batched concrete proposed for use. Discuss placement methods, water stops and curing. Propose methods of hot and cold weather concreting as required.

C. A meeting shall be held prior to the placement of plasticized concrete. The plasticizer (high range water reducer) manufacturer's representative and the Contractor shall be available to discuss the properties and techniques of batching and placing plasticized concrete.

D. If during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the Engineer may order such changes in proportions or materials, or both, as may be necessary to secure the desired properties. All changes so ordered shall be made at the Contractor's expense.

E. If during the progress of the work, the materials from the sources originally accepted the change in characteristics, the Contractor shall, at his expense, make new acceptance tests of aggregates and establish new design mixes. Such testing and design shall be accomplished with the assistance of an independent testing laboratory acceptable to the Engineer.

F. Reinforced concrete shall comply with ACI 301, ACI 318, the recommendations of ACI 304R and ACI 350R, and other stated requirements, codes, and standards, except as modified herein.

G. Samples of constituents and concrete as placed will be subjected to laboratory tests. All materials incorporated in the work shall conform to accepted samples.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Cement: Store in weathertight buildings, bins, or silos to provide protection from dampness and contamination and to minimize warehouse set.

B. Aggregate: Arrange and use stockpiles to avoid excessive segregation or contamination with other materials or with other sizes of like aggregates. Build stockpiles in successive horizontal layers not exceeding 3 foot in thickness. Complete each layer before the next is started. Do not use frozen or partially frozen aggregate.

C. Sand: Arrange and use stockpiles to avoid contamination. Allow the sand to drain to a uniform moisture content before using it. Do not use frozen or partially frozen aggregates.

D. Admixtures: Store in closed containers to avoid contamination, evaporation, or damage. Provide suitable agitating equipment to assure uniform dispersion of ingredients in admixture solutions which tend to separate. Protect liquid admixtures from freezing and other temperature changes which could adversely affect their characteristics.

E. Pozzolan: Store in weathertight buildings, bins, or silos to provide protection from dampness and contamination.

F. Sheet Curing Materials: Store in weathertight buildings or off the ground and undercover.

G. Liquid Curing Compounds: Store in closed containers.

PART 2 PRODUCTS

2.1 GENERAL

A. The use of the manufacturer's name and model or catalog number is to establish the standard of quality and general configuration desired.

B. Like items of materials shall be the end products of one manufacturer in order to provide standardization for appearance, maintenance, and manufacturer's service.

2.2 MATERIALS

A. Materials shall comply with this Section and any applicable state or local requirements.

B. Cement: Domestic portland cement complying with ASTM C150. Air entraining cements shall not be used. Cement brand shall be subject to approval by the Engineer and one brand shall be used throughout the Work. The following cement type(s) shall be used:

1. Type II low alkali cement.

2. Type I low alkali cement with fly ash, resulting in C3A being below 8 percent of total cementitious content.

3. Type III low alkali cement limited to 8 percent C3A, where approved by the Engineer.

4. Type V when in contact with wastewater.

C. Fine Aggregate: Washed inert natural sand conforming to the requirements of ASTM C33.

D. Coarse Aggregate: Well graded crushed stone or washed gravel conforming to the requirements of ASTM C33. Size numbers for the concrete mixes shall be as shown in Table 1 herein. Grading requirements shall be as listed in ASTM C33 Table 2 for the specified coarse aggregate size number. Limits of Deleterious Substances and Physical Property Requirements shall be as listed in ASTM C33 Table 3 for severe weathering regions.

E. Water: Potable water free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other deleterious substances.

F. Admixtures: Admixtures shall be free of chlorides and alkalis (except for those attributable to water). When it is required to use more than one admixture in a concrete mix, the admixtures shall be from the same manufacturer. Admixtures shall be compatible with the concrete mix including other admixtures.

1. Air Entraining Admixture: The admixture shall comply with ASTM C260. Proportioning and mixing shall be in accordance with the manufacturer's recommendations.

2. Water Reducing Agent: The admixture shall comply with ASTM C494, Type A. Proportioning, and mixing shall be in accordance with the manufacturer's recommendations.

3. High Range Water Reducer (Plasticizer): The admixture shall comply with ASTM C494 Type F and shall result in non-segregating plasticized concrete with little bleeding and with physical properties of low water/cement ratio concrete. The treated concrete shall be capable of maintaining its plastic state in excess of 2 hours. Proportioning and mixing shall be in accordance with the manufacturer's recommendations.

4. Admixtures causing retarded or accelerated setting of concrete shall not be used without written approval from the Engineer. When allowed, the admixtures shall be retarding or accelerating water-reducing or high range water reducing admixtures.

G. Pozzolan (Fly ash)

1. Pozzolan shall be Class C or Class F fly ash complying with ASTM C618, including the requirements of Table 1 except the Loss on Ignition (LOI) shall be limited to 3 percent maximum.

2. Testing of the fly ash and/or the fly ash and concrete mixture is required to provide test data confirming that the fly ash in combination with the cement to be used meets all strength requirements and is compatible with the other concrete additives. The testing shall be performed by the independent testing laboratory engaged by the Contractor.

a. Pozzolan shall be tested in compliance with ASTM C311 with the following restriction: A minimum of one sample weighing 4 pounds shall be taken from each 200 tons of pozzolan supplied for the project.

H. Sheet Curing Materials. Waterproof paper, polyethylene film, or white burlap polyethylene sheeting all complying with ASTM C171.

I. Liquid Curing Compound. Liquid membrane-forming curing compound shall comply with the requirements of ASTM C309 Type 1 D (clear or translucent with fugitive dye) and shall contain no wax, paraffin, or oil.

2.3 MIXES

A. The development of mix designs and testing shall be by an independent testing laboratory acceptable to the Engineer engaged by and at the expense of the Contractor.

B. Select proportions of ingredients, in accordance with ACI 211.1, to meet the design strength and materials limits specified in Table 1, and to produce concrete having proper placability, durability, strength, appearance, and other required properties. Proportion ingredients to produce a homogenous mixture which will readily work into corners and

angles of forms and around reinforcement without permitting materials to segregate or allowing excessive free water to collect on the surface.

C. The design mix shall be based on one of the following:

1. Standard deviation data of prior mixes, with essentially the same proportions of the same constituents, in accordance with ACI 318.

2. Trial mixtures developed by laboratory tests. The water content of the concrete shall be based on a curve showing the relation between water cementitious ratio and 7- and 28-day compressive strengths of concrete made using the proposed materials. The curves shall be determined by four or more points, each representing an average value of at least three test specimens at each age. The curves shall have a range of values sufficient to yield the desired data, including the compressive strengths specified, without extrapolation. The water content of the concrete mixes to be used, as determined from the curve, shall correspond to strengths 16 percent greater than the required design strengths. The resulting mix shall not conflict with the limiting values for maximum water cementitious ratio and net minimum cementitious content as specified in Table 1.

