

AGREEMENT AND SPECIFICATIONS

COORS CHANNEL DRAINAGE IMPROVEMENTS

BID NUMBER SW 09-23

VOLUME 1 OF 2

CONTRACT DOCUMENTS

JANUARY 2023



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**EL PASO WATER UTILITIES
PUBLIC SERVICE BOARD**

PSB BID NO. SW 09-23

INFORMAL NOTICE

Sealed proposals for construction of COORS CHANNEL DRAINAGE IMPROVEMENTS will be received by the City of El Paso Water Utilities - Public Service Board at the Board's principal office located at 1154 Hawkins Boulevard or by mail to 1154 Hawkins Boulevard, El Paso, Texas, 79925 until February 3, 2023, 1:50 p.m. local time. **After 2:00 p.m., bids will not be accepted.** Bid Opening will occur at 2:00 pm. and bids will be publicly opened and read aloud via the "GoToMeeting" format noted in Section 00020.

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

Mobilization and demobilization, removal of existing curb, concrete channel, concrete flume, headwall, rockwall and rock rip rap, chainlink fence, rubble on slopes, concrete pipes, saw cut pavement and replace pavement. Coordination with Texas Gas for the removal and replacement of their gas line. Furnish and Installation of the following concrete structures: Concrete box culvert, concrete pipes, concrete junction boxes, concrete manholes, manhole rings and covers, depth gauge, inlets, thrust blocks, desilting basins, two sack backfill, pond excavation, wrought iron gate, wrought iron fence, pavement and curb removal and replacement, landscape and irrigation removal and replacement, handicap ramps/tiles removal and replacement, rockwalls, rock rip rap, per plans and specifications complete in place. SWPPP measures, traffic control, project clean-up and various items relevant to said project. The subject project will provide for the construction, testing, project coordination, mobilization de-mobilization, permits and permit fees, traffic control and any appurtenant items required for satisfactory completion of the project to include warranties as required.

Contract documents may be examined and obtained by accessing the following El Paso Water's website:
www.epwater.org/business_center/purchasing_overview/bids

If you have trouble accessing the Contract Documents, please contact the Purchasing Department of the El Paso Water Utilities, Public Service Board, at (915) 594-5628. Physical (hard) copies of the Contract Documents will **NO** longer be made available.

A pre-bid meeting will be held on January 19, 2023, at 10:00a.m., local time (*see instructions at the end of Section 00020*).

Each Bid shall be submitted in accordance with the Instructions to Bidders and be accompanied by a Bid Security in the amount of five percent of the amount bid.

The Successful Bidder states he or she must furnish a 100 percent (100%) Performance Bond and a 100 percent (100%) Payment Bond, in accordance with the Instructions to Bidders and the General Conditions.

Bids shall be submitted at the time and place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque, sealed envelope marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), name and address of the Bidder and accompanied by the Bid security and other required documents. If the Bid is sent through the mail or other delivery system,

the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it. The Bid proposal package shall include one original, three copies and an electronic version of the bid, containing a copy of the full bid package submitted, saved on a USB drive.

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

Wages paid on this project shall be not less than the minimum prevailing wage rates listed in the Contract Documents, Section 00840, General Wage Requirements.

The El Paso Water Utilities (EPWU) adheres to the Cone of Silence policy which prohibits any communication regarding the bid between potential bidders (and subcontractors) and EPWU Board Members, Staff, and assigned Consulting Engineers. The provisions do not apply to oral communications with Purchasing Agent or Administrative Analyst, provided the communications is limited strictly to matters of process or procedure already contained in the solicitation document, oral communications at pre-bid conferences, or communications in writing (email preferred) submitted to the Administrative Analyst in response to inquiries regarding the bid. In addition to any other penalties provided by law, violation of the Cone of Silence by any bidder shall render that bidder's bid voidable. Any person having personal knowledge of a violation of these provisions shall report such violations to the EPWU General Counsel and/or the Purchasing Agent in writing.

EL PASO WATER
PUBLIC SERVICE BOARD

COORS CHANNEL DRAINAGE IMPROVEMENTS

Bid Number SW09-23

CITY OF EL PASO, TEXAS

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SECTION 00020

INVITATION TO BID

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Contract documents may be examined and obtained by accessing the following El Paso Water's website:

www.epwater.org/business_center/purchasing_overview/bids

If you have trouble accessing the Contract Documents, please contact the Purchasing Department of the El Paso Water Utilities, Public Service Board, at (915) 594-5628. Physical (hard) copies of the Contract Documents will **NO** longer be made available.

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

Bids shall be submitted at the time and place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque sealed envelope, marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted) and name and address of the Bidder and accompanied by the Bid security and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it. The Bid proposal package shall include one original, three copies and an electronic version of the bid, containing a copy of the full bid package submitted, saved on a USB drive.

By submission of the bid, Bidder states he or she fully understands the requirements of the Contract

Documents and agrees to comply with all requirements thereof.

Wages paid on this project shall be not less than the minimum prevailing wage rates listed in the Contract Documents.

The El Paso Water Utilities (EPWU) adheres to the Cone of Silence policy which prohibits any communication regarding the bid between potential bidders (and subcontractors) and EPWU Board Members, Staff, and assigned Consulting Engineers. The provisions do not apply to oral communications with Purchasing Agent or Administrative Analyst, provided the communications is limited strictly to matters of process or procedure already contained in the solicitation document, oral communications at pre-bid conferences, or communications in writing (email preferred) submitted to the Administrative Analyst in response to inquiries regarding the bid. In addition to any other penalties provided by law, violation of the Cone of Silence by any bidder shall render that bidder's bid voidable. Any person having personal knowledge of a violation of these provisions shall report such violations to the EPWU General Counsel and/or the Purchasing Agent in writing.

PRE-BID MEETING INSTRUCTIONS

The Pre-Bid meeting will be held via:

Microsoft Teams meeting

Join on your computer, mobile app or room device

[Click here to join the meeting](#)

Meeting ID: 215 430 511 604

Passcode: 8BHfkr

[Download Teams](#) | [Join on the web](#)

Or call in (audio only)

[+1 915-255-2297,,999872825#](#) United States, El Paso

Phone Conference ID: 999 872 825#

[Find a local number](#) | [Reset PIN](#)

Please join the meeting from your computer, tablet, or smartphone using the link below:

BID OPENING INSTRUCTIONS

Bid Openings are now to be broadcast through “GoToMeeting” format.

To View Bid Opening Click the Link Below:

09-23 Coors Channel Drainage Improvements

Feb 3, 2023, 2:00 – 2:30 PM (America/Denver)

Please join my meeting from your computer, tablet or smartphone.

<https://meet.goto.com/473980637>

You can also dial in using your phone.

Access Code: 473-980-637

United States (Toll Free): [1 866 899 4679](tel:18668994679)

United States: [+1 \(571\) 317-3116](tel:+15713173116)

Get the app now and be ready when your first meeting starts:

<https://meet.goto.com/install>



SECTION 00100

INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS (Revised 3/18/96, 9/9/96, 4/21/97, 7/13, 10/16/20)

Terms used in these Instructions to Bidders which are defined in the Standard General Conditions of the Construction Contract (EJCDC C-700, 2018 ed.) have the meanings assigned to them in the General Conditions. The term "Bidder" means the entity (such as a corporation, partnership, or sole proprietor) that submits a Bid directly to Owner, as distinct from a sub-bidder, who submits a Bid to a Bidder. The term "Successful Bidder" means the lowest, responsible, and responsive Bidder to whom Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award. The term "Bidding Documents" includes the Advertisement or Invitation to Bid, Instructions to Bidders, the Bid Form, the Bid Bond or other Bid Security, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids). Other terms are defined in this Section 00100.

Other terms used in the Bidding Documents and not defined elsewhere have the following meanings which are applicable to both the singular and plural thereof:

Texas Resident Bidder - A bidder whose principal place of business is in this state and includes a Contractor whose ultimate parent company or majority owner has its principal place of business in this state.

Nonresident Bidder - 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.

EPCWID #1 - El Paso County Water Improvement District #1 which authorizes dewatering into its facilities under certain terms and conditions and with whom the Owner has negotiated specific basic fees and procedures.

NADB – North American Development Bank

2. COPIES OF BIDDING DOCUMENTS (Revised 10/16/20)

2.1 Complete sets of the Bidding Documents stated in the Advertisement or Invitation to Bid may be obtained by accessing the following El Paso Water Utilities – Public Service Board (EPWU-PSB) website:

https://www.epwater.org/business_center/purchasing_overview/bids/construction

If you have trouble accessing the Contract Documents, please contact the Purchasing Department of the EPWU-PSB at (915) 594-5628. Physical (hard) copies of the Contract Documents will no longer be made available.

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

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

3. DETERMINING LOWEST RESPONSIBLE, RESPONSIVE BIDDER (Revised 9/2/92, 2/25/94, 1/10/95, 5/22/95, 3/18/96, 9/9/96, 4/17/97, 6/17/97, 9/26/97, 12/10/97, 6/3/99, /10/99, 12/17/99, 3/13/00, 8/19/04, 1/18/10, 1/12/11,7/18/11, 11/2/16, 1/11/17, 9/27/17, 11/9/17, 7/23/18, 1/17/19,

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

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

- (a) the quality, availability, and adaptability of the supplies, materials, equipment, or contractual services, to the particular use required;
- (b) the number and scope of conditions attached to the bid;
- (c) the ability, capacity, and skill of the entity to perform the contract or to provide the service required;
- (d) whether the bidder can perform the contract and provide the service promptly, or within the time required, without delay or interference;
- (e) the character, responsibility, integrity, reputation, and experience of the bidder;
- (f) the quality of performance of previous services, or contracts;
- (g) the previous and existing compliance by the bidder with laws relating to the contract or service;
- (h) any previous or existing noncompliance by the bidder with specifications, or requirements relating to time of submission of specified data such as samples, models, drawings, certificates, or other information;
- (i) the sufficiency of the financial resources and ability of the bidder to perform the contract or to provide the service;
- (j) the ability of the bidder to provide maintenance, repair parts, and service for the use of the subject of the contract during the required one-year warranty period.
- (k) the ability of the bidder to provide competent personnel for the job, as demonstrated by a listing of the names and the skills of experienced personnel who are currently employed by the bidder and who will be available for performing this work;
- (l) the experience of the bidder in performing work similar in type, size and complexity to this project, as demonstrated by a listing of projects, with verifiable references (names, addresses, phone numbers, etc.), successfully completed.

MINIMUM GENERAL REQUIREMENTS - ALL CONSTRUCTION PROJECTS

QUALIFYING PROJECTS

Bidders on Qualifying Projects must provide a Safety Record consisting of: (1) copies of the bidder's OSHA Forms 300, 300A, and 301 for the last three calendar years (January – December); (2) the Establishment Search Results from the Occupational Safety and Health Administration's website (<https://www.osha.gov/pls/imis/establishment.html>); and (3) a completed and signed Contractor Pre-Qualification Form (Section 00301). A Qualifying Project is a project with a value greater than \$100,000 or one that the Chief Technical Officer and Vice President of Operations and Technical Services determine poses a significant hazard.

EPWU will deem a bidder not responsible if the bidder (1) fails to provide a complete Safety Record; (2) received within the last three calendar years (January – December) six or more serious violations, one or more willful violations, or a single repeat of a serious violation; or (3) has experienced a workplace fatality in the last three calendar years (January – December), unless the bidder can demonstrate that the factors that caused the fatality were outside the bidder's control. A bidder, however, may fail the above criteria but still be deemed responsible if (1) no other appropriate bidder can be found; (2) the bidder is approved by the Chief Technical Officer and the Vice President of Operations and Technical Services; and (3) the bidder agrees to implement the special safety procedures (which might include a requirement to

work only with trained EPWU personnel present) that the Vice President of Operations and Technical Services establishes for the project.

PROJECTS WITH VALUE LESS THAN \$1,000,000:

The Bidder, or at least two *Key Personnel employed by the Bidder, must demonstrate **Successful Completion of a project similar in nature and scope to this project within the past five years and a similar project with a value of at least one-third the value bid for this project.

PROJECTS WITH VALUE BETWEEN \$1,000,000 AND \$3,000,000:

The Bidder, or at least three *Key Personnel employed by the Bidder, must demonstrate **Successful Completion of one project similar in nature and scope to this project within the past five years and one similar project with a value of at least 50% of the value bid for this project.

PROJECTS WITH VALUE BETWEEN \$3,000,000 AND \$6,000,000:

The Bidder must demonstrate a minimum of four years of experience in projects similar in nature and scope to this project. At least four *Key Personnel employed by the Bidder must have a minimum of five years of experience in similar construction projects. The Bidder must demonstrate **Successful Completion during the last five years of at least one project comparable in nature and scope to this project and one similar project with a dollar value of at least 60% of the value bid for this project. The Bidder must have an employee, to be dedicated to this project, who is experienced in scheduling, with demonstrated ability in employing scheduling techniques similar to those to be used for this project.

PROJECTS WITH VALUE BETWEEN \$6,000,000 AND \$15,000,000:

The Bidder must have a minimum of five years of experience in projects similar in nature and scope to this project. At least four of the Bidder's *Key Personnel must have a minimum of five years of experience in similar construction projects. The Bidder must demonstrate **Successful Completion of at least two projects similar in nature and scope to this project and one similar project with a dollar value of at least 75% of the value bid for this project, both within the past five years. The Bidder must demonstrate that it has an experienced employee who will serve as the scheduler; who is dedicated to this project; who has successfully employed scheduling techniques appropriate for this project. At least two *Key Personnel for this project must have completed at least two projects, similar in scope and nature to the project being bid, as an employee of the Company bidding this project.