D. Compression Tests: Provide testing of the proposed concrete mix or mixes to demonstrate compliance with the compression strength requirements in conformity with the provisions of ACI 318.

E. Entrained air, as measured by ASTM C231, shall be as shown in Table 1.

1. If the air-entraining agent proposed for use in the mix requires testing methods other than ASTM C231 to accurately determine air content, make special note of this requirement in the air-entraining admixture submittal.

F. The slump of the concrete as measured by ASTM C143, shall be as shown in Table 1. If plasticizer is used, the slump indicated shall be that measured before plasticizer is added. Plasticized concrete shall have a slump ranging from 7- to 10-inches.

G. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

H. Where fly ash is included in the mix, the fly ash content shall be no less than 15 percent nor more than 25 percent of the total cement plus pozzolan content, by weight.

I. Where Type III cement is used, the concrete shall conform to Table 1, except that the design strength shall be attained at 7 days.

Table 1

Class	Design Strength (1)	Fine Aggregate (2)	Coarse Aggregate (3)	Cementitious Content (4)
A	2,500	C 33	57	440
D	4,000	C 33	57	560

Class	W/C Ration (5)	AE Range (6)	WR (7)	Slump (8)
A	2,500	C 33	57	440
D	4,000	C 33	57	560

NOTES:

(1) Minimum compressive strength in psi at 28 days

(2) ASTM designation

(3) Size Number in ASTM C33

(4) Minimum cementitious content in pounds per cubic yard

(5) W/C is Water Cementitious ratio by weight

(6) AE is percent air entrainment

(7) WR is water reducing admixture

(8) Permissible slump range, inch

PART 3 EXECUTION

3.1 PREPARATION, INSPECTION, AND COORDINATION

A. The batching, mixing, transporting, placing, and curing of concrete shall be subject to the inspection of the Engineer at all times. The Contractor shall advise the Engineer of his/her readiness to proceed at least 24 hours prior to each concrete placement. The Engineer will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing and the alignment, cleanliness, and tightness of formwork. No placement shall be made without the inspection and acceptance of the Engineer.

B. Embedments

1. Ensure that all required embedded items are accurately placed at correct locations and orientations.

2. Support embedded items against displacement during concrete placement. Provide templates for positioning embedded anchor bolts.

3. Voids in sleeves, inserts, anchors, etc. shall be filled temporarily with readily removable material to prevent the entry of concrete.

4. Ensure that all aluminum embedments are effectively coated or covered to prevent aluminum concrete reaction or electrolytic action between aluminum and steel.

5. Unless otherwise shown or approved, conduits and pipes embedded within a slab, wall, or beam (other than those merely passing through) shall satisfy the following:

a. The maximum outside dimension shall be no greater than one-third of the overall thickness of the slab, wall, or beam.

b. Spacing shall be greater than or equal to three diameters or widths in the center.

c. Size, number, and placement shall not significantly impair the strength of the member.

C. Concrete for the work shall provide a homogeneous structure which, when hardened, will have the required strength, durability, and appearance. Mixtures and workmanship shall be such that concrete surfaces, when exposed, will require no patching, or repairs due to

defects. When concrete surfaces are stripped, the concrete when viewed in good lighting from 10 feet away shall be pleasing in appearance, and at 20 feet shall show no visible defects.

3.2 MEASURING MATERIALS

A. Concrete shall be composed of portland cement, pozzolan (where applicable), fine aggregate, coarse aggregate, water, and admixtures, as specified and shall be produced by a concrete mixing plant conforming to ACI 301 and acceptable to the Engineer. All constituents, including admixtures, shall be batched at the plant.

B. Measure materials for batching concrete by weighing in conformity with and within the tolerances given in ASTM C94 except as otherwise specified. Scales shall have been certified by the local Sealer of Weights and Measures within one year of use.

C. Measure the amount of free water in fine aggregates within 0.3 of a percent with a moisture meter. Compensate for varying moisture contents of fine aggregates. Record the number of gallons of water as batched on printed batching tickets.

D. Admixtures shall be dispensed either manually using calibrated containers or measuring tanks, or by means of an automatic dispenser approved by the manufacturer of the specific admixture.

1. Charge air-entraining and chemical admixtures into the mixer as a solution using an automatic dispenser or similar metering device.

2. Inject multiple admixtures separately during the batching sequence.

3.3 MIXING AND TRANSPORTING

A. Concrete shall be ready mixed concrete produced by equipment acceptable to the Engineer. No hand mixing will be permitted. Clean each transit mix truck drum and reverse drum rotation before the truck proceeds under the batching plant. Equip each transit mix truck with a continuous, nonreversible, revolution counter showing the number of revolutions at mixing speeds.

B. Ready-mix concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of their rated capacities as stated on the nameplate.

C. Keep the water tank valve on each transit truck locked at all times. Any addition of water must be directed by the Engineer. Added water shall be incorporated by additional mixing of at least 35 revolutions. All added water shall be metered, and the amount of water added shall be shown on each delivery ticket.

D. All central plant and rolling stock equipment and methods shall comply with ACI 301 and ACI 318.

E. Select equipment of size and design to ensure a continuous flow of concrete at the delivery end. Metal or metal lined non-aluminum discharge chutes shall be used and shall have slopes not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long and chutes not meeting slope requirements may be used if the concrete is discharged into a hopper before distribution.

F. Retempering of concrete or mortar, (that is, mixing with or without additional cement, aggregate, or water), which has obtained initial set, will not be permitted.

G. Handle concrete from mixer to placement as quickly as practicable while providing concrete of required quality in the placement area. Dispatch trucks from the batching plant so they arrive at the worksite just before the concrete is required, thus avoiding excessive mixing of concrete while waiting or delays in placing successive layers of concrete in the forms.

H. Furnish a delivery ticket for ready mixed concrete to the Engineer as each truck arrives. Each ticket shall provide a printed record of the weight of cement and each aggregate as batched individually. Use the type of indicator that returns for zero punch or returns to zero after a batch is discharged. Clearly indicate the weight of fine and coarse aggregate, cement and water in each batch, the quantity delivered, the time any water is added, and the numerical sequence of the delivery. Show the time of day batched and time of discharge from the truck. Indicate the number of revolutions of the transit mix truck.

I. Temperature and Mixing Time

1. In cold weather (see Paragraph 3.5 D below) maintain the as mixed temperature of the concrete and concrete temperatures at the time of placement in the forms as indicated in Table 2.

2. If water or aggregate has been heated, combine water with aggregate in the mixer before the cement is added. Do not add cement to mixtures of water and aggregate when the temperature of the mixture is greater than 90 °F.