* KEY PERSONNEL: Defined as individuals who will be directly assigned to this project which includes, but is not limited to, the Bidder's Project Manager, the Project Superintendent, the Scheduler, the Bidder's Construction Engineer, and Supervisory personnel such as the Foremen who will be directly assigned to this project as well as similar Subcontractor Key Persons. Resumes of Key Personnel must be submitted and accepted by the Owner in order for Bidder to receive the Award.

** SUCCESSFUL COMPLETION: Defined as completion of a project on time, which generally means no more than thirty days later than the original contract time allocated. It also means within budget, which generally means within 5% of the original contract price. If there is any project submitted by the Bidder as qualifying, but which does not meet these requirements, in order to be fully responsive, the Bidder is required to submit detailed information on that project demonstrating what caused the increases to cost or time. The name and telephone numbers of the Design Engineer and the Client are to be provided for evaluation as to whether the project may be considered "successful". For any project where liquidated damages were assessed, the Bidder will not be considered to have been on time.

BIDDER MUST MEET THE FOLLOWING MINIMUM PROJECT SPECIFIC CRITERIA IN ORDER TO QUALIFY FOR AWARD OF THE BID:

1. This project requires experience in civil work; including but not limited to demolition, dust mitigation, concrete work, grading, earthwork, shoring, landscaping and pavement restoration. The bidder shall demonstrate at least one (1) successful completed project experience with installation of culvert boxes and junction box structures at a minimum depth of 6ft. The bidder shall have experience installing at least 200 linear feet of concrete box culverts, construction of 3'x 5' concrete cast in place junction boxes, and a minimum of 10,000 CY of cut and fill in the past ten (10) years. Multiple projects can fulfill these requirements. A subcontractor with similar experience may be submitted and will be subject to owners' approval.
2. The bidder shall demonstrate one (1) successful completion of projects similar in scope within the past ten (10) years requiring heavy construction abutting TxDOT right-of-way. Bidder must demonstrate familiarity with TxDOT Traffic Control Plan requirements and submittal process. This includes but is not limited to, traffic devices, barriers, flagging personnel, etc. A subcontractor with similar experience may be submitted and will be subject to owners' approval.
3. This Project requires a critical stormwater facility to always remain operational during construction to allow for the passage of stormwater flows, while maintaining a safe work site for Bidder's employees and surrounding property. Bidder or approved subcontractor shall submit documentation demonstrating one (1) project where these two conditions, within the last 10 years were satisfied: 1) handling of stormwater flows during rain event during construction and 2) maintained safe working conditions for employees and property whether adjacent or downstream.
4. The Key personnel required for this project are a Project Manager, a full-time superintendent, full time foremen, and safety officer for the duration of the project. Resumes of key personnel must be provided for each individual.
5. **The basis of award is contingent on qualifications of key personnel and substitutions will be subject to owners' approval.**

EPWU CIP FUNDED PROJECTS
GOOD FAITH EFFORTS
TO OBTAIN MINORITY PARTICIPATION IN THIS PROJECT

The Utility's policy for its projects is to encourage the participation of Small Locally-Owned Businesses (SLBE), Minority Business Enterprises (MBE), and Women-Owned Business Enterprises (WBE). The utility's minimum goals for this project are:

25% FOR SMALL LOCALLY-OWNED BUSINESSES
10% FOR MINORITY-OWNED BUSINESSES
7% FOR WOMEN-OWNED BUSINESSES

The bidder must meet each of these three goals or demonstrate at the time of making the bid that he or she has made a good faith effort to meet each of the three goals in order to qualify for award of this project. The definition of a "Good Faith Effort" is described below. If the bidder fails to meet the goals, *and also fails to provide evidence that a good faith effort has been made to meet each goal*, the Owner reserves the right to request additional information from the bidder as support to Good Faith Effort documentation. The bidder may meet the requirement in one of three ways:

1. If goals in each category are fully achieved, bidder to provide all details of the actual participation in the Bid Proposal Form, Section 00300, where space has been provided for bidder's use.
2. If goals are partially achieved in each of the categories, bidder to provide the details of the actual participation in the Bid Proposal Form, and to provide evidence of the Good Faith Effort to meet each goal, as part of the bid proposal, at the time the bid is submitted.

3. If goals are not achieved, bidder to provide evidence of a demonstrated Good Faith Effort, as defined below, as part of the bid proposal, at the time the bid is submitted.

Although a single prime contractor, a subcontractor, or a supplier may be a Small Locally-Owned Business and also a Minority Business or a Woman-Owned Business, each firm will be counted in only one category (SLBE, MBE, or WBE) for purposes of meeting these goals.

DEFINITIONS (Revised 7/28/14, 10/16/20, 3/4/22)

GOOD FAITH EFFORT: Documentation that minority firms were given a genuine opportunity to participate. Evidence of a Good Faith Effort must include copies of a reasonable number of letters sent to bona fide firms in each of the categories described showing the full details of the work solicited to be performed by the minority firm; copies of certified mail/return receipts, facsimile or e-mail confirmations of receipt, copies of responses to the letters, and copies of correspondence with the Chamber of Commerce, Small Business Administration, Minority Business Development Agency, MBE and WBE associations, and/or newspaper or trade magazine notices. Facsimile and e-mail confirmations of receipt must show sufficient information to identify the company name to which the solicitation was sent. Sample solicitation letters are included in Section 00310. The Owner's Purchasing Department has a listing of qualified firms in each of these categories, which are available on the Owner's website, https://www.epwater.org/business_center/purchasing_overview/become_a_hub_vendor. Additional sources for locating Small Locally-Owned Business Enterprises, Minority-Owned Business Enterprises, and Women-Owned Business Enterprises: Texas Comptroller of Public Accounts <http://www.window.state.tx.us/procurement/prog/hub/hub-reporting/>, El Paso Hispanic Chamber of Commerce Minority Business Enterprise Center, <https://ephcc.org/blog/other-resources/procurement-opportunities/>.

SMALL LOCALLY-OWNED BUSINESS ENTERPRISE (SLBE): A business corporation, partnership, joint venture, sole proprietorship, or other legal entity formed for the purpose of making a profit, has been located within the County of El Paso for at least twelve months and is 51% or more owned by residents of El Paso County; furthermore, that business must employ fewer than 100 employees or have annual gross sales of less than \$7,000,000 and is not a subsidiary of a business which would not meet these guidelines.

MINORITY-OWNED BUSINESS ENTERPRISE (MBE): A business that is at least 51% owned and controlled by one or more citizens or lawful permanent residents of the United States who are either African American, Hispanic American, Asian American, Native American, or Service Disabled Veteran.

WOMEN-OWNED BUSINESS ENTERPRISE (WBE): A business that is at least 51% owned and controlled by one or more citizens or lawful permanent resident of the United States who are non-minority females.

SMALL BUSINESS ENTERPRISE (SBE): A small business concern, including any affiliate, that is independently owned and operated, not dominant in the field in which they operate, and that is qualified as a small business by the Small Business Administration.

SMALL BUSINESS IN RURAL AREAS (SBRA): A small business concern that is located and conducts its principal operations in a rural area (a non-metropolitan county) as delineated by the Small Business Administration.

DEFINITION OF "MINORITY BUSINESS ENTERPRISE (MBE)": A business which is:

- 1) certified as socially and economically disadvantaged by the Small Business Administration;
- 2) certified as a minority business enterprise by a U.S. State or Federal agency;

- 3) an independent business concern which is at least 51% owned and controlled by minority group members
 - A. A minority group member is an individual who is a citizen of the United States and one of:
 1. Black American
 2. Hispanic American
 3. Native American
 4. Asian Pacific American
 5. Other groups whose members have been found to be disadvantaged by the Small NEW Business Act or by the Secretary of Commerce under Exec. Order 11625, Sec. 5
 - B. The minority owner's interest must be real, substantial, and continuing. This would include such characteristics as risk of loss/share of profit commensurate with proportional ownership and receipt of the customary incidents of ownership such as salary and/or tangible benefits.
 - C. A minority owner must have control of business decisions such as authority to sign bids and contracts, decisions in price negotiations, incurring liabilities for the firm, making staffing decisions, policymaking, etc.
 - D. A qualified MBE firm must perform a useful business function according to custom and practice in the industry. Acting merely as a passive conduit of funds to some other firm where such action is unnecessary to accomplish the project does not constitute a useful business function to practice in the industry.

DEFINITION OF "WOMEN-OWNED BUSINESS ENTERPRISE (WBE)": An independent business concern which is at least 51% owned by a woman or women having the same interests and controls identified in the MBE definition section of this guidance. Only United States citizens will be deemed eligible to be WBE's.

DEFINITION OF FIVE AFFIRMATIVE ACTION STEPS:

- (1) Include qualified SBRA, MBE, WBE firms on solicitations for bids;
- (2) Assure that these firms are solicited whenever they are potential sources;
- (3) Divide total requirements, when economically feasible, into small tasks or quantities to permit maximum participation of such firms.
- (4) Establish delivery schedules, where the requirements of the work permit, which will encourage participation;
- (5) Use the services and assistance of the Small Business Administration and the Minority Business Development Agency, U.S. Department of Commerce, and other agencies as appropriate.

The form entitled "Minority Certification and Participation Summary", which is located at the end of Section 00300, Bid Form, should be completed and submitted by the Successful Bidder within ten days of Notice of Award.

It is mandatory that bidder submit with his or her bid a fully executed bid proposal (including the tabulation of proposed subcontractors and suppliers), an original bid bond, the certificate of insurance availability, and minority participation categories reflecting bidder has met minority participation goals OR evidence of bidder's good faith effort to do so. Failure to submit these items with the bid will result in a finding that the bid is non-responsive and the bid will be disqualified.

Evidence of bidder's good faith effort *or* evidence of *full* participation in each category is also required at

the time of bid. Owner reserves the right to request additional information from the bidder as support to good faith effort documentation.

Bidders shall furnish a financial statement or other evidence of the Bidder's financial sufficiency to perform the contract, a sworn statement of his or her experience record, and a listing of the equipment available to him or any other statement or documentation required by the Owner or Owner's consultant as to his or her capability to complete the Work. The Post-Bid/Pre-Award Checklist and the Qualifications Statement may require submittal of additional documentation. PLEASE REVIEW THE CHECKLISTS PROVIDED AT THE END OF THIS SECTION 00100.

To assist the Owner in evaluating the Bidder's responsibility, the lowest responsive Bidder is required to complete and submit the "Qualification and Financial Disclosure Statement" found at the end of Section 00100 within five calendar days of the consulting Engineer's request. The Engineer will submit this document and any additional information received as requested by the consulting Engineer, to the Owner as an attachment to his or her Recommendation of Award.

The Checklists found at the back of this Section are provided to assist the Bidder in fulfilling these requirements.

The Purchasing Department will evaluate the responsiveness of the Bidder's submittal. Purchasing Agent will forward the bids and results of the Purchasing Department's evaluation to the consulting Engineer for further evaluation of responsiveness, qualifications of the Bidder and other related conditions of this Bid. Engineer will forward the results of the evaluation to the Owner in writing. Owner will review Engineer's evaluation and present its recommendation to the Public Service Board for award.

Bidder is required to submit information regarding his or her status as a "RESIDENT" or "NONRESIDENT" as shown on the spaces provided in the proposal form.

A "Nonresident Bidder" will not be awarded the Contract if the state of his or her principal place of business assesses a penalty against out-of-state bidders unless his or her bid is lower than the lowest bid submitted by a responsible Texas resident bidder by the same amount that a Texas resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located.

The terms "Texas Resident Bidder" and "Nonresident Bidder" shall the meanings set forth for those terms in Chapter 2252 of the Texas Government Code.

4. EXAMINATION OF CONTRACT DOCUMENTS AND SITE (Revised 3/18/96, 4/21/97, 1/18/10, 1/12/11, 4/13, 10/16/20)

- 4.1 It is the responsibility of each Bidder, before submitting a Bid, to (a) examine the Contract Documents thoroughly, (b) visit the site to become familiar with local conditions that may affect cost, progress, performance or furnishing of the Work, and to determine the character of equipment and facilities needed preliminary to and during the prosecution of the Work, (c) consider federal, state and local laws and regulations that may affect cost progress, performance or furnishing of the Work, (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) notify Engineer of all conflicts, errors, or discrepancies in the Contract Documents.

When information as to soil conditions, test borings, and existing underground and overhead utility locations is shown on the Plans, Specifications, Drawings, or in preliminary reports prepared by the Engineer or under the Engineer's direction, such information was obtained for the Owner. The correctness of such information is not guaranteed by the Owner or by the Engineer and in no event shall be considered as a part of the contract, an inducement to bidding, or a factor for computation of bids. If such information is used by the Bidder in preparing a proposal, the Bidder must assume all risks that conditions encountered in performing the Work may be different from the approximation shown. Owner hereby grants reasonable access to Bidder and/or his employees or

contractors to examine the work site over which Owner has ownership or control.

4.2 Reference is made to the Supplementary General Conditions for identification of:

4.2.1 Those reports of explorations and tests of subsurface conditions at the site which have been utilized by Engineer in preparation of the Contract Documents.

4.2.2 Those drawings of physical conditions in or relating to existing surface and subsurface conditions (except Underground Facilities) which are at or contiguous to the site which have been utilized by Engineer in preparation of the Contract Documents.

Copies of such reports and drawings will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents. Technical data has been identified and established in the Supplementary General Conditions.

4.2.3 See SC 18.13. Those certain dewatering issues, procedures, payment terms, submittal requirements, and close out terms which are the responsibility of the Bidder and which may impact Bidder's pricing of this Bid.

4.3 Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities or others, and Owner does not assume responsibility for the accuracy or completeness thereof.

4.4 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Facilities and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraphs 5.03 and 5.04 of the General Conditions, and as may be amended in the Supplementary General Conditions.

4.5 Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

4.6 Each Bidder will be required to get permission from property owners to obtain access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes, clean up and restore the site to its former condition and to the satisfaction of the Engineer, upon completion of such explorations. Owner hereby grants reasonable access to Bidder and/or his employees or contractors to examine the work site over which Owner has ownership or control.

4.7 The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by Owner unless otherwise provided in the Contract Documents.

4.8 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the work required by the Contract Documents and such means, methods, techniques, sequences or procedures of construction as may be indicated in or required

by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey to Bidder the understanding of all terms and conditions for performance and furnishing of the Work.

5. INTERPRETATIONS AND ADDENDA (Revised 10/16/20, 3/4/22)

- 5.1 Pursuant to the Cone of Silence policy, all questions about the meaning or intent of the Contract Documents are to be directed to the Purchasing/Contracts Department (*see Purchasing Contacts on EPWU website: https://www.epwater.org/business_center/purchasing_overview/bids/construction*). Interpretations or clarifications considered necessary by EPWU staff, Engineer, or Consultant in response to such questions will be issued by Addenda and will be posted on the EPWU website. Bidder will be responsible to check the website regularly for any addenda or additional information for the project. Questions received less than ten (10) days prior to the date for opening of Bids will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications, either by EPWU staff, Engineer, or Consultant will be without legal effect.
- 5.2 Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner or Engineer, with Owner's approval.

6. BID SECURITY (Revised 10/12/92, 2/25/93, 1/10/95, 5/22/95, 1/18/10, 7/13, 1/17/19, 10/16/20, 3/4/22)

- 6.1 Each Bid must be accompanied by an original and notarized Bid security made payable to Owner in an amount of five percent of the Bidder's maximum Bid price and in the form of a certified or cashier's check or a Bid Bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions and Paragraph 6.01 of the Supplementary General Conditions.
- 6.2 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required contract security and insurance, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required contract security, insurance, and other required contract documents within ten days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh day after the Effective Date of the Agreement or the ninety-first day after the Bid opening, whereupon Bid security furnished by such Bidders will be returned. Bid security with Bids which are not competitive will be returned within seven days after the Bid opening.

The Bidder agrees by signing this Bid that he fully understands the requirements of the bid documents.

An incentive payment is available in the amount of \$100 per day, up to a maximum of \$300, for the Bidder's successful efforts in expediting delivery of fully compliant documents in a time period shorter than the 10-day maximum called out in the Notice of Award.

Should the Bidder fail to return the Agreements, acceptable Bonds, Insurance Certificates and insurance policies within ten days of receipt of the documents, the Utility may charge excess costs generated by such delay at the rate of \$100 for each day of delay. In the event more than two reviews of insurance submittals are required by the Utility's Risk Manager, the Successful Bidder will additionally reimburse the Utility for those costs at the rate of \$150 per hour which will apply to each fifteen-minute fraction thereof charged by the Risk Manager. These reimbursed costs will be deducted from the Bidders first Application for Payment or, in the event a Bid Bond is forfeited, such expenses may be reimbursed from the proceeds of the Bid Bond as part of the excess costs or re-procurement.

7. CONTRACT TIME

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

8. LIQUIDATED DAMAGES *(Revised 3/18/96, 10/16/20)*

Provisions for liquidated damages, if any, are set forth in the Agreement and in the Supplementary General Conditions SC-11.11.

9. SUBSTITUTE OR "OR EQUAL" ITEMS

The Contract, if awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or equal" item of material or equipment may be furnished or used by Contractor is acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the date of the Notice to Proceed. The procedure for submission of any such application by Contractor and consideration by Engineer is set forth in Paragraphs 7.05 and 7.06 of the General Conditions and may be supplemented in the General Requirements.

10. SUBCONTRACTORS, SUPPLIERS AND OTHERS *(Revised 10/12/92, 9/9/96, 12/10/97, 12/17/99, 7/13, 10/16/20)*

10.1 The Bidder is required to identify all Subcontractors and Suppliers; to provide the value of each proposed subcontract or purchase order; and to report their own and their subcontractor's business classification (Small Locally-Owned Business Enterprise, Minority Business Enterprise, Woman-Owned Business Enterprise, or Other). The Bidder shall submit with his or her Bid a list of all proposed Subcontractors and Suppliers. Space for this submittal is provided within the Bid Proposal, Section 00300. Use additional sheets as necessary. The Bidder is required to submit the MWBE Certification and Participation Summary Form with his or her Bid. If requested by Engineer or by Owner, Bidder shall provide an experience statement with pertinent information regarding similar projects and other evidence of qualifications for each such Subcontractor, Supplier, person, or organization. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, other person or organization, either Owner or Engineer may, before the Notice of Award is given, request the apparent Successful Bidder to submit an acceptable substitute, in which case the apparent Successful Bidder shall submit an acceptable substitute, that Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution and Owner may consider such price adjustment in evaluating Bids and making the Contract Award.

10.2 No Contractor shall be required to employ any Subcontractor, Supplier, other person or organization against whom Contractor has reasonable objection.

10.3 The Bidder shall submit a Final Report of total payments made to each subcontractor and supplier, as part of the required close out documents.

This submittal shall be made as a condition precedent to Final Payment.

11. BID FORM *(Revised 10/16/20)*

11.1 The Bid Form is included with the Bidding Documents.

- 11.2 All blanks on the Bid Form must be completed in ink. Bids which do not have all blanks filled in or completed may be rejected at the Owner's option by Owner or Purchasing Agent.
- 11.3 Bids by corporations must be executed in the corporate name by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal if any must be affixed and officer's signature must be attested by the secretary or an assistant secretary. The corporate address, state of incorporation, and state of principal place of business must be shown below the signature.
- 11.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title and authority to sign must appear under the signature and the official address of the partnership must be shown below the signature.
- 11.5 All names must be printed below the signature.
- 11.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).
- 11.7 The address and telephone number for communications with Bidder regarding the Bid must be shown.

12. SUBMISSION OF BIDS (Revised 10/16/20, 3/4/22)

Bids shall be submitted at the time and place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque, sealed envelope, marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), name and address of the Bidder and accompanied by the Bid security and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it. The Bid proposal packet shall include one original, three copies and an electronic version of the bid, containing a full copy of the full bid package submitted, saved on a USB drive.

Any questions or clarifications pertaining to the bid documents, requirements, specifications, or terms and conditions of the bid or contract documents should be addressed via the Addendum process described above in Section 5. Any extraneous documentation, letters, explanations, limitations, commentary, conditions, or the like submitted with a Bid will ***NOT*** be considered or incorporated as the basis of any award. Bidder agrees to be held solely to the terms and conditions of these Bid documents; General and Supplementary Conditions (as may be amended from time to time); and any other documents identified by EPWU.

13. MODIFICATION AND WITHDRAWAL OF BIDS

- 13.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.
- 13.2 If, within twenty-four 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 the mistake is clerical; that the mistake is so serious that enforcement of the Bid would be unconscionable; and that the mistake has occurred despite the exercise of ordinary care; that Bidder may withdraw its Bid and the Bid security will be returned. Thereafter, that Bidder will be disqualified from further bidding on the Work to be provided under the Contract Documents.

14. OPENING OF BIDS

Bids will be opened and (unless obviously nonresponsive) 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.

15. BIDS TO REMAIN SUBJECT TO ACCEPTANCE *(Revised 12/10/97, 1/18/10, 7/13, 10/16/20)*

All Bids will remain subject to acceptance for a minimum of 90 days after the day of the Bid opening, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to that date. In the case of State, Federal, or NADBank-funded projects, all Bids will remain subject to acceptance for 90 days or such reasonable time as the funding agency may require.

16. AWARD OF CONTRACT *(Revised 3/18/96, 12/10/97, 10/9/98, 1/18/10, 10/16/20)*

16.1 Owner reserves the right to reject any and all Bids, to waive any and all informalities not involving price, time or changes in the Work and the right to disregard all immaterial, nonconforming, nonresponsive, unbalanced, or conditional Bids. Also, Owner reserves the right to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to the Bidder, whether because the Bid is not responsive, or the Bidder is not responsible because the Bidder is deemed to be unqualified or of doubtful financial ability or fails to meet any other pertinent criteria established by Owner under Paragraph 3 hereof. Discrepancies in the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Any bids submitted in which there is a material failure to comply with the Bid requirements or specifications will be rejected and the contract will be awarded to the lowest responsible Bidder conforming to the specifications unless the Owner decides to reject all Bids.

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

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

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

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

16.6 If the contract is to be awarded, Owner will give the Successful Bidder a Notice of Award within 90 days after the day of the Bid opening. In the case of State or Federally-funded projects, Owner will give the Successful Bidder a Notice of Award within 90 days after the day of the Bid opening, or such reasonable time as the funding agency may require.

17. CONTRACT SECURITY *(Revised 9/17/93; 3/18/96, 7/13, 10/16/20, 3/4/22)*

Paragraph 6.01 of the General Conditions and the Supplementary General Conditions set forth Owner's requirements as to performance and payment Bonds. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by the required Performance and Payment Bonds and the

Certificate of Insurance and insurance policies. A Payment Bond must be provided for contracts more than \$50,000 in value. If the contract requires an expenditure of less than \$100,000, the Owner reserves the right to waive the requirement for a Performance Bond, provided that payment is not due to the Contractor until the Work is completed and accepted by the Owner. Any provision in any bond furnished in attempted compliance with House Bill No. 31 that expands or restricts the rights or liabilities provided under this Act shall be disregarded and the provisions of this Act shall be read into that Bond.

18. SIGNING OF AGREEMENT

When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within ten days after, Contractor shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner with the required Bonds and a copy of the Certificate of Insurance along with a copy or copies of the actual Insurance policy or policies. Owner shall deliver fully signed final contract to Contractor when all pre-construction contract requirements have been met.

19. PRE-BID CONFERENCE *(Revised 10/16/20)*

A pre-bid conference will be held at 10:00a.m., local time, on the 19th day of January, 2023 virtually using Microsoft Teams software. The link for the meeting will be posted on the EPWater website. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Owner will publish on the EPWater website such Addenda as Engineer considers necessary in response to questions arising at the conference.

20. SALES AND USE TAXES *(Revised 3/18/96, 4/13)*

Owner is exempt from Municipal and State Sales and Use Taxes on materials and equipment to be incorporated in the Work. Said taxes shall not be included in the Contract Price. Refer to Supplementary General Conditions SC-7.10.B for additional information.

QUALIFICATION AND FINANCIAL DISCLOSURE STATEMENT

BIDDER:

PROJECT NAME:

COORS CHANNEL DRAINAGE IMPROVEMENTS

1. ORGANIZATION

- 1.1 How many years has your organization been in business as a Contractor?
- 1.2 How many years has your organization been in business under its present business name?
- 1.2.1 Under what other or former names has your organization operated?
- 1.3 If your organization is a corporation, answer the following:
- 1.3.1 Date of incorporation: _____
- 1.3.2 State of incorporation: _____
- 1.3.3 President's name: _____
- 1.3.4 Vice-president's name(s): _____

- 1.3.5 Secretary's name: _____
- 1.3.6 Treasurer's name: _____
- 1.4 If your organization is a partnership, answer the following:
- 1.4.1 Date of organization: _____
- 1.4.2 Type of partnership (if applicable): _____
- 1.4.3 Name(s) of general partner(s): _____
- 1.5 If your organization is an individually owned sole proprietorship, answer the following:
- 1.5.1 Date of organization: _____
- 1.5.2 Name of owner: _____
- 1.6 If the form of your organization is other than those listed above, describe it and name the principals:

2. LICENSING

- 2.1 List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable. Indicate name, license number and expiration date for Master Electrician or other trade required under the Instructions to Bidders section of this Bid.
- 2.2 List jurisdictions in which your organization's partnership or trade name is filed.

3. EXPERIENCE (Revised 3/18/96, 9/9/96, 12/10/97, 10/9/98, 7/13)

- 3.1 List the categories of work that your organization normally performs with its own forces.
- 3.2 Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)
 - 3.2.1 Has your organization ever failed to complete any work awarded to it?
 - 3.2.2 Are there any judgments, claims, arbitration proceedings, or suits pending or outstanding against your organization or its officers?
 - 3.2.3 Has your organization filed any lawsuits or requested arbitration with regard to construction contracts within the last five years?
- 3.3 Within the last five years, has any officer or principal of your organization been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.)
- 3.4 On a separate sheet, list major construction projects your organization has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.
 - 3.4.1 State total worth of work in progress and under contract:
- 3.5 On a separate sheet, list the major projects your organization has completed in the past five years, giving the name of project, owner, architect, contract amount, date of completion and percentage of the cost of the work performed with your own forces.
 - 3.5.1 State annual amount of construction work performed each year during the past five years:
- 3.6 On a separate sheet, list the construction experience and present commitments of the key individuals of your organization. Submit resumes of Key Personnel (as defined in Section 00100, Instructions to Bidders). By execution of this bid, the Bidder certifies that its Resident Superintendent has the authority to act on behalf of the Contractor at all times. No substitution shall be made without the written approval of the Owner and the Engineer based upon acceptance of the qualifications of the proposed substitute.
- 3.7 On a separate sheet, provide evidence that the Bidder meets the minimum criteria called out in Section 00100, Instructions to Bidders. Provide similar evidence for Subcontractors, if required by Bid or by Engineer.
- 3.8 Provide the MWBE CERTIFICATION SUMMARY FORM found at the end of Section 00300.