3. In hot weather, cool ingredients before mixing to maintain the temperature of the concrete below the maximum placing temperature of 90 °F. If necessary, substitute well-crushed ice for all or part of the mixing water.

4. The maximum time interval between the addition of mixing water and/or cement to the batch and the placing of concrete in the forms shall not exceed the following:

Table 2

Concrete Temperature	**Maximum Time**
80 to 90 °F (27 to 32 °C)	45 Minutes
70 to 79 °F (21 to 26 °C)	60 Minutes
40 to 69 °F (5 to 20 °C)	90 Minutes

If an approved high range water reducer (plasticizer) is used to produce plasticized concrete, the maximum time interval shall be 90 minutes.

J. Concrete mix showing either poor cohesion or poor coating of the coarse aggregate with paste shall be remixed. If this does not correct the condition, the concrete shall be rejected. If the slump is within the allowable limit, but excessive bleeding, poor workability, or poor finishability are observed, changes in the concrete mix shall be obtained only by adjusting one or more of the following:

1. The gradation of aggregate.

2. The proportion of fine and coarse aggregate.

3. The percentage of entrained air, within the allowable limits.

3.4 PLACING AND COMPACTING

A. Placing

1. Verify that all formwork completely encloses concrete to be placed and is securely braced prior to concrete placement. Remove ice, excess water, dirt, and other foreign materials from forms. Confirm that reinforcement and other embedded items are securely in place. Have a competent workman at the location of the pour who can assure that reinforcement and embedded items remain in designated

locations while concrete is being placed. Sprinkle semi-porous subgrades or forms to eliminate suction of water from the mix. Seal extremely porous subgrades in an approved manner.

2. Deposit concrete as near its final position as possible to avoid segregation due to rehandling or flowing. Place concrete continuously at a rate that ensures the concrete is being integrated with fresh plastic concrete. Do not deposit concrete which has partially hardened or has been contaminated by foreign materials or on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If the section cannot be placed continuously, place construction joints as specified or as approved.

3. Pumping of concrete will be permitted in accordance with the recommendations of ACI 304.2R. Use a mix design and aggregate sizes suitable for pumping and submit for approval.

4. Remove temporary spreaders from forms when the spreader is no longer useful. Temporary spreaders may remain embedded in concrete only when made of galvanized metal or concrete and if prior approval has been obtained.

5. Do not place concrete for supported elements until concrete previously placed in the supporting element (columns, slabs, and/or walls) has reached adequate strength.

6. Where surface mortar is to form the base of a finish, especially surfaces designated to be painted, work coarse aggregate back from forms with a suitable tool to bring the full surface of the mortar against the form. Prevent the formation of excessive surface voids.

7. Slabs

    a. After suitable bulkheads, screeds, and jointing materials have been positioned, the concrete shall be placed continuously between construction joints beginning at a bulkhead, edge form, or corner. Each batch shall be placed into the edge of the previously placed concrete to avoid stone pockets and segregation.

    b. Avoid delays in casting. If there is a delay in casting, the concrete placed after the delay shall be thoroughly spaded and consolidated at the edge of that previously placed to avoid cold joints. Concrete shall then be brought to the correct level and struck off with a straightedge. Bullfloats or darbies shall be used to smooth the surface, leaving it free of humps or hollows.

    c. Where slabs are to be placed integrally with the walls below them, place the walls and compact as specified. Allow 1 hour to pass between the placement of the wall and the overlying slab to permit the consolidation of the wall concrete. Keep the top surface of the wall moist to prevent cold joints.

8. Formed Concrete

    a. Place concrete in forms using tremie tubes and taking care to prevent segregation. The bottom of the tremie tubes shall preferably be in contact with the concrete already placed. Do not permit concrete to drop freely more than 4 feet. Place concrete for walls in 12- to 24-inch lifts, keeping the surface horizontal. If plasticized concrete is used, the maximum lift thickness may be increased to 7 feet and the maximum free fall of concrete shall not exceed 15 feet.

B. Compacting

1. Consolidate concrete by vibration, puddling, spading, rodding, or forking so that concrete is thoroughly worked around reinforcement, embedded items, and openings and into corners of forms. Puddling, spading, etc. shall be continuously performed along with the vibration of the placement to eliminate air or stone pockets which may cause honeycombing, pitting or planes of weakness.

2. All concrete shall be placed and compacted with mechanical vibrators. The number, type, and size of the units shall be approved by the Engineer in advance of placing operations. No concrete shall be ordered until sufficient approved vibrators (including standby units in working order) are on the job.

3. A minimum frequency of 7,000 revolutions per minute is required for mechanical vibrators. Insert vibrators and withdraw at points from 18- to 30-inches apart. At each insertion, vibrate sufficiently to consolidate the concrete, generally from 5 to 15 seconds. Do not over vibrate to segregate. Keep a spare vibrator on the site during concrete placing operations.

4. Concrete Slabs: Concrete for slabs less than 8-inches thick shall be consolidated with vibrating screeds; slabs 8- to 12-inches thick shall be compacted with internal vibrators and (optionally) with vibrating screeds. Vibrators shall always be placed into concrete vertically and shall not be laid horizontally or laid over.

5. Walls and Columns: Internal vibrators (rather than form vibrators) shall be used unless otherwise approved by the Engineer. In general, for each vibrator needed to melt down the batch at the point of discharge, one or more additional vibrators must be used to densify, homogenize and perfect the surface. The vibrators shall be inserted vertically at regular intervals, through the fresh concrete and slightly into the previous lift if any.

6. Amount of Vibration: Vibrators are to be used to consolidate properly placed concrete but shall not be used to move or transport concrete in the forms. Vibration shall continue until:

   a. Frequency returns to normal

   b. The surface appears liquefied, flattened, and glistening

   c. Trapped air ceases to rise

   d. The coarse aggregate has blended into the surface but has not disappeared

3.5 CURING AND PROTECTION

A. Protect all concrete work against injury from the elements and defacements of any nature during construction operations.

B. Curing Methods

1. Curing Methods for Concrete Surfaces: Cure concrete to retain moisture and maintain the specified temperature at the surface for a minimum of 7 days after placement. Curing methods to be used are as follows:

   a. Water Curing: Keep entire concrete surface wet by ponding, continuous sprinkling, or covering with saturated burlap. Begin wet cure as soon as concrete attains an initial set and maintains a wet cure 24 hours a day.

   b. Sheet Material Curing: Cover the entire surface with sheet material. Securely anchor sheeting to prevent wind and air from lifting the sheeting

or entrapping air under the sheet. Place and secure sheet as soon as the initial concrete set occurs.

c. Liquid Membrane Curing: Apply over the entire concrete surface except for surfaces to receive additional concrete. Curing compound shall NOT be placed on any concrete surface where additional concrete is to be placed, where surface coatings are to be used, or where the concrete finish requires an integral floor product. Curing compound shall be applied as soon as the free water on the surface has disappeared and no water sheen is visible, but not after the concrete is dry or when the curing compound can be absorbed into the concrete. The application shall comply with the manufacturer's recommendations.