4. REFERENCES

4.1 Trade References:

4.2 Bank References:

4.3 Surety:

Name and telephone number of Bonding Company: _____

Name, telephone, and address of Agent: _____

5. FINANCING

5.1 Financial Statement

5.1.1 Attach a financial statement, preferably audited, including your organization's latest balance sheet and income statement showing the following items:

- a. Cash Flow Statement
- b. Notes to Financial Statement
- c. Auditor Statement
- d. Comparison Statements, if available

5.1.2 Name and address of firm preparing attached financial statement, and date thereof.

5.1.3 Is the attached financial statement for the identical organization named on page one?

5.1.4 If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsubsidiary).

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

6. SIGNATURE

6.1 To be executed by a Principal of the firm authorized to certify the foregoing information:
_____, being duly sworn, deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

6.2 Dated at _____ this _____ day of _____, 20____.

Name of Organization: _____

By: _____

(Printed Name)

Title: _____

BID PROPOSAL CHECKLIST (packet should be submitted unbound and unstapled)

Section 00100/00300	1. <u>MANDATORY</u> : Signed Bid Form with all blanks filled in, including acknowledgement of any issued addenda and names of all Subcontractors and Suppliers.
Section 00100/00300	2. <u>MANDATORY</u> : Original and Notarized Bid Security or Bond
Section 00100/00300	3. <u>MANDATORY</u> : Certificate of Insurance Availability
Section 00100/00300	4. <u>MANDATORY</u> : Names and categories (SMLB, MBE OR WBE) of all Subcontractors and Suppliers with SMLB, MBE OR WBE certifications
Section 00100/00310	5. <u>MANDATORY</u> : Evidence of Good Faith Efforts if Minority Participation Goals are not met
Section 00100/00302	6. <u>MANDATORY</u> : Texas Ethics Commission requirement, "Certificate of Interested Parties", Form 1295 – Contractor must have registered/completed on-line application
Section 00100/00301	7. <u>MANDATORY</u> : Safety Record (Qualifying Projects only)
Section 00100/00303	8. <u>MANDATORY</u> : Statement of Residency
Section 00100/00304	9. <u>MANDATORY</u> : Statement of Non-Divestment from Israel
Section 00100/00300	10. <u>MANDATORY</u> : Electronic version of the bid, containing a copy of the full bid package submitted on a USB Drive.
Section 00100/00300	11. <u>MANDATORY</u> : Provide one original and three hard copies of the bid proposal submitted.
	12.

POST-BID/PRE-AWARD CHECKLIST

Section 00100/00800 00810/00850	1. <u>MANDATORY</u> : Evidence of Worker's Compensation Insurance Coverage: a Certificate of Insurance or Form DWC-81, DWC-82, DWC-83, DWC-84, DWC-85 or if self-insured, a coverage agreement filed with the Texas Worker's Compensation Commission's Division of Self Insurance Regulation.
Section 00100/00800 /00810	2. <u>MANDATORY</u> : If employees provided by leasing company, evidence of Texas State License and copy of their Worker's Compensation policy. If no leased employees will be used, provide a letter on Contractor's letterhead stating so.
Section 00100	3. <u>MANDATORY</u> : Financial Statements
Section 00100	5. <u>MANDATORY</u> : Qualification Statement and Qualifications of Key Personnel (included in Section 00100)
Section 00100/00300	6. <u>MANDATORY</u> : Updated Minority Certification and Participation Summary

SECTION 00300

BID FORM

PROJECT IDENTIFICATION: El Paso Water Utilities

COORS CHANNEL DRAINAGE IMPROVEMENTS

BID NO.: SW 09-23

Name and Address of OWNER:

El Paso Water Utilities

Public Service Board

1154 Hawkins Boulevard

P. O. Box 511

El Paso, Texas 79961

Name and Address of BIDDER:

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
2. BIDDER accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for ninety days after the day of Bid opening. In the case of State, Federal, or NADBank-funded projects, all Bids will remain subject to acceptance for 90 days or such reasonable time as the funding agency may require. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within ten days after the date of OWNER's Notice of Award.
3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:
 - A. BIDDER has examined copies of all the Bidding Documents and of the following Addenda **(receipt of all which is hereby acknowledged)**:

Date

Number

- B. BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the Work.
 - C. BIDDER has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions as provided in Paragraph 5.03 of the General Conditions, and accepts the determination set forth in Paragraph SC-5.03 of the Supplementary Conditions of the extent of the technical data contained in such reports and drawings.
 - D. BIDDER has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests and studies (in addition to or to supplement those referred to in "C." above) which pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work as BIDDER considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 5.03 of the General Conditions.
 - E. BIDDER has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities.
 - F. BIDDER has correlated the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Contract Documents.
 - G. BIDDER has given ENGINEER written notice of all conflicts, errors, or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER.
 - H. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.
 - I. All prices quotes by the bidder shall be entirely in United States Currency (U.S. Dollars).
4. Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

***** HIGH IMPORTANCE *****

**TEXAS ETHICS COMMISSION
REQUIREMENT**

*****IN THE EVENT YOU RECEIVE AN AWARD OF THIS CONTRACT*****

Reference: FORM 1295 (revised 12/22/17) "Certificate of Interested Parties"

**A business entity must file Form 1295 electronically with the Texas Ethics Commission using the Commission's online filing application, which can be found at:
https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm**

SEE INSTRUCTIONS: Form 1295 and Sample Form 1295 (Section 00302)

<u>Item No.</u>	<u>Estimated Quantity</u>	<u>UOM</u>	<u>Brief Description of Item</u>	<u>Unit Bid Price</u>	<u>Extended Amount (Qty. x Unit Price)</u>
1.	1	L.S.	Insurance, Bonds, and Move-In Related Expenses, Not to Exceed 5% of Bid Item Nos. 2 through 39. If Item No. 1 exceeds 5%, bid may be deemed non-responsive).	\$ _____	\$ _____
2.	1	L.S.	Video Taping of Project: Pre-Construction and Post-Construction.	\$ _____	\$ _____
3.	12	MO.	Storm Water Pollution Prevention Plan: Install and Management.	\$ _____	\$ _____
4.	12	MO.	Barricades and Traffic Control: Installation and Management	\$ _____	\$ _____
5.	1130	L.F.	Trench Safety System: Trench Box Method or Shoring, Sheeting, and Bracing Method	\$ _____	\$ _____
6.	1	L.S.	Pavement Restriping and Markings	\$ _____	\$ _____
7.	23,907	C.Y.	Earthwork Cut, Fill and Disposal of Excess.	\$ _____	\$ _____
8.	480	L.F.	Demolish and Dispose: Chain-link Fence.	\$ _____	\$ _____
9.	768	S.F.	Demolish and Dispose: Channel Rock Riprap.	\$ _____	\$ _____

<u>Item No.</u>	<u>Estimated Quantity</u>	<u>UOM</u>	<u>Brief Description of Item</u>	<u>Unit Bid Price</u>	<u>Extended Amount (Qty. x Unit Price)</u>
10.	10,704	S.F.	Demolish and Dispose: Existing Concrete Channel.	\$ _____	\$ _____
11.	3,500	S.F.	Remove and Dispose: Rubble Along Slope.	\$ _____	\$ _____
12.	1	LS	Remove and Replace: Landscape Materials (Tree, Shrubs, rock) and Irrigation Lines	\$ _____	\$ _____
13.	5	EA.	Remove and Replace: Landscape Boulders.	\$ _____	\$ _____
14.	103	L.F.	Saw Cut Concrete channel abutting existing retaining wall at billboard sign and headwalls	\$ _____	\$ _____
15.	502	L.F.	Saw Cut Concrete asphalt Pavement in parking lot & Frutas Street	\$ _____	\$ _____
16.	650	S.Y.	Demolish and Dispose: Pavement and Base Course.	\$ _____	\$ _____
17.	287	L.F.	Demolish and Dispose: Curb and Gutter.	\$ _____	\$ _____
18.	1,040	S.F.	Demolish and Dispose: Concrete Sidewalk.	\$ _____	\$ _____
19.	2	EACH	Demolish and Dispose: ADA Ramp and tile	\$ _____	\$ _____
20.	5	C.Y.	Demolish and Dispose: Retaining Rockwall.	\$ _____	\$ _____
21.	170	L.F.	Remove and Dispose: 24 inch Concrete Pipe.	\$ _____	\$ _____
22.	1	EACH	Adjust Butterfly Valve- Manhole Ring and Cover Complete in place	\$ _____	\$ _____
23.	5	EACH	Furnish and Install Manhole Ring and Cover on junction boxes Complete in Place.	\$ _____	\$ _____
24.	25	PERCH	Furnish and Install Retaining Rockwall, Complete in Place	\$ _____	\$ _____

<u>Item No.</u>	<u>Estimated Quantity</u>	<u>UOM</u>	<u>Brief Description of Item</u>	<u>Unit Bid Price</u>	<u>Extended Amount (Qty. x Unit Price)</u>
25.	650	S.Y.	Furnish and Install 3 in. HMAC/Base Course w/ 12" cement stabl backfill and Sub-Grade Prep.	\$ _____	\$ _____
26.	287	L.F.	Furnish and Install 6 in. Curb and Gutter, Complete in Place	\$ _____	\$ _____
27.	1,040	S.F.	Furnish and Install 4 in. thick Sidewalk	\$ _____	\$ _____
28.	2	EACH	Furnish and Install ADA Ramp with tile, Complete in Place	\$ _____	\$ _____
29.	1	EACH	Furnish and Install Concrete Junction Box #1, Complete in Place	\$ _____	\$ _____
30.	1	EACH	Furnish and Install Concrete Junction Box #2, Complete in Place	\$ _____	\$ _____
31.	1	EACH	Furnish and Install Concrete Junction Box #3, Complete in Place	\$ _____	\$ _____
32.	1	EACH	Furnish and Install Concrete Junction Box #4, Complete in Place	\$ _____	\$ _____
33.	150	L.F.	Furnish and Install Concrete Box culvert 4 ft. x 4 ft. , Complete in Place	\$ _____	\$ _____
34.	780	L.F.	Furnish and Install Concrete Box Culvert 5 ft. x 3 ft., Complete in Place	\$ _____	\$ _____
35.	390	L.F.	Furnish and Install Concrete Box Culvert 8 ft. x 4 ft., Complete in Place	\$ _____	\$ _____
36.	1	EACH	Furnish and Install Type-I Inlet 2-Grates, Complete in Place	\$ _____	\$ _____
37.	112	L.F.	Furnish and Install 24 in. Reinforced Concrete Pipe	\$ _____	\$ _____

<u>Item No.</u>	<u>Estimated Quantity</u>	<u>UOM</u>	<u>Brief Description of Item</u>	<u>Unit Bid Price</u>	<u>Extended Amount (Qty. x Unit Price)</u>
38.	2	EACH	Furnish and Install Concrete Collars for 24 " RCP	\$ _____	\$ _____
39.	75	PERCH	Furnish and Install 6 ft. Rockwall w/ wrought iron fence to include footing	\$ _____	\$ _____
40.	4	EACH	Furnish and Install New Pond Warning Signs	\$ _____	\$ _____
41.	1	EACH	Furnish and Install Depth Gauge, Complete in Place	\$ _____	\$ _____
42.	1	EACH	Furnish and Install Concrete Thrust Block, Complete in Place	\$ _____	\$ _____
43.	23	C.Y.	Furnish and Install 12 in. Rock Riprap Desilting Basin	\$ _____	\$ _____
44.	1606	S.Y.	Furnish and Install 3 inch Screening material on maintenance road	\$ _____	\$ _____
45.	338	S.Y.	Furnish and Install 8 inch Crushed aggregate base course for pond access ramp	\$ _____	\$ _____
46.	100	C.Y.	Subsurface Trash Removal, haul and disposal – NTE \$10,000	\$ _____	\$ _____

TOTAL BID PRICE (ITEMS 1 THROUGH 46) \$ _____

Quantities are not guaranteed.

If multiple awards are contemplated under a single bid document, an additional breakdown of bid amounts, subcontractors, and suppliers is required. It will also be necessary to adjust the MWBE Certification and Participation Summary Form accordingly.

In accordance with Section 151.311 of the Texas Tax Code (V.A.T.C.S.), regarding taxes on materials and services, and requiring a separated contract, the following is the breakdown of cost for materials and cost for labor for this bid:

MATERIALS TO BE INCORPORATED IN PROJECT NOT SUBJECT TO SALES TAX: \$ _____

LABOR TO BE INCORPORATED IN PROJECT NOT SUBJECT TO SALES TAX: \$ _____

**RENTAL EQUIPMENT
AND OTHER TAXABLE ITEMS:** \$ _____

**OTHER (I.E. BONDS, INSURANCE,
CAPITAL EQUIPMENT, ETC.)** \$ _____

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

5. BIDDER agrees that the Work will be Substantially completed within 300 Calendar Days from the date when the Contract Time commences to run as provided in Paragraph 2.03 of the General Conditions, and as revised in Supplementary Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions, and as revised in the Supplementary Conditions, within 330 calendar days. Final completion includes CONTRACTOR'S resolution of all punch list items and CONTRACTOR'S submission of required close-out documentation. Any failure of the CONTRACTOR to complete the project within the contract time will be considered a material breach of this contract.

BIDDER accepts the provisions of the Supplementary Conditions and the Agreement as to liquidated damages in the event of failure to complete the Work on time.

6. BIDDER MUST ANSWER THE FOLLOWING QUESTIONS: (Refer to INSTRUCTIONS TO BIDDERS for definitions.)

- A. Is the bidder that is making and submitting this bid a "RESIDENT BIDDER" or a "NONRESIDENT BIDDER"?

Answer: _____

- B. If the bidder is a "NONRESIDENT BIDDER", does the state in which the Nonresident Bidder's principal place of business is located have a law requiring a Nonresident Bidder of that state to bid a certain amount of percentage under the bid or a Resident Bidder of that state in order for the nonresident bidder of that state to be awarded a contract on his or her bid in such state?

Answer: _____

- C. If the answer to the question in Paragraph 6B above is "yes", then what amount or percentage must a Texas Resident Bidder bid under the bid of a Resident Bidder of that state in order to be awarded a contract on such bid in said state?

Answer: _____

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

- A. Required Bid Security in the form of _____

- B. A tabulation of all Subcontractors who will provide labor at the site of the work or render services to the CONTRACTOR in or about the construction of the work and Suppliers and

other persons and organizations is required to be identified in this Bid. Complete the following table, designating each as Small Locally-Owned Business Enterprise (SLBE), Minority Business Enterprise (MBE), Women-Owned Business Enterprise (WBE), or Other (not either SLBE, WBE MBE) is required. Only one category may be checked. Include the work item and value of work to be provided by the Prime Contractor, as well as its category.

Tabulation of Subcontractors and Suppliers

SUBCONTRACTOR/SUPPLIER	WORK ITEM	SUBCONTRACT OR PURCHASE ORDER VALUE (If value is unknown, please list <i>Pending</i>)	S L B E	M B E	W B E
Prime Contractor:					

C. Will the Contractor meet the Small Locally Owned Business Enterprise, Minority Business Enterprise and Women-Owned Business Enterprise goals as required by these contract documents and the funding agencies?

YES _____ NO _____

If "YES", include above each of the firms to be used, their business status as a SLBE, MBE, or WBE, the proposed dollar value and type of work to be performed.

If "NO", documentation supporting good faith effort is required.

8. Communications concerning this Bid shall be addressed to the following named individual, address, telephone number, facsimile number, and e-mail address:

Name: _____

Address: _____

Phone: _____ Fax: _____ E-mail: _____

9. The terms used in this Bid which are defined in the General Conditions of the Construction Contract included as part of the Contract Documents have the meanings assigned to them in the General Conditions.

SUBMITTED on _____, 20__.

If BIDDER is:

An Individual

By _____ (SEAL)
(Name of Bidder)

(Title) (Signature)

doing business as _____

Business Address: _____

Phone No.: _____

A Partnership

By _____ (SEAL)
(Firm Name)

(Signature - general partner)

Business Address: _____

Phone No.: _____

A Corporation (Revised 10/12/92, 1/7/93, 4/13, 3/1/22)

By _____
(Corporation Name)

(State of Incorporation and State of Principal Place of Business)

By _____
(Name of Person Authorized to Sign)

(Title) (Signature)

(Corporate Seal)

Attest _____
(Secretary)

Business Address: _____

Phone No.: _____

Federal Tax Identification Number: _____

When proposing as a Corporation, Bidder swears and affirms by signing this Bid that the proposing Corporation is currently in existence, is currently authorized to do business in the State of Texas (or State of incorporation) and that no franchise tax reports or payments are delinquent as of the date of this Bid Proposal. The Bidder will provide a Certificate of Account Status with the signed Contract Documents. See Section 00510, for the sample form which is to be obtained by the successful Contractor from the Texas (or other state) Comptroller of Public Accounts and submitted as part of the final, executed Contract Documents.

CERTIFICATION OF INSURANCE AVAILABILITY

Date _____

I, _____ (Name of Insurance Agent), certify that I have reviewed the insurance requirements listed in Article 5 of the Supplementary Conditions of the specifications for the Coors Channel Drainage Improvements (Name of Project), Bid No. SW 42-22, and further certify that _____ (Name of Bidder) has or can obtain the insurance coverage required by this Project so that a certificate of insurance and a copy(s) for the actual insurance policies can be submitted to the Owner within ten (10) days of the Notice of Award.

Signed _____

Title _____

Insurance Agency _____

Address _____

Telephone _____

**MINORITY CERTIFICATION
AND
PARTICIPATION SUMMARY**
(EPWU CIP FUNDED PROJECTS)

BID NUMBER: _____

BID TITLE: _____

I certify that the Small Locally-Owned Businesses (SLBE), Minority (MBE) and Women's Business Enterprises (WBE) participating in this project are qualified in accordance with the Minority requirements included in the above listed Bid Documents and that we will ensure all consultants, contractors, suppliers, and subcontractors will comply with the Minority guidelines. Definitions of each category are found in the 00100, Instructions to Bidders Section. Attached are:

Solicitation Documents: _____

Proposed Subcontracts for the below listed firms: _____

SLBE, MBE, or WBE FIRM NAME	ADDRESS	PHONE	CONTRACT AMOUNT	SLBE	MBE	WBE

The attached documents outline the Good Faith Effort taken in complying with the Minority Guidelines.

CONTRACTOR

SIGNATURE OF AUTHORIZED REPRESENTATIVE

DATE

PRINTED NAME OF AUTHORIZED REPRESENTATIVE

**MINORITY CERTIFICATION
AND
PARTICIPATION SUMMARY**
(TWDB FUNDED PROJECTS)

BID NUMBER: _____

BID TITLE: _____

I certify that the Minority (MBE) and Women's Business Enterprises (WBE), Small Business Enterprises (SBE), and Small Business in Rural Area (SBRA) participating in this project are qualified in accordance with the Minority requirements included in the above listed Bid Documents and that we will ensure all consultants, contractors, suppliers, and subcontractors will comply with the Minority guidelines. Definitions of each category are found in the 00100, Instructions to Bidders Section. Attached are:

Solicitation Documents: _____

Proposed Subcontracts for the below listed firms: _____

MBE, WBE, SBE or SBRA FIRM NAME	ADDRESS	PHONE	CONTRACT AMOUNT	MBE	WBE	SBE	SBRA

The attached documents outline the Good Faith effort taken in complying with the Minority Guidelines.

CONTRACTOR

SIGNATURE OF AUTHORIZED REPRESENTATIVE

DATE

PRINTED NAME OF AUTHORIZED REPRESENTATIVE

CONTRACTOR PRE-QUALIFICATION FORM

EPWater requires any contractor who will work on EPWater Qualifying Projects, as well as subcontractors performing 20% of the work on a Qualifying Project, to demonstrate their ability to work safely. A Qualifying Project is a project with a value greater than \$100,000 or one that the Chief Technical Officer and Vice President of Operations and Technical Services determine poses a significant hazard. This procedure allows EPWater to identify contractors that can perform site activities without compromising the safety or health of EPWater personnel.

Any contractor wishing to perform work on any Qualifying Project must complete this form and return with the bid package.

The information contained on this form will be evaluated and considered as a part of the overall selection process. Contractors who do not complete and submit this form will be considered non-responsive for any work they propose.

As part of this process, Contractors must certify that its employees have, or will have, appropriate training on the following subjects:

- Basic health and safety issues,
- the Contractor's health and safety programs, and
- the methods and techniques the Contractor will use on the project,
- Procedures for Contractor entrance into and exit from the area of work, and
- Informing EPWater about any unique hazards presented by the Contractor's work or found as a result of the Contractor's work.

Although EPWater will not ask for training documentation on each employee, EPWater requires that this documentation be available within twenty-four hours of request.

CONTRACTOR PRE-QUALIFICATION FORM

1.0 Company Name: _____
Address of Principal Place of Business: _____
Street: _____
City, State, Zip: _____
Telephone Number: _____
E-Mail: _____

2.0 Other Company Names Used: _____

3.0 Name(s) and Relationships of Parent Company, Affiliates, Subsidiaries, Partners:
Company: _____
Address: _____
City, State, Zip: _____
Relationship: _____
Company: _____
Address: _____
City, State, Zip: _____
Relationship: _____

4.0 Has the ownership in your company changed within the last three years? If so, please indicate who the previous owner was in the space below.
YES _____ NO _____

5.0 Please attach certificates showing the extent of coverage, exclusions, and deductibles for the following:

- General Business Liability Insurance Coverage
- Contractors Pollution Liability Insurance Coverage
- Professional Liability Insurance (limits and exclusions)
- Workers' Compensation Insurance Coverage

5.1 How long have you been covered by your current provider of Worker Compensation Insurance?

CONTRACTOR PRE-QUALIFICATION FORM

6.0 Please transfer the numbers and rates of injuries and illnesses from your firm's OSHA No. 300 Logs to the table below:

Injuries & Illnesses in Year:	2019		2020		2021	
Type of Injury Statistic	#	Rate	#	Rate	#	Rate
Lost Workday Cases						
Restricted Workday Cases						
Medical Treatment (not First Aid) Cases						
Total Illness Cases						
Total Recordable Cases						
Employee Hours Worked in Year:						

6.1 List any fatalities your company has had in the last three calendar years (January-December). Include location, cause, and corrective action.

7.0 Do you require that documented safety meetings be held for:

- a. Field Supervisor? Yes ___ No ___ Frequency _____
- b. Employees? Yes ___ No ___ Frequency _____
- c. New Hires? Yes ___ No ___ Frequency _____
- d. Subcontractors? Yes ___ No ___ Frequency _____

8.0 Will a corporate representative audit safety practices on this job?

YES _____ NO _____

8.1 Name _____ Title _____

8.2 How frequently will the representative visit the project? _____

8.3 Does the representative have the authority to take corrective action? Yes ___ No ___

8.4 To whom does the representative report?

Name _____ Title _____

CONTRACTOR PRE-QUALIFICATION FORM

9.0 Does the company have a health and safety plan? If yes, please give details.

10.0 Describe the type and extent of training Contractor employees will have.

10.1 What percentage of those employees will have this training? _____

11.0 Please give the name of the company's health and safety officer, if any.

12.0 Attach a list of any State or Federal Health and Safety citations received in the past three years.

13.0 Signature of Company Officer: _____

Title: _____

Date: _____

INSTRUCTIONS – FORM 1295

*****IN THE EVENT YOU RECEIVE AN AWARD OF THIS CONTRACT*****

Effective January 1, 2016, a governmental entity may not enter into a contract requiring Board approval, unless the business entity submits a Disclosure of Interested Parties (Form 1295) prior to the convening Board awarding the contract.

The following definitions apply:

1. “Interested Party” means a person:
 - a. Who has a controlling interest in a business entity with whom a governmental entity contracts, or;
 - b. Who actively participates in facilitating the contract or negotiating the terms of the contract, including a broker, intermediary, adviser, attorney, or representative of, or agent for, the business entity.
2. “Intermediary” means a person who actively participates in the facilitation of the contract or negotiating the contract, including a broker, adviser, attorney, or representative of, or agent for, the business who:
 - a. Receives compensation from the business entity for the person’s participation;
 - b. Communicates directly with the governmental entity or state agency on behalf of the business entity regarding the contact, and;
 - c. Is not an employee of the business entity.
3. “Business Entity” means any entity, recognized by law, through which business is conducted, including a sole proprietorship, partnership, or corporation. “Business entity includes a for-profit or non-profit entity. The term does not include a governmental entity or state agency.
4. “Contract” includes an amended, extended, or renewed contract.
5. “Controlling Interest” means:
 - a. An ownership interest or participating interest in a business entity by virtue of units, percentage, shares, stock, or otherwise, that exceeds ten (10) percent;
 - b. Membership on the board of directors or other governing body of a business entity of which the board or other governing body is composed of not more than ten (10) members, or;
 - c. Service as an officer of a business entity that has four (4) or fewer officers, or serve as one of the four (4) officers most highly compensated by a business entity that has more than four (4) officers.

A business entity must file Form 1295 electronically with the Texas Ethics Commission using the Commission’s online filing application, which can be found at:

https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm

The business entity must print a copy of the completed form, which will include a certification of filing containing a unique certification number. “Section 6 - Unsworn Declaration” of Form 1295 must be signed by an authorized agent of the business entity. The business entity must then submit the completed, signed Form 1295 to El Paso Water.

CERTIFICATE OF INTERESTED PARTIES

FORM 1295

Complete Nos. 1 - 4 and 6 if there are interested parties.
 Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

OFFICE USE ONLY

1 Name of business entity filing form, and the city, state and country of the business entity's place of business.

2 Name of governmental entity or state agency that is a party to the contract for which the form is being filed.

3 Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the services, goods, or other property to be provided under the contract.

4 Name of Interested Party	City, State, Country (place of business)	Nature of Interest (check applicable)	
		Controlling	Intermediary

5 Check only if there is NO Interested Party.

6 UNSWORN DECLARATION

My name is _____, and my date of birth is _____.