2. Specified applications of curing methods.

a. Slabs for water containment structures: Water curing only.

b. Slabs on grade and footings (not used to contain water): Water curing, sheet material curing, or liquid membrane curing.

c. Structural Slabs (other than water containment): Water curing or liquid membrane curing.

d. Horizontal surfaces that will receive additional concrete, coatings, grout, or other material that requires a bond to the substrate: Water curing.

e. Formed surfaces: None if nonabsorbent forms are left in place for 7 days. Water cure if absorbent forms are used. Sheet cure or liquid membrane cure if forms are removed prior to 7 days. Exposed horizontal surfaces of formed walls or columns shall be water cured for 7 days or until the next placement of concrete is made.

f. Concrete Joints: Water cured, or sheet material cured.

3. Curing time may be reduced to 3 days after placement where Type III cement is approved and used.

C. Finished surfaces and slabs shall be protected from the direct rays of the sun to prevent checking and crazing.

D. Cold Weather Concreting:

1. "Cold weather" is defined as a period when for more than 3 successive days, the average daily outdoor temperature drops below 40 °F. The average daily temperature shall be calculated as the average of the highest and the lowest temperature during the period from midnight to midnight.

2. Concrete placed during cold weather shall be batched, delivered, placed, cured, and protected in compliance with the recommendations of ACI 306R and the additional requirements specified herein.

3. Discuss a cold-weather work plan with the Engineer. The discussion shall encompass the methods and procedures proposed for use during cold weather including the production, transportation, placement, protection, curing, and temperature monitoring of the concrete. The procedures to be implemented upon abrupt changes in weather conditions or equipment failures shall also be discussed. Cold weather concreting shall not begin until the work plan is acceptable to the Engineer.

4. The minimum temperature of concrete immediately after placement and during the protection period shall be as indicated in Table 3. The temperature of the concrete in place and during the protection period shall not exceed these values by more than 20 °F. Prevent overheating and non-uniform heating of the concrete.

Table 3	
< 12 Inches	55 °F
12 to 36 Inches	50 °F

5. During periods of cold weather, concrete shall be protected to provide continuous warm, moist curing (with supplementary heat when required) for a total of at least 350 degree days of curing.

   a. Degree days are defined as the total number of 24-hour periods multiplied by the weighted average daily air temperature at the surface of the concrete (e.g., 5 days at an average 70°F = 350 degree days).

   b. To calculate the weighted average daily air temperature, sum hourly measurements of the air temperature in the shade at the surface of the concrete taking any measurement less than 50°F as 0°F. Divide the sum thus calculated by 24 to obtain the weighted average temperature for that day.

6. Salt, manure, or other chemicals shall not be used for protection.

7. At the end of the protection period, allow the concrete to cool gradually to the ambient temperature. If water curing has been used, the concrete shall not be exposed to temperatures below those shown in Table 3 until at least 24 hours after water curing has been terminated.

8. During periods not defined as cold weather, but when freezing temperatures are expected or occur, protect concrete surfaces from freezing for the first 24 hours after placing.

E. Hot Weather Concreting

1. "Hot weather" is defined as any combination of high air temperatures, low relative humidity, and wind velocity which produces a rate of evaporation as estimated in ACI 305R, approaching or exceeding 0.2 pounds per square foot per hour.

2. Concrete placed during hot weather shall be batched, delivered, placed, cured, and protected in compliance with the recommendations of ACI 305R and the additional requirements specified herein.

   a. The temperature of concrete being placed shall not exceed 90°F and every effort shall be made to maintain a uniform concrete mix temperature below this level. The temperature of the concrete shall be such that it will cause no difficulties from loss of slump, flash set, or cold joints.

   b. All necessary precautions shall be taken to promptly deliver, to promptly place the concrete upon its arrival at the job, and to provide vibration immediately after placement.

   c. The Engineer may direct the Contractor to immediately cover plastic concrete with sheet material.

3. Discuss with the Engineer a work plan describing the methods and procedures proposed to use for concrete placement and curing during hot weather periods. Hot weather concreting shall not begin until the work plan is acceptable to the Engineer.

3.6 REMOVAL OF FORMS

A. Except as otherwise specifically authorized by the Engineer, forms shall not be removed before the concrete has attained a strength of at least 30 percent of its specified design strength, nor before reaching the following number of day degrees of curing (whichever is the longer):

Table 4

Forms For	**Degree Days**
Beams and Slabs	500
Walls and Vertical Surfaces	100

B. Shores shall not be removed until the concrete has attained at least 60 percent of its specified design strength and also sufficient strength to support safely its weight and the construction live loads upon it.

3.7 FIELD TESTS

A. Sets of field control cylinder specimens will be taken by the Engineer (or inspector) during the progress of the work, in compliance with ASTM C31. The number of sets of concrete test cylinders taken of each class of concrete placed each day shall not be less than once a day, nor less than once for each 150 cubic yards of concrete nor less than once for each 5,000 square feet of surface area for slabs or walls.

1. A "set" of test cylinders consists of four cylinders: one to be broken at 7 days and two to be broken and their strengths averaged at 28 days. The fourth may be used for a special break at 3 days or to verify strength after 28 days if 28 day breaks are low.

2. When the average 28-day compressive strength of the cylinders in any set falls below the required compressive strength or below proportional minimum 7-day strengths (where proper relation between 7- and 28-day strengths have been established by tests), proportions, water content, or temperature conditions shall be changed to achieve the required strengths.

B. Cooperate in the making of tests by allowing free access to the work for the selection of samples, providing an insulated closed curing box for specimens, affording protection to the specimens against injury or loss through the operations, and furnish material and labor required for the purpose of taking concrete cylinder samples. All shipping of specimens will be paid for by the Contractor. Curing boxes shall be acceptable to the Engineer

C. Slump tests will be made in the field immediately prior to placing the concrete. Such tests shall be made in accordance with ASTM C143. If the slump is greater than the specified range, the concrete shall be rejected.

D. Air Content: Test for air content shall be made on a fresh concrete sample. Air content for concrete made of ordinary aggregates having low absorption shall be made in compliance with either the pressure method complying with ASTM C231 or by the volumetric method

complying with ASTM C173. If lightweight aggregates or aggregates with high absorptions are used, the latter test method shall be used.

E. All passing construction tests requested by the Engineer will be paid for by the testing allowance. Should construction testing reveal that the item tested does not meet the requirements of the Construction Documents, retesting shall be required until the item does meet the requirements. All failing tests shall be at the Contractors expense and shall not be paid for by the testing allowance. The Contractor may obtain any additional tests which he may require for quality control, using his testing laboratory, at his expense. The testing allowance shall not be used for testing desired by the Contractor.