My address is _____, _____, _____, _____, _____.
(street) (city) (state) (zip code) (country)

I declare under penalty of perjury that the foregoing is true and correct.

Executed in _____ County, State of _____, on the _____ day of _____, 20____.
(month) (year)

 Signature of authorized agent of contracting business entity
 (Declarant)

ADD ADDITIONAL PAGES AS NECESSARY

STATEMENT OF RESIDENCY

The following information is required by El Paso Water – Public Service Board (“EPW”) in order to comply with the provisions of Texas Government Code §§ 2252.001 *et. seq.* Failure to provide the required information may constitute a basis for rejection of your bid. Bidders’ cooperation in this regard will avoid costly time delays in the award of bids by EPWU. Failure to provide all required information may result in the apparent low bidder being considered non-responsive and non-responsible, and the second low bidder being considered for award.

Definitions

Resident Bidder: a person whose principal place of business is in the State of Texas, including a contractor whose ultimate parent company or majority owner has its principal place of business in the State of Texas.

Nonresident Bidder: a person who is not a resident.

Principal Place of Business in Texas: a permanent business office located in Texas from which a bid is submitted and from which business activities are primarily conducted for the organization other than submitting bids to governmental agencies, where at least one employee works for the business entity.

Bidder’s Complete Company Name: _____

State the address of your principal place of business in the space provided below:

State the nature of the business conducted at your principal place of business in the space provided below:

State the number of employees you have at your principal place of business: _____

I swear and attest that the information provided above is true and correct as of the date _____ (“Bidder”) submitted its bid on Bid No. _____. I further attest that I am an authorized representative of Bidder or have been duly authorized to represent Bidder in this matter. I understand that the information provided is being relied on by EPWU in order for it to comply with state purchasing laws and will materially affect its decisions in this regard. Should the information provided be false or materially misleading, any contract entered into between EPWU and Bidder will be void and EPWU may pursue any legal claims it may have against Bidder.

[SIGNATURE ON NEXT PAGE]

By: _____

Name: _____

Title: _____

Company: _____

ACKNOWLEDGMENT

STATE OF _____ §

§

COUNTY OF _____ §

This instrument was acknowledged before me on the ____ day of _____, 20____, by _____, as _____ of _____, a _____.

Notary Public, State of _____

My Commission Expires:

The logo for ACME CONSTRUCTION features the company name in white, uppercase letters inside a blue oval. A yellow swoosh is positioned above the oval, extending from the left side towards the top right.

ACME CONSTRUCTION

**10518 Burr Oak Drive
San Antonio, Texas 78609**

512-557-7089
Fax 512-557-2097

January 5, 2008

CERTIFIED MAIL / RETURN RECEIPT REQUESTED

Amazing Results Landscape and Supply Company
111 Red Rock Terrace
Lignite, Texas 72533

Gentlemen:

We are actively seeking MWBE Contractors and suppliers for work to be done under Project Number 123456, Sewer System Improvements, City of Anywhere, Texas. The work will consist of utility worm, concrete, paving, fencing, landscaping, masonry, excavation and trucking, barricades, back-hoe work and supplies and materials.

Plans and specifications may be viewed or obtained at the project engineer's general offices, Bing, Campbell and Associates, 19510 Jackson Blvd., Muleshoe, Texas 76698.

All bids must be submitted to the above mentioned address by Noon, Friday, February 16, 2008.

Sincerely,

John Q. Doe, Project Director
Acme Construction



Amazing Results
Landscaping

January 12, 2008

Mr. John Q. Doe, Project Director
Acme Construction
10518 Burr Oak Drive
San Antonio, Texas 78609

RE: PROJECT NO. 123456, ANYWHERE TEXAS SEWER SYSTEM IMPROVEMENTS PROJECT

Dear Mr. Doe:

We wish to submit the following bid for the above mentioned project:

St. Augustine sod – 900 square yards at \$1.75 per square yard
(Includes installation, rolling, fertilizing, and days of watering) \$1,575.00

Hydro-Mulch – 15 acres at \$1,175 per acre \$17,625.00
(5-acre minimum pre trip; No water; No maintenance; areas that do not
germinate will be reseeded) Proper watering is the responsibility of
customer.

Hay Bales – We will furnish and install at a rate of \$15.00 per bale

We look forward to hearing from you concerning our bid. Thank you.

Sincerely,

Theodore T. "Red" Robbins
Manager

*** A Certified MBE FIRM ***

1111 Red Rock Terrace
Lignite, Texas 72533
(512) 489-5678 (800) 549-0000
(512) 489-5679 fax
www.amazingresults.com

The logo for ACME CONSTRUCTION features the company name in white, uppercase letters inside a blue oval. A yellow swoosh underline is positioned above the oval, extending from the left side of the page towards the right.

ACME CONSTRUCTION

**10518 Burr Oak Drive
San Antonio, Texas 78609**

512-557-7089
Fax 512-557-2097

January 5, 2008

CERTIFIED MAIL / RETURN RECEIPT REQUESTED

Rider Excavation Services
7856 Dry Gulch
Little Indian Mound, Texas 74561

Gentlemen:

We are actively seeking MWBE Contractors and suppliers for work to be done under Project Number 123456, Sewer System Improvements, City of Anywhere, Texas. The work will consist of utility worm, concrete, paving, fencing, landscaping, masonry, excavation and trucking, barricades, back-hoe work and supplies and materials.

Plans and specifications may be viewed or obtained at the project engineer's general offices, Bing, Campbell and Associates, 19510 Jackson Blvd., Muleshoe, Texas 76698.

All bids must be submitted to the above mentioned address by Noon, Friday, February 16, 2008.

Sincerely,

John Q. Doe, Project Director
Acme Construction



Rider Excavation Services

January 8, 2008

Mr. John Q. Doe, Project director
Acme Construction
10518 Burr Oak Drive
San Antonio, Texas 78609

RE: PROJECT NO. 123456
ANYWHERE TEXAS SEWER SYSTEM IMPROVEMENTS PROJECT

Dear Mr. Doe:

Thank you for your letter of January 5, 2008 requesting bids for the Anywhere, Texas Sewer System Improvements Project. We will not be submitting a bid because we are scheduled to begin work on another project that is projected to start on approximately the same date as ours.

We appreciate the opportunity to participate in your project. Please contact us again for any future projects.

Sincerely,

Easy Rider President
Rider Excavation Services

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ACME CONSTRUCTION

**10518 Burr Oak Drive
San Antonio, Texas 78609**

512-557-7089
Fax 512-557-2097

January 5, 2008

CERTIFIED MAIL / RETURN RECEIPT REQUESTED

Shadow Paving
P. O. Box 903
Pharr, Texas 72579

Gentlemen:

We are actively seeking MWBE Contractors and suppliers for work to be done under Project Number 123456, Sewer System Improvements, City of Anywhere, Texas. The work will consist of utility worm, concrete, paving, fencing, landscaping, masonry, excavation and trucking, barricades, back-hoe work and supplies and materials.

Plans and specifications may be viewed or obtained at the project engineer's general offices, Bing, Campbell and Associates, 19510 Jackson Blvd., Muleshoe, Texas 76698.

All bids must be submitted to the above mentioned address by Noon, Friday, February 16, 2008.

Sincerely,

John Q. Doe, Project Director
Acme Construction

SHADOW PAVING



January 8, 2008

Acme Construction
John Q. Doe, Project Director
10518 Burr Oak Dr.
San Antonio, TX 78609

Dear Mr.Doe:

Thank you for your letter of January 5, 2008 requesting a bid for the paving portion of the Anywhere, Texas Sewer System Improvements Project. Because of the distance of the project from our offices, we will not be interested in submitting a bid.

We appreciate your interest in our services. Please keep us in mind for future projects that may require expertise and services.

Sincerely,

Elmer A. Paver
Office Manager, Shadow Paving

The logo for ACME CONSTRUCTION features the company name in white, uppercase letters inside a blue oval. A yellow swoosh is positioned above the oval, extending from the left side towards the top right.

**10518 Burr Oak Drive
San Antonio, Texas 78609**

512-557-7089
Fax 512-557-2097

January 5, 2008

CERTIFIED MAIL / RETURN RECEIPT REQUESTED

Construction Trades Newsletter
100 Someplace Dr.
P. O. Box 500
Anywhere, Texas 08654

Attn: Ms. Glory Everett, Editor

Dear Ms. Everett:

Please publish the following in the "Public Notices" section of your weekly newsletter on the following dates: 1/11/08; 1/18/08; 1/25/08; and 2/1/08.

"Acme Construction is soliciting subcontract and material bids in connection with the Improvements to the Sewer System for the City of Anywhere, Texas. Qualified MBE and WBE firms are encouraged to submit bids in response to this invitation. The work will consist of utility work, concrete, paving, fencing, landscaping, masonry, excavation and trucking, barricades, back-hoe work and supplies and materials. Plans and specifications may be viewed or obtained at the project engineer's general offices, Bing, Campbell and Associates, 19510 Jackson Blvd., Muleshoe, Texas 76698. Telephone No. 512-557-2091, Fax 512-557-2090. All bids must be submitted to the above mentioned address by Noon, Friday, February 16, 2008".

Please bill Acme Construction, 10518 Burr Oak Drive, San Antonio, Texas 78609. The person authorizing the placement of this ad is B. J. Tenfold. If you have any questions, you may contact Mr. Tenfold at 512-557-7000.

Sincerely,

B. J. Tenfold
Manager of Accounts

**10518 Burr Oak Drive
San Antonio, Texas 78609**

512-557-7089
Fax 512-557-2097

January 5, 2008

CERTIFIED MAIL / RETURN RECEIPT REQUESTED

Anywhere Weekly Courier
1111 Main Street
P. O. Box 1
Anywhere, Texas 08654

Attn: Mr. Bucky Beaver, Circulation Manager

Dear Mr. Beaver:

Please publish the following in the "Public Notices" section of your weekly newspaper editions on the following dates: 1/11/08; 1/18/08; 1/25/08; and 2/1/08.

"Acme Construction is soliciting subcontract and material bids in connection with the Improvements to the Sewer System for the City of Anywhere, Texas. Qualified MBE and WBE firms are encouraged to submit bids in response to this invitation. The work will consist of utility work, concrete, paving, fencing, landscaping, masonry, excavation and trucking, barricades, back-hoe work and supplies and materials. Plans and specifications may be viewed or obtained at the project engineer's general offices, Bing, Campbell and Associates, 19510 Jackson Blvd., Muleshoe, Texas 76698. Telephone No. 512-557-2091, Fax 512-557-2090. All bids must be submitted to the above mentioned address by Noon, Friday, February 16, 2008".

Please bill Acme Construction, 10518 Burr Oak Drive, San Antonio, Texas 78609. The person authorizing the placement of this ad is B. J. Tenfold. If you have any questions, you may contact Mr. Tenfold at 512-557-7000.

Sincerely,

B. J. Tenfold
Manager of Accounts

THE STATE OF TEXAS }
COUNTY OF GHI }

Before me Homer Shortcut, a Notary Public in and for GHI County, Texas on this day personally appeared Bucky Beaver, Circulation Manager for Small Town Newspapers Group, Inc., publishers of the Anywhere Weekly Courier, who being by me duly sworn did depose and say that said newspaper has been published continuously for more than fifty-two weeks prior to the first insertion of this Legal Notice Number 879 at GHI County, Texas and the attached printed copy of the legal notice is a true copy of the original and was printed weekly on the following date(s): 1/11/08; 1/18/08; 1/25/08; 2/1/08.

Circulation Manager
Anywhere Weekly Courier
Small Town Newspaper Group, Inc.

Appeared and sworn to before me on this
21st day of January, 2008

NOTARY PUBLIC in and for the State of Texas
My Commission expires 12/28/2010

Legal Notice as Published

Acme Construction is soliciting subcontract and material bids in connection with the Improvements to the Sewer System for the City of Anywhere, Texas. Qualified MBE and WBE firms are encouraged to submit bids in response to this invitation. The work will consist of utility work, concrete, paving, fencing, landscaping, masonry, excavation and trucking, barricades, back-hoe work and supplies and materials. Plans and specifications may be viewed or obtained at the project engineer's general offices, Bing, Campbell and Associates, 19510 Jackson Blvd., Muleshoe, Texas 76698. Telephone No. 512-557-2091, Fax 512-557-2090. All bids must be submitted to the above mentioned address by Noon, Friday, February 16, 2008.

SECTION 00500

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

THIS AGREEMENT is dated as of the _____ day of _____ in the year 20__ by and between El Paso Water Utilities-Public Service Board, a component unit of the City of El Paso, a Texas municipal corporation (hereinafter called OWNER), and _____ (hereinafter called CONTRACTOR). OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. **WORK**

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

COORS CHANNEL DRAINAGE IMPROVEMENTS

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

Mobilization and demobilization, removal of existing curb, concrete channel, concrete flume, headwall, rockwall and rock rip rap, chainlink fence, rubble on slopes, concrete pipes, saw cut pavement and replace pavement. Coordination with Texas Gas for the removal and replacement of their gas line. Furnish and Installation of the following concrete structures: Concrete box culvert, concrete pipes, concrete junction boxes, concrete manholes, manhole rings and covers, depth gauge, inlets, thrust blocks, desilting basins, two sack backfill, pond excavation, wrought iron gate, wrought iron fence, pavement and curb removal and replacement, landscape and irrigation removal and replacement, handicap ramps/tiles removal and replacement, rockwalls, rock rip rap, per plans and specifications complete in place. SWPPP measures, traffic control, project clean-up and various items relevant to said project. The subject project will provide for the construction, testing, project coordination, mobilization de-mobilization, permits and permit fees, traffic control and any appurtenant items required for satisfactory completion of the project to include warranties as required.