3.8 FIELD CONTROL

A. The Engineer may have cores taken from any questionable area in the concrete work such as construction joints and other locations as required for determination of concrete quality. The results of tests on such cores shall be the basis for acceptance, rejection, or determining the continuation of concrete work.

B. Cooperate in obtaining cores by allowing free access to the work and permitting the use of ladders, scaffolding, and such incidental equipment as may be required. Repair all core holes. The work of cutting and testing the cores will be at the expense of the Owner.

3.9 FAILURE TO MEET REQUIREMENTS

A. Should the strengths shown by the test specimens made and tested in compliance with the previous provisions fall below the values given in Table 1, the Engineer shall have the right to require changes in proportions outlined to apply to the remainder of the work. Furthermore, the Engineer shall have the right to require additional curing on those portions of the structure represented by the test specimens which failed. The cost of such additional curing shall be at the Contractor's expense. In the event that such additional curing does not give the strength required, as evidenced by core and/or load tests, the Engineer shall have the right to require strengthening or replacement of those portions of the structure which fail to develop the required strength. The cost of all such core borings and/or load tests and any strengthening or concrete replacement required because the strengths of test specimens are below that specified shall be entirely at the expense of the Contractor. In such cases of failure to meet strength requirements, the Contractor and Engineer shall confer to determine what adjustment, if any, can be made in compliance with Sections titled "Strength" and "Failure to Meet Strength Requirements" of ASTM C94. The "purchaser" referred to in ASTM C94 is the Contractor in this Section.

B. When the tests on control specimens of concrete fall below the required strength, the Engineer will permit check tests for strengths to be made by means of typical cores drilled from the structure in compliance with ASTM C42 and C39. In case of failure of the cores, the Engineer may require, at the Contractor's expense and in addition to other recourses, load tests on any one of the slabs, beams, piles, caps, and columns in which such concrete was used. The test need not be made until the concrete has aged 60 day

C. Should the strength of test cylinders fall below 60 percent of the required minimum 28-day strength, the concrete shall be rejected and shall be removed and replaced.

3.10 PATCHING AND REPAIRS

A. Immediately after the forms have been stripped and before the concrete has changed color, fins and other projections shall be removed; recesses left by the removal of form ties shall be filled, and surface defects which do not impair structural strength shall be repaired. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete, to the approval of the Engineer.

B. Immediately after removal of forms, remove plugs and break off metal ties as required by Section 03100. Holes are then to be promptly filled upon stripping as follows: Moisten the hole with water, followed by an o/16 inch brush coat of neat cement slurry mixed to the consistency of a heavy paste. Immediately plug the hole with a 1 to 1.5 mixture of cement and concrete sand mixed slightly damp to the touch (just short of "balling"). Hammer the grout into the hole until dense, and an excess of paste appears on the surface in the form of a spiderweb. Trowel smooth with heavy pressure. Avoid burnishing.

C. Surface defects that do not impair the structural integrity shall be repaired as approved by the Engineer. Defective concrete and honeycombed areas, as determined by the Engineer, shall be replaced or repaired using methods specified in Section 03740.

D. When patching defects in exposed surfaces, the same source of cement and sand as used in the parent concrete shall be employed. Adjust color if necessary, by the addition of proper amounts of white cement. Rub lightly with a fine Carborundum stone at an age of 1 to 5 days if necessary, to bring the surface down with the parent concrete. Exercise care to avoid damaging or staining the virgin skin of the surrounding parent concrete. Wash thoroughly to remove all rubbed matter.

3.11 SCHEDULE

A. The following (Table 5) are the general applications for the various concrete classes and design strengths:

Table 5

Class	Design Strength (psi)	Description
A	2,500	Concrete fill and duct encasement
D	4,000	Walls, slabs, on grade, suspended slab and beam systems, columns, grade beams, sidewalks, and all other structural concrete

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this work item, but it shall be included in the unit price bid for pipeline, as noted in the Proposal.

END OF SECTION

SECTION 03600

GROUT

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, tools, superintendence, and incidentals required and install grout complete as shown on the Drawings and as specified herein.

1.2 RELATED WORK

A. Cast in Place Concrete is included in Section 03300.

B. Modifications and Repair to Concrete are included in Section 03740.

1.3 SUBMITTALS

A. Submit to the Engineer, in accordance with Section 01300, shop drawings and product data showing materials of construction and details of installation for:

1. Commercially manufactured nonshrink cementitious grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards, and Material Safety Data Sheet.

2. Commercially manufactured nonshrink epoxy grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards, and Material Safety Data Sheet.

3. Cement grout. The submittal shall include the type and brand of the cement, the gradation of the fine aggregate, product data on any proposed admixtures, and the proposed mix of the grout.

4. Concrete grout. The submittal shall include data as required for concrete as delineated in Section 03300. This includes the mix design, constituent quantities per cubic yard, and the water/cement ratio.

B. Laboratory Test Reports

1. Submit laboratory test data as required under Section 03300 for concrete to be used as concrete grout.

C. Certifications

1. Manufacturers of commercially manufactured grout products shall submit certification of their qualifications for the supply of the specified grout products.

1.4 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C531 Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacings

2. ASTM C827 Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures

3. ASTM C1107 Standard Specification for Packaged Dry, Hydraulic Cement Grout (Nonshrink)

4. ASTM D695 Standard Test Method for Compressive Properties of Rigid Plastics

B. U.S. Army Corps of Engineers Standard (CRD)

1. CRD C 621 Corps of Engineers Specification for Nonshrink Grout

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.5 QUALITY ASSURANCE

A. Qualifications

1. Manufacturers of commercially manufactured grout products shall have a minimum of 10 years of experience in the production and use of the type of grout proposed for the work.

B. Services of Manufacturer's Representative

1. A qualified field technician of the nonshrink grout manufacturer, specifically trained in the installation of the products, shall be available for consultation and assistance during the installation of each type of nonshrink grout. Services shall also be provided, as required, to correct any installation problems at no additional cost to the Owner.

C. Field Testing

1. The field testing of concrete grout will be as specified for concrete in Section 03300.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the jobsite in original, unopened packages, clearly labeled with the manufacturer's name, product identification, batch numbers, and printed instructions.

B. Store materials in full compliance with the manufacturer's recommendations. Total storage time from date of manufacture to the date of installation shall be limited to 6 months or the manufacturer's recommended storage time, whichever is less.

C. Material that becomes damp or otherwise unacceptable shall be immediately removed from the site and replaced with acceptable material at no additional expense to the Owner.

D. Nonshrink cement-based grouts shall be delivered as preblended, prepackaged mixes requiring only the addition of water.