ARTICLE 2. **ENGINEER**

The Project has been designed by CONDE INC. who is hereinafter called ENGINEER and who is to act as OWNER's representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 3. CONTRACT TIME (Revised 9/2/92, 10/9/98, 6/3/99, 4/13, 10/16/20)

- 3.1 The Work will be Substantially completed within 270 Calendar Days from the date when the Contract Time commences to run as provided in Paragraph 4.01 of the General Conditions, and as revised in Supplementary Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions, and as revised in the Supplementary Conditions, within 300 calendar days. Final completion includes CONTRACTOR'S resolution of all punch list items and CONTRACTOR'S submission of required close-out documentation. Any failure of the CONTRACTOR to complete the project within the contract time will be considered a material breach of this contract.
- 3.2 Liquidated Damages.

This section can be modified for a lump sum, per diem amount or can be tied to a Milestone(s) date(s), if desired. Insert the following language for a contract requiring a fixed amount per day:

- 3.2 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss and public inconvenience if the Work is not completed and the submittals are not submitted within the times specified in Paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 11 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER the sum of One thousand one hundred and twenty eight dollars and forty six centers (**\$1216.59**) for each Calendar Day that expires after the time specified in the Agreement for Substantial Completion until the Work is substantially complete. After Substantial Completion, if CONTRACTOR shall neglect, refuse or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER nine hundred fifteen dollars and eight five cents (\$968.96) for each Calendar Day that expires after the time specified in the Agreement for completion and readiness for final payment.

ARTICLE 4. CONTRACT PRICE (Revised 10/12/92, 6/7/93; 2/13/97)

- 4.1 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents in current funds, per the attached CONTRACTOR's Bid in accordance with the below listed separate charges:

MATERIALS TO BE INCORPORATED IN PROJECT NOT SUBJECT TO SALES TAX: \$ _____

LABOR TO BE INCORPORATED IN PROJECT NOT SUBJECT TO SALES TAX: \$ _____

RENTAL EQUIPMENT AND OTHER TAXABLE ITEMS: \$ _____

OTHER (I.E. BONDS, INSURANCE, CAPITAL EQUIPMENT, ETC.) \$ _____

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

ARTICLE 5. PAYMENT PROCEDURES *(Revised 5/14/96, 7/13, 10/16/20, 3/4/22)*

CONTRACTOR shall submit Applications for Payment in accordance with Article 15 of the General Conditions and Article 15 of the Supplementary Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

5.1 Progress Payments. OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's Applications for Payment as recommended by ENGINEER for Work which is completed in accordance with the terms and conditions of the Contract Documents. All progress payments will be on the basis of the progress of the Work measured by the schedule of values established in Paragraph 2.03 and referenced in Paragraph 2.05 of the General Conditions (and in the case of Unit Price Work based on the number of units completed and accepted) or, in the event there is no schedule of values, as provided in the General Requirements. Each invoice, regardless of contract type, shall contain a summary indicating the budget, the current invoiced amount, less a withholding of a 5% retainage amount, and the billed to date figure.

Prior to Substantial Completion, progress payments will be made in an amount equal to the percentages indicated below, but, in each case, less the aggregate of payments previously made and less such amounts as ENGINEER shall recommend, or OWNER may withhold, in accordance with Paragraph 15.06 of the General Conditions.

Ninety-five percent of Work completed (ninety percent for contracts under \$400,000.00), including 95 percent of materials and equipment not incorporated in the Work (but delivered, suitably stored and accompanied by documentation satisfactory to OWNER as provided in Paragraph 15.01 of the General Conditions).

5.2 Final Payment. Upon final completion and acceptance of the Work in accordance with Article 15 of the General and Supplementary Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said Article.

ARTICLE 6. CONTRACTOR'S REPRESENTATIONS *(Revised 10/12/92, 7/13, 11/9/17, 10/16/20, 3/4/22)*

In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations:

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

6.2 CONTRACTOR has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions as provided in Paragraph 5.03 of the General Conditions, and accepts the determination set forth in Paragraph SC-5.03 of the Supplementary Conditions of the extent of the technical data contained in such reports and drawings.

6.3 CONTRACTOR has obtained and carefully studied (or assumes responsibility for obtaining and

carefully studying) all such examinations, investigations, explorations, tests, reports and studies (in addition to or to supplement those referred to in Paragraph 6.2 above) which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise which may affect the cost, progress, performance or furnishing of the Work necessary for the performance or furnishing of the Work at the Contract Price, specifically within the provisions of Paragraph 5.03 of the General Conditions. CONTRACTOR understands that the correctness of such information is not guaranteed by the OWNER or the ENGINEER and CONTRACTOR understand(s) that the conditions encountered in performing the work may be different from the approximations shown.

- 6.4 CONTRACTOR has reviewed all information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the location of said Underground Facilities as determined by his or her own field investigations. CONTRACTOR understands that the correctness of such information is not guaranteed by the OWNER or the ENGINEER and CONTRACTOR understand that the conditions encountered in performing the work may be different from the approximations shown.
- 6.5 CONTRACTOR has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.
- 6.6 CONTRACTOR has given ENGINEER written notice of all conflicts, errors, or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.
- 6.7 CONTRACTOR affirms it is not a foreign-owned company that is owned or controlled by citizens of or directly controlled by the government of China, Iran, North Korea, Russia or a designated country pursuant to Chapter 2274 of the Texas Government Code. Additionally, CONTRACTOR affirms it is not a company that is headquartered in China, Iran, North Korea, Russia, or a designated country pursuant to Chapter 2274 of the Texas Government Code.
- 6.8 CONTRACTOR affirms it does not boycott Israel and will not boycott Israel during the term of the Agreement.
- 6.9 In accordance with Chapter 2274 of the Texas Government Code, CONTRACTOR affirms that it does not boycott energy companies and will not boycott energy companies during the term of the Agreement.
- 6.10 In accordance with Section 2274.002 of the Texas Government Code, CONTRACTOR affirms that it does not have a practice, policy, guidance or directive that discriminates against a firearm entity or firearm trade association and will not discriminate during the term of the Agreement against a firearm entity or firearm trade association.

ARTICLE 7. CONTRACT DOCUMENTS (Revised 11/16/94, 1/12/11, 7/13, 11/2/16, 10/16/20, 3/4/22)

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

- 7.1 CONTRACTOR's Bid (Section 00300)
- 7.2 Agreement (Section 00500)
- 7.3 Performance and Payment Bonds, and Certificate of Insurance, and insurance policies identified as

- Sections 00610, 00630 and 00650.
- 7.4 Notice of Award.
- 7.5 General Conditions (Section 00700)
- 7.6 Supplementary Conditions (Section 00800)
- 7.7 Supplement for Special-Funded Project (Section 00805) – IF APPLICABLE
- 7.8 General Wage Rates (Section 00840)
- 7.9 Specifications bearing the title Project Manual for the Construction of Coors Channel Drainage Improvements consisting of division numbers 1, 2, 3, 7, 31, 32 and 33, and Exhibit _____ as listed in table of contents thereof.
- 7.10 Drawings consisting of a cover sheet and sheets listed in the Index to Drawings, each sheet bearing the following general title:

CITY OF EL PASO, TEXAS
EL PASO WATER UTILITIES - PUBLIC SERVICE BOARD

COORS CHANNEL DRAINAGE IMPROVEMENTS

Drawings 1 through 31

(Drawings not attached to this Agreement.)

- 7.11 Addenda numbers _____ to _____, inclusive (not attached to this Agreement.)
- 7.12 Documentation submitted by CONTRACTOR prior to Notice of Award (Pages _____ to _____, inclusive).
- 7.13 Contractor Health and Safety Plan
- 7.14 The Instructions to Bidders, Information Available to Bidders, Bid Form and Bid Security, as well as any supplements to the Bid Form.
- 7.15 The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other documents amending, modifying, or supplementing the Contract Documents pursuant to Paragraphs 11.01 of the General Conditions.
- 7.16 The documents listed in Paragraphs 7.2 et. seq. above are attached to this Agreement (except as expressly noted otherwise above).

There are no Contract Documents other than those listed above in this Article 7. The Contract Documents may only be amended, modified or supplemented as provided in Paragraphs 11.01 of the General Conditions.

ARTICLE 8. MISCELLANEOUS

- 8.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions will have

the meanings indicated in the General Conditions.

- 8.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically, but without limitation, moneys that may become due and moneys that are 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.
- 8.3 OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.

ARTICLE 9. OTHER PROVISIONS *(Revised 3/4/22)*

- 9.1 It is agreed that should any dispute arise under this Contract which culminates in litigation, venue of that suit shall be in a court of competent jurisdiction sitting in El Paso County, Texas. The court shall apply the laws of the State of Texas in construing and interpreting the terms of this Contract and the Contract Documents.
- 9.2 In case any one or more of the provisions contained in this Agreement shall, for any reason, be held to be invalid, illegal, or unenforceable in any respect, that invalidity, illegality, unenforceability shall not affect any other provisions and this Agreement shall be construed as if such invalid, illegal, or unenforceable provisions had never been included, and the Agreement provisions shall be read and interpreted so as to harmonize with the Agreement itself.
- 9.3 The captions or headings of paragraphs in this Contract are for convenience only and shall not be considered in constraining the provisions hereof if any question of intent should arise.
- 9.4 For NADBank-funded projects, Contractor agrees to indemnify and hold harmless North American Development Bank (NADB) and each of its directors, officers, employees, agents and representatives (collectively, "NADB's Associated Persons") against all claims for death, personal injury, damages, or other relief against NADB or NADB's Associated Persons, including costs, expenses and attorney's fees, resulting from negligence or willful acts or failure to act by the Contractor.
- 9.5 In accordance with Sections 552.371 and 552.372 of the Texas Government Code, the following language is included, and applicable in contracts that require or result in the expenditure of public funds of at least \$1,000,000:

CONTRACTING INFORMATION. CONTRACTOR must preserve all contracting information related to this Agreement as provided by the records retention schedule requirements applicable to the OWNER for the duration of this Agreement. CONTRACTOR will promptly provide the OWNER any contracting information related to this Agreement that is in the custody or possession of the CONTRACTOR on request of the OWNER. On completion of this Agreement, CONTRACTOR will either provide at no cost to the OWNER all contracting information related to this Agreement that is in the custody or possession of the CONTRACTOR or preserve the contracting information related to this Agreement as provided by the records retention requirements applicable to the OWNER.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement in triplicate. One

counterpart each has been delivered to OWNER, CONTRACTOR and ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or by ENGINEER on their behalf.

This Agreement will be effective on _____, 20____.

OWNER: El Paso Water Utilities
Public Service Board of
the City of El Paso, Texas

CONTRACTOR: _____

By _____
Purchasing Agent

By _____
Name: _____
Title: _____

Address for giving notices:

1154 Hawkins Boulevard
El Paso, Texas 79925

Address for giving notices:

Date Signed _____

Date Signed _____

Federal Tax I.D. No. _____

Agent for service or process:

INSTRUCTIONS FOR EXECUTING CONTRACT

If the CONTRACTOR be a corporation, the following certificate should be executed:

I, _____, certify that I am the _____ of the corporation named as CONTRACTOR hereinabove; that, _____ who signed the foregoing Contract on behalf of the CONTRACTOR was then, _____ of said Corporation; that said Contract was duly signed for and in behalf of said Corporation by authority of its governing body and is within the scope of its corporate powers.

Corporate Seal

If the Contract is signed by the secretary of the corporation, the above certificate should be executed by some other officer of the corporation under the corporate seal. In lieu of the foregoing certificate, there may be attached to the Contract copies of so much of the records of the corporation as will show the official character and authority of the officers signing, duly certified by the Secretary or Assistant Secretary under the corporate seal to be true copies.

The full name and business address of the CONTRACTOR should be inserted and the Contract shall be signed with his or her official signature. Please have the name of the signing party or parties typewritten or printed under all signatures to the Contract.

If the CONTRACTOR should be operating as a partnership, each partner should sign the Contract. If the Contract is not signed by each partner, there should be attached to the Contract a duly authenticated Power of Attorney, or other appropriate resolution or document evidencing the signer's (signers') authority to sign such Contract for and in behalf of the partnership.

If the CONTRACTOR is an individual, the trade name (if the CONTRACTOR is operating under an assumed or trade name) should be indicated in the Contract and the Contract should be signed by such individual. If signed by one other than the CONTRACTOR, there should be attached to the Contract a duly authenticated Power of Attorney evidencing the signer's authority to execute such Contract for and in behalf of the CONTRACTOR.

CONTRACT SUBMITTAL CHECKLIST

(The following items must be submitted within **10** calendar days of the Notice of Award unless stated otherwise in the General or Supplemental Conditions)

1.	Executed Agreement
2.	Payment and Performance Bonds
3.	Insurance Certificate and Policies. Policies should be sent in electronic format to rguevara@epwater.org , with copy to becky.ramirez@hubinternational.com (Owner's Risk Manager) and to Purchasing.Info@epwater.org .
4.	If employees provided by leasing company, evidence of Texas State License and copy of their Worker's Compensation policy. If no leased employees will be used, provide a letter on Contractor's letterhead stating so.
5.	Certificate of Account Status (paid franchise taxes)
6.	Final/Updated (if applicable) Minority Certification and Participation Summary
7.	Preliminary Schedule of Values
8.	Preliminary Construction Schedule
9.	Schedule of Shop Drawings
10.	Trench Safety System (sealed by a Professional Engineer)
11.	Trench Safety Plan
12.	Stormwater Pollution Prevention Plan
13.	Traffic Control Plan
14.	Health and Safety Plan
15.	
16.	
17.	