E. Nonshrink epoxy grouts shall be delivered as premeasured, prepackaged, three-component systems requiring only blending as directed by the manufacturer.

1.7 DEFINITIONS

A. Nonshrink Grout: A commercially manufactured product that does not shrink in either the plastic or hardened state, is dimensionally stable in the hardened state and bonds to a clean base plate.

PART 2 PRODUCTS

2.1 GENERAL

A. The use of a manufacturer's name and product or catalog number is to establish the standard of quality desired.

B. Like materials shall be the products of one manufacturer or supplier in order to provide standardization of appearance.

2.2 MATERIALS

A. Nonshrink Cementitious Grout

1. Nonshrink cementitious grouts shall meet or exceed the requirements of ASTM C1107 Grades B or C and CRD C 621. Grouts shall be portland cement-based, contain a pre proportioned blend of selected aggregates and shrinkage compensating agents, and shall require only the addition of water. Nonshrink cementitious grouts shall not contain expansive cement or metallic particles. The grouts shall exhibit no shrinkage when tested in conformity with ASTM C827.

a. General-purpose nonshrink cementitious grout shall conform to the standards stated above and shall be SikaGrout 212 by Sika Corp.; Set Grout by Master Builders, Inc.; Gilco Construction Grout by Gifford Hill & Co.; Euco NS by The Euclid Chemical Co.; NBEC Grout by U.S. Grout Corp.; or equal.

b. Flowable (precision) nonshrink cementitious grout shall conform to the standards stated above and shall be Masterflow 928 by Master Builders, Inc.; Hi Flow Grout by the Euclid Chemical Co.; SikaGrout 212 by Sika Corp.; Supreme Grout by Gifford Hill & Co.; Five Star Grout by U.S. Grout Corp.; or equal.

B. Nonshrink Epoxy Grout

1. Nonshrink epoxy-based grout shall be a pre proportioned, three-component, 100 percent solids system consisting of epoxy resin, hardener, and blended aggregate. It shall have a compressive strength of 14,000 psi in 7 days when tested in conformity with ASTM D695 and have a maximum thermal expansion of 30 by 10 6 when tested in conformity with ASTM C531. The grout shall be Ceilcote 648 CP by Master Builders, Inc.; Five Star Epoxy Grout by U.S. Grout Corp.; Sikadur 42 Grout Pak by Sika Corp.; High Strength Epoxy Grout by the Euclid Chemical Co.; or equal.

C. Cement Grout

1. Cement grouts shall be a mixture of one part portland cement conforming to ASTM C150 Types I, II, III, or IV and 1 to 2 parts sand conforming to ASTM C33 with sufficient water to place the grout. The water content shall be sufficient to impart workability to the grout but not to the degree that it will allow the grout to flow. Compressive strength shall be in accordance with ASTM C150.

D. Concrete Grout

1. Concrete grout shall conform to the requirements of Section 03300, except as specified herein. It shall be proportioned with cement, coarse and fine aggregates, water, water reducer, and air-entraining agent to produce a mix having a minimum compression strength of 2,500 psi at 28 days. The coarse aggregate size shall be d inch maximum. The slump should not exceed 5 inches and should be as low as practical yet still retain sufficient workability.

E. Water

1. Potable water, free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other deleterious substances.

PART 3 EXECUTION

3.1 PREPARATION

A. Grout shall be placed over cured concrete which has attained its full specified design strength unless otherwise approved by the Engineer.

B. Concrete surfaces to receive grout shall be clean and sound; free of ice, frost, dirt, grease, oil, curing compounds, laitance, and paints, and free of all loose material or foreign matter which may affect the bond or performance of the grout.

C. Roughen concrete surfaces by chipping, sandblasting, or other mechanical means to ensure the bond of the grout to the concrete. Remove loose or broken concrete. Irregular voids or projecting coarse aggregate need not be removed if they are sound, free of laitance, and firmly embedded into the parent concrete.

1. Air compressors used to clean surfaces in contact with grout shall be the oilless type or equipped with an oil trap in the airline to prevent oil from being blown onto the surface.

D. Remove all loose rust, oil, or other deleterious substances from metal embedments or the bottom of baseplates prior to the installation of the grout.

E. Concrete surfaces shall be washed clean and then kept moist for at least 24 hours prior to the placement of cementitious or cement grout. Saturation may be achieved by covering the concrete with saturated burlap bags, the use of a soaker hose, flooding the surface, or another method acceptable to the Engineer. Upon completion of the 24-hour period, visible water shall be removed from the surface prior to grouting. The use of an adhesive bonding agent in lieu of surface saturation shall only be used when approved by the Engineer for each specific location of grout installation.

F. Epoxy-based grouts do not require the saturation of the concrete substrate. Surfaces in contact with epoxy grout shall be completely dry before grouting.

G. Construct grout forms or other leakproof containment as required. Forms shall be lined or coated with release agents recommended by the grout manufacturer. Forms shall be of adequate strength, securely anchored in place, and shored to resist the forces imposed by the grout and its placement.

1. Forms for epoxy grout shall be designed to allow the formation of a hydraulic head and shall have chamfer strips built into forms.

H. Level and align the structural or equipment bearing plates in accordance with the structural requirements and the recommendations of the equipment manufacturer.

I. Equipment shall be supported during alignment and installation of grout by shims, wedges, blocks, or other approved means. The shims, wedges, and blocking devices shall be prevented from bonding to the grout by appropriate bond-breaking coatings and removed after grouting unless otherwise approved by the Engineer.

3.2 INSTALLATION

A. Mix, apply, and cure products in strict compliance with the manufacturer's recommendations and this Section.

B. Have sufficient manpower and equipment available for rapid and continuous mixing and placing. Keep all necessary tools and materials ready and close at hand.

C. Maintain temperatures of the foundation plate, supporting concrete, and grout between 40°F and 90°F during grouting and until grout compressive strength reaches 1,000 psi or

as recommended by the grout manufacturer, whichever is longer. Take precautions to minimize differential heating or cooling of baseplates and grout during the curing period.

D. Take special precautions for hot weather or cold weather grouting as recommended by the manufacturer when ambient temperatures and/or the temperature of the materials in contact with the grout are outside of the 60°F and 90°F range.

E. Install grout in a manner that will preserve the isolation between the elements on either side of the joint where grout is placed in the vicinity of an expansion or control joint.

F. Reflect all existing underlying expansion, control, and construction joints through the grout.

3.3 CEMENT GROUTS AND NONSHRINK CEMENTITIOUS GROUTS

A. Mix in accordance with the manufacturer's recommendations. Do not add cement, sand, pea gravel, or admixtures without prior approval by the Engineer.

B. Avoid mixing by hand. Mixing in a mortar mixer (with moving blades) is recommended. Pre-wet the mixer and empty excess water. Add a premeasured amount of water for mixing, followed by the grout. Begin with the minimum amount of water recommended by the manufacturer and then add the minimum additional water required to obtain workability. Do not exceed the manufacturer's maximum recommended water content.

C. Placements greater than 3 inches in depth shall include the addition of clean, washed pea gravel to the grout mix when approved by the manufacturer. Comply with the manufacturer's recommendations for the size and amount of aggregate to be added.

D. Place grout into the designated areas in a manner which will avoid segregation or entrapment of air. Do not vibrate grout to release air or to consolidate the material. Placement should proceed in a manner that will ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.

E. Place grout rapidly and continuously to avoid cold joints. Do not place cement grouts in layers. Do not add additional water to the mix (retemper) after initial stiffening.

F. Just before the grout reaches its final set, cut back the grout to the substrate at a 45-degree angle from the lower edge of the bearing plate unless otherwise approved by the Engineer. Finish this surface with a wood float (brush) finish.

G. Begin curing immediately after form removal, cutback, and finishing. Keep grout moist and within its recommended placement temperature range for at least 24 hours after placement or longer if recommended by the manufacturer. Saturate the grout surface by use of wet burlap, soaker hoses, ponding, or other approved means. Provide sunshades as necessary. If drying winds inhibit the ability of a given curing method to keep grout moist, erect windbreaks until the wind is no longer a problem or curing is finished.

3.4 NONSHRINK EPOXY GROUTS

A. Mix in accordance with the procedures recommended by the manufacturer. Do not vary the ratio of components or add solvent to change the consistency of the grout mix. Do not overmix. Mix full batches only to maintain proper proportions of resin, hardener, and aggregate.

B. Monitor ambient weather conditions and contact the grout manufacturer for special placement procedures to be used for temperatures below 60 °F or above 90 °F.

C. Place grout into the designated areas in a manner which will avoid trapping air. Placement methods shall ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.

D. Minimize "shoulder" length (extension of grout horizontally beyond base plate). In no case shall the shoulder length of the grout be greater than the grout thickness.

E. Finish grout by puddling to cover all aggregate and provide a smooth finish. Break bubbles and smooth the top surface of the grout in conformity with the manufacturer's recommendations.

F. Epoxy grouts are self-curing and do not require the application of water. Maintain the formed grout within its recommended placement temperature range for at least 24 hours after placing, or longer if recommended by the manufacturer.

3.5 CONCRETE GROUT

A. Screed underlying concrete to the grade shown on the Drawings. Provide the surface with a broomed finish, aligned to drain. Protect and keep the surface clean until the placement of concrete grout.

B. Remove the debris and clean the surface by sweeping and vacuuming of all dirt and other foreign materials. Wash the tank slab using a strong jet of water. Flushing of debris into tank drain lines will not be permitted.

C. Saturate the concrete surface for at least 24 hours prior to the placement of the concrete grout. Saturation may be maintained by ponding, by the use of soaker hoses, or by other methods acceptable to the Engineer. Remove excess water just prior to the placement of the concrete grout. Place a cement slurry immediately ahead of the concrete grout so that the slurry is moist when the grout is placed. Work the slurry over the surface with a broom until it is coated with approximately o/16- to c inch thick cement paste. (A bonding grout composed of 1 part portland cement, 1.5 parts fine sand, an approved bonding admixture, and water, mixed to achieve the consistency of thick paint, may be substituted for the cement slurry.)

D. Place concrete grout to the slopes shown on the Drawings.

E. Finish and cure the concrete grout as specified for cast in place concrete.

3.6 SCHEDULE

A. The following list indicates where the particular types of grout are to be used:

1. General-purpose nonshrink cementitious grout: Use at all locations where non-shrink grout is called for on the plans except for base plates greater in area than 3-feet wide by 3-feet long and except for the setting of anchor rods, anchor bolts or reinforcing steel in concrete.

2. Flowable nonshrink cementitious grout: Use under all base plates greater in area than 3-feet by 3-feet. Use at all locations indicated to receive flowable nonshrink grout by the Drawings. The Contractor, at his/her option and convenience, may also substitute flowable nonshrink grout for general-purpose nonshrink cementitious grout.

3. Nonshrink epoxy grout: Use for the setting of anchor rods, anchor bolts, and reinforcing steel in concrete and for all locations specifically indicated to receive epoxy grout.

4. Cement grout: Cement grout may be used for grouting of incidental base plates for structural and miscellaneous steel such as post base plates for platforms, base plates for beams, etc. It shall not be used when nonshrink grout is specifically called for on the Drawings or for grouting of primary structural steel members such as columns and girders.

5. Concrete grout: Use where specifically noted on the Drawings.

PART 4 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this work item, but it shall be included in the unit price bid for the pipeline, as noted in the Proposal.

END OF SECTION

SECTION 03740

MODIFICATIONS AND REPAIR TO CONCRETE

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, tools, superintendence, and incidentals required to cut, repair, or otherwise modify parts of in-place concrete structures or appurtenances as shown on the Drawings and as specified herein, as necessary to complete the Work under this Contract.

B. Repairs to concrete structures shall be made, when so directed by the Engineer, in accordance with methods specified herein.

1.2 RELATED WORK

A. Cast-In-Place Concrete is included in Section 03300.

B. Grout is included in Section 03600.

1.3 SUBMITTAL

A. Submit product data, including catalog cut, technical data, storage requirements, installation requirements, locations of use, and conformity to ASTM standards, in accordance with Section 01300, for any of the following products proposed to be used in the Work:

1. Repair Mortar
2. Epoxy Paste Adhesive
3. Crack Sealant
4. Bonding Agent

B. Submit shop drawings showing materials of construction and details of installation for any proposed repair methods.

1.4 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C881 Epoxy-Resin-Base Bonding Systems for Concrete
2. ASTM C1059 Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply, unless otherwise noted.

1.5 DESCRIPTION

A. No structure or concrete requiring modification or repair shall be shifted, cut, removed, or otherwise altered until authorization is given by the Engineer.

B. When removing materials or portions of structures and when making openings to in-place structures, all precautions shall be taken and all necessary barriers, shoring and bracing, and other protective devices shall be erected to prevent damage to the structure beyond the limits necessary for the modifications, to protect personnel, and to prevent damage by falling or flying debris. Unless otherwise permitted, shown, or specified, line drilling will be required in cutting in-place concrete.

PART 2 PRODUCTS

2.1 MATERIALS

A. Repair Mortar

1. Repair mortar shall be a two-component, polymer-modified, cementitious, fast-setting, trowel grade, structural repair mortar suitable for use on horizontal, vertical and overhead surfaces, and above or below grade on concrete and mortar.

2. Materials:

a. The mortar shall not contain chlorides, nitrates, added gypsum, added lime, or high alumina cements. The system shall be non-combustible, either before or after cure. The system shall not produce a vapor barrier.

b. Properties of Cured Material

(1) Color - Concrete Gray

(2) Bond Strength (pull-off method) - 100 percent concrete substrate failure

c. Repair mortar shall be SikaTop 122 or SikaTop 123 as manufactured by Sika Corporation, Lyndhurst, New Jersey, or equal.

B. Epoxy Paste Adhesive

1. Epoxy paste adhesive shall be a two-component, solvent-free, moisture insensitive epoxy resin material suitable for bolt grouting, as an adhesive for mating surfaces where the glue line is c inch or less, and to bond fresh, plastic concrete to clean, sound, hardened concrete.

2. The material shall conform to Type IV, Grade 3 adhesive in accordance with ASTM C881 90.

3. Epoxy paste adhesive shall be Sikadur 31, Hi-Mod Gel, as manufactured by Sika Corporation, Lyndhurst, New Jersey, or equal.

C. Crack Sealant

1. Crack sealant shall be a two-component, solvent-free, moisture-insensitive epoxy resin material suitable for crack grouting, by injection or gravity feed.

2. The epoxy material shall conform to Type IV, Grade 1 adhesive in accordance with ASTM C881-90.

3. Crack sealant shall be Sikadur 35, Hi-Mod LV, as manufactured by Sika Corp., Lyndhurst, New Jersey, or equal.

D. Bonding Agent

1. Epoxy bonding agent shall be a two-component, solvent-free, moisture insensitive, epoxy resin material conforming to ASTM C881-90, Type V. The bonding agent shall be Sikadur 32 Hi Mod by Sika Corporation of Lyndhurst, New Jersey; Concresive Liquid (LPL) by Master Builders of Cleveland, Ohio; or equal.

2. Latex bonding agent shall be a non-reemulsifiable acrylic polymer latex conforming to ASTM C1059, Type II.

E. Grout shall be in accordance with Section 03600, Grout.

PART 3 EXECUTION

3.1 GENERAL

A. Concrete removal and repairs shall be as directed by the Engineer and as specified herein.

B. In all cases where the joint between the modification and the in-place concrete will be exposed in the finished work, the limit of concrete removal shall be defined by a 1-inch deep saw cut on each exposed surface of the in-place concrete, unless otherwise noted or specified.

C. When the finished surface is not specified to be coated, the color of new concrete in the exposed surfaces shall match the color of the existing adjoining concrete as closely as possible.

D. Where indicated or specified, in-place concrete shall be removed to the depth indicated or required to expose sound concrete. The surface-exposed shall be roughened by chipping, sandblasting, scarifying, or other appropriate means before applying bonding agents or repair material as specified.

E. Where in-place reinforcing steel is to be incorporated in a repair, the reinforcing steel shall be cleaned by mechanical means to remove all loose material and products of corrosion before proceeding with the repair. If more than half of the diameter of the reinforcing steel is exposed, chip out behind the steel. The distance chipped behind the steel shall be a minimum of 2-inch. Reinforcing to be left in place shall not be damaged during the repair operation. It shall be cut, bent, or lapped to new reinforcing steel as directed and provided with 1-inch minimum cover all around.

F. All commercial products specified in this Section shall be stored, mixed, and applied in strict accordance with the manufacturer's recommendations.

G. In all cases where concrete is repaired in the vicinity of an expansion joint or control joint, the repairs shall be made so as to preserve the isolation between components on either side of the joint.

H. Where exposed embedded metal is required to be painted, prepare substrate as approved and paint with two coats zinc-rich primer before installation of adjacent new materials.

I. When drilling holes in in-place concrete for dowels or bolts, drilling shall stop if reinforcing steel is encountered. As approved by the Engineer, the hole shall be relocated to avoid rebar. Rebar shall not be cut without prior approval by the Engineer. Where possible, rebar locations shall be identified prior to drilling using "rebar locators" so that drilled hole locations may be adjusted to avoid rebar interferences.

J. Concrete specified to be left in place which is damaged by the Contractor shall be repaired by approved means to the satisfaction of the Engineer, at no cost to the Owner.

K. Where existing reinforcement is to remain at an exposed cut surface, coat the exposed surface with repair mortar.

L. Installation of grout materials shall be in accordance with Section 03600, Grout.

3.2 REPAIR METHODS

A. Surface Repair and Patching

1. Remove fractured, loose, deteriorated, and unsound concrete by saw cutting, bush hammering, chipping, or other appropriate means. Restore area to original limits or as shown using repair mortar in accordance with manufacturer’s recommendations.

B. Epoxy Injection

1. Cracks shall be repaired by epoxy injection where directed by the Engineer, as required for repair of in-place concrete structures.

2. Installation shall be by pressure injecting crack sealant through polyethylene valves sealed to the surface with epoxy paste adhesive for vertical cracks and by gravity feeding crack sealant into horizontal cracks.

C. All exposed efflorescence, laitance, surface encrustations, and foreign material shall be removed by abrasive blasting, grinding, acid etching and flushing, or other approved means, as required for epoxy injection or surface repairs.

3.3 CONCRETE CONNECTION METHODS

A. The following are specific concrete "connection methods" to be used where called for on the Drawings or as directed by the Engineer.

1. Method A. Bonding by using cement paste. After the concrete surface at connection has been roughened and cleaned, thoroughly moisten the surface with water. Brush on a c inch layer of neat cement slurry mixed to the consistency of a heavy paste. Immediately after application of cement paste, place new concrete or grout mixture, as specified.

2. Method B. Bonding by using a bonding agent. After the concrete surface has been roughened and cleaned, apply an approved bonding agent at the connection surface. The field preparation and application of the bonding agent shall comply strictly with the manufacturer's recommendations. Place new concrete or grout mixture as specified within time constraints recommended by the manufacturer to ensure bond.

3. Method C. Drilled dowels or bolts using epoxy paste. Drill a hole 3-inch larger than the diameter of the dowel. The hole shall be blown clear of loose particles and dust just prior to installing epoxy. The drilled hole shall first be filled with epoxy paste and the dowel/bolt buttered with paste, and then the dowel/bolt shall be inserted by tapping. Unless otherwise shown on the Drawings, deformed bars shall be drilled and set to a depth of 10 bar diameters and smooth bars shall be drilled and set to a depth of 15 bar diameters. If not noted or shown on the Drawings, the Contractor shall request details regarding the size and depth of anchor bolts from the Engineer.

4. Method D. Drilled dowels or bolts using cement grout. Drill a hole 2-inch larger than the diameter of the dowel. The hole shall be blown clear of loose particles and dust just prior to installing grout. The drilled hole shall first be filled with nonshrink cementitious grout and then the dowel inserted by turning and tapping to the specified embedment depth.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this work item, but it shall be included in the unit price bid for the pipeline, as noted in the Proposal.

END OF SECTION