- **Deliver all items to the OWNER's Purchasing Department**
- **Deliver electronic copies of items 7-14 to EPWater Project Manager**



TEXAS COMPTROLLER OF PUBLIC ACCOUNTS

SUSAN COMBS • COMPTROLLER • AUSTIN, TEXAS 78774

July 30, 2007

CERTIFICATE OF ACCOUNT STATUS

THE STATE OF TEXAS
COUNTY OF TRAVIS

I, Susan Combs, Comptroller of Public Accounts of the State of Texas, DO
HEREBY CERTIFY that according to the records of this office

is, as of this date, in good standing with this office having no franchise
tax reports or payments due at this time. This certificate is valid through
the date that the next franchise tax report will be due November 15, 2007.

This certificate does not make a representation as to the status of the
corporation's Certificate of Authority, if any, with the Texas Secretary of
State.

This certificate is valid for the purpose of conversion when the converted
entity is subject to franchise tax as required by law. This certificate is
not valid for the purpose of dissolution, merger, or withdrawal.

GIVEN UNDER MY HAND AND
SEAL OF OFFICE in the City of
Austin, this 30th day of
July 2007 A.D.

Susan Combs
Texas Comptroller

Taxpayer number:
File number:

Form 05-304 (Rev. 02-03/14)

TEXAS STATUTORY PERFORMANCE BOND

(Penalty of this Bond must be 100% of Contract Amount)

Public Work – State of Texas

STATE OF TEXAS }
COUNTY OF _____ }

BOND NUMBER _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ (hereinafter called the Principal), as Principal and _____, a corporation organized and existing under the laws of the State of _____, and whose principal office is located in the City of _____, and duly authorized to do business in the State of Texas (hereinafter called the Surety).

As Surety, are held firmly bound unto El Paso Water Utilities / Public Service Board, hereinafter called the Owner), in the penal sum of _____ Dollars (\$_____) for the payment of which sum well and truly to be made, we bind ourselves, our heirs, administrators, executors, successors and assigns, jointly and severally, by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Owner, dated the _____ day of _____, 20____, a copy of which is hereto attached and made a part hereof, for _____.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if the said Principal shall faithfully perform the work in accordance with the plans, specifications and contract documents, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code and all liabilities on this Bond shall be determined in accordance with the provisions thereof to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

BY: _____
Principal

WITNESS:

BY: _____
Surety

PAYMENT BOND

Public Work – State of Texas

STATE OF TEXAS }
COUNTY OF _____ }

BOND NUMBER _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ of the City of _____, County of _____ and State of _____ (hereinafter called the Principal), and _____ authorized under the laws of the State of Texas to act as Surety on bonds for Principals (hereinafter called the Surety) are held firmly bound unto El Paso Water Utilities / Public Service Board, hereinafter called the Owner), in the penal sum of _____ Dollars (\$ _____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Owner, dated the _____ day of _____, 20____, for _____ to which Contract is hereby referred to and made part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the work provided for in said Contract, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code and all liabilities on this Bond shall be determined in accordance with the provisions of said Chapter to the same extent as if it were copied at length herein.

Surety, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work performed thereunder, or the plans, specifications or drawings accompanying the same, shall in anywise affect its obligation on this Bond and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

BY: _____
Principal

WITNESS:

BY: _____
Surety



EL PASO WATER UTILITIES - PUBLIC SERVICE BOARD

ENGINEER'S CERTIFICATE OF SUBSTANTIAL COMPLETION

COORS CHANNEL DRAINAGE IMPROVEMENTS, BID NO. SW 09-23

(TO BE FILLED OUT AND SUBMITTED BY ENGINEER)

The above-referenced project is substantially complete as of _____, 20____.
 Exceptions and/or items requiring additional work are indicated as follows:

The following documents are required contract submittals. Certificate of Final Completion and Final Payment will <i>not</i> be issued until all submittals listed below are received and correct (pursuant to contract requirements).	
1. Contractor's Waiver of Claim/Lien (GC 15.06.A.3)	
2. <i>Original</i> Consent of Surety to Final Payment (GC 15-06.A.2.a)	
3. Copy of Release to Contractor from EPWID#1 for Dewatering Fees, if applicable (SC 18.13.E)	
4. Completed Operations Insurance Letter (coverage for at least 2 years after final payment (GC 6.03.B.3 and SC-6.03.C.6)	
5. Delivery to the Engineer of all Operating & Maintenance Manuals, Guarantees, Certificates of Inspection, and Marked-up As-Builts or Record Drawings, if applicable (GC 10.07.D and GC 15.06.A.1)	
6. Final Report of Total Payments to subcontractors and suppliers	
7. Evidence of Payment of Final Water Bill and Return of Water Meter	
8. Ensure that <i>Certified</i> Payrolls for entire contract period for contractor and all subcontractors, including "Final" (SC 7.11.D.5) payroll from each, are entered in the Utility Automated Payroll Software program and ensure that all outstanding corrections and/or evidence of restitution have been submitted	
9. Warranty/Guarantee, if applicable	
10. NPDES Requirements (NOT), if applicable	

 EPWU Engineering Division Manager

 Project Engineer of Record

 Date

 Date



CONTRACTOR'S PROJECT CLOSE-OUT SUBMITTALS CHECKLIST

The following documents are required contract submittals for the Close-Out of this project. Contractor is contractually required to submit the following in one packet to the Engineer for review. Certificate of Final Completion and Final Payment will not be issued until all submittals listed below are received and correct.

REQUIRED ITEM	INCLUDED
1. Final Change Order (if applicable)	
2. Contractor's Waiver of Lien (GC 15.06.A.3)	
3. <i>Original</i> Consent of Surety to Final Payment (GC 15.06.A.2.b)	
4. Copy of Release to Contractor from EPWID#1 for Dewatering Fees, if applicable (SC 18.13.E)	
5. Completed Operations Insurance Letter (coverage for at least 2 years after final payment (GC 6.03.B.3 and SC 6.03.C.6)	
6. Transmittal Letter of Delivery to Engineer of all Operating & Maintenance Manuals, Guarantees, Certificates of Inspection, and Marked-up As-Builts or Record Drawings, if applicable (GC 10.07.D and GC 15.06.A.1)	
7. Final Report of Total Payments to Subcontractors and Suppliers	
8. Final Certified Payrolls (list 'Final' atop the payrolls) (SC 7.11.D.5). Submit any and all outstanding corrections and/or evidence of paid restitution.	
9. Warranty/Guarantee, if applicable	
10. NPDES Requirements (NOT), if applicable	
11. Paid Final Water Bill, Completed Meter and Removal Forms for Fire Hydrant Meter	

* All items must be submitted and received as a complete packet. An incomplete packet will be returned.

When all items have been received and approved by EPWater, the assigned Project Compliance Specialist will notify Project Engineer, Consultant Engineer, and Contractor. At that time, Contractor may submit the Final Pay Application to Consultant Engineer. Consultant Engineer will provide the Certificate of Final Completion and the approvable Final Pay Application to the Project Compliance Specialist for processing and closing of project.

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared By



Endorsed By



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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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 document prepared by Contractor, in a form acceptable to Engineer, to request 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; 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; 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.
- 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.
 - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
 - d. 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), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations 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 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. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
 21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.
23. *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.
24. *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.
 - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
 - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
 - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *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.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner’s acceptance of the Bid.
29. *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.
30. *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.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor’s plan to accomplish the Work within the Contract Times.
32. *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.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *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.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals.
36. *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.
37. *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.
38. *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 or areas furnished by Owner which are designated for the use of Contractor.
39. *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.
40. *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.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers’ instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *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 of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, 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.
46. *Technical Data*
- a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
 - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
 - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
48. *Unit Price Work*—Work to be paid for on the basis of unit prices.
49. *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.
50. *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 Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:* 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:* The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:* The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - 1. does not conform to the Contract Documents;
 - 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - 3. 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 Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
 - 1. The word “furnish,” when used in connection with services, materials, or equipment, means 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, means 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, means 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. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. 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 Performance and Payment Bonds; Evidence of Insurance*

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner’s Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), 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 signed 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 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 *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 the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will 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.
 - 4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents 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 Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one Contract Document 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 versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will 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.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will 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.
- G. Nothing in the Contract Documents creates:
 - 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
 - 2. 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.

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, means 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, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer 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 or Engineer 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 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 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 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 in writing 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.

- 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 notify Owner and Contractor in writing 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 versions, 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 precludes 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 30th 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 60th day after the day of Bid opening or the 30th 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 may 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 must 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 will 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 Contract Price or 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. Such an adjustment will 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 third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
 - 4. Acts of war or terrorism.

- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
 2. Contractor shall not be entitled to an adjustment in Contract Price 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. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
 5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. 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, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses 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.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing 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, or to improvements, structures, utilities, or similar facilities located at such adjacent lands 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 7.13, 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 in a court of competent jurisdiction; 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 will 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 of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
3. Technical Data contained in such reports and drawings.

- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

- C. *Reliance by Contractor on Technical Data:* 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 Paragraph 1.01.A.46.b.

- D. *Limitations of Other Data and Documents:* 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;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
4. 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:
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;
 2. is of such a nature as to require a change in the Drawings or Specifications;
 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 whether it is necessary for Owner to obtain 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; 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. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- E. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, 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 subject to the provisions of Paragraphs 4.05.D and 4.05.E.
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;
 - 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 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, then any such adjustment will 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, 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.
- F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 5. 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 on the Drawings, or was not shown or indicated on the Drawings 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), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; 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
 4. 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. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, 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. 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;
 - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
 - c. 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, then any such adjustment will 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, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

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

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; 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 on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. 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;
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, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, 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. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- 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, 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.I obligates 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 obligates 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 Contractor's obligations under the Contract. These bonds must 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 terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.
- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

Regulations, and must be issued and signed by a surety named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, 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 must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. 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.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

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. Alternative forms of insurance coverage, including but not limited to self-insurance and “Occupational Accident and Excess Employer’s Indemnity Policies,” are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages 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, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages 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, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. 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, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. 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.
- H. Contractor shall require:
 - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
 - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain 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.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) 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 will be adjusted accordingly.

- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, 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 and Engineer.

6.03 Contractor's Insurance

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
 - 1. include at least the specific coverages required;
 - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
 - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, 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;
 - 4. apply with respect to the performance of the Work, whether such performance is 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; and
 - 5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds:* The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
 - 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
 - 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
 - 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other 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 Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- 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 advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.
- E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. 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 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer 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.

1. 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, risks, 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 individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater 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.
 2. None of the above waivers extends 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. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, 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, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
1. 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 all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights 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 insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract 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 fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 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 6.04 shall maintain such proceeds in a segregated account, and 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, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *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.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *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 maintain good discipline and order at the Site.

- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. 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 will 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.

7.04 *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 must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will 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 must 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.

7.05 *"Or Equals"*

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, 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 equipment or material, or items from other proposed Suppliers, under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
 - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) 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) has a proven record of performance and availability of responsive service; and
 - 4) is not objectionable to Owner.
- b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) the item 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 will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request:* If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

- A. *Contractor's Request; Governing Criteria:* Unless the specification or description of an item of equipment or material 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 equipment or material under the circumstances described below. To the extent possible such requests must 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 equipment or material from anyone other than Contractor.
 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.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 equipment or material that Contractor seeks to furnish or use. The application:
 - a. will 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 the item specified; and
 - 3) be suited to the same use as the item 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 the item specified; and
 - 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. will 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 will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers 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 or Supplier 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 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. 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 or Suppliers 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 or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, 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 or Supplier, whether initially or as a replacement, will 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 solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *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 an 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 will be disclosed 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.

7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. 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.

7.10 *Taxes*

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

7.11 *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. 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 is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written 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 written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *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.

7.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. 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.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.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).
- E. 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.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that 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.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
- H. 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.

- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will 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.

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as 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 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 by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

- 1. Before submitting a Shop Drawing or Sample, Contractor shall:
 - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determine and verify:
 - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
 - 2) 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
 - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
 - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.
- 2. Each Shop Drawing or Sample must 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 Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings must 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.C.
 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.C.
 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. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. 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, comply with the requirements of 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 will 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 or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 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, will 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 or Sample will 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.C.4.

D. Resubmittal Procedures for Shop Drawings and Samples

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 Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
 - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
 - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
 - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

- d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
 2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

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 is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
1. abuse, or improper modification, 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.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
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. The end of the correction period established in Paragraph 15.08;
 8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.
- E. 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 will 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 losses, damages, costs, and judgments (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 from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage 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 will 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.

7.19 *Delegation of Professional Design Services*

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
 - 1. Checking for conformance with the requirements of this Paragraph 7.19;
 - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
 - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

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 third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. 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.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, 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.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

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 for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, 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. 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 will 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, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will 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 or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- 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.
 - 1. 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 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 8.03.B.
 - 2. 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 Contractor.
- C. 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 will 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 (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 10.07. 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 *Resident 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 the Supplementary Conditions and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.

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

10.05 *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.

10.06 *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.

10.07 *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, will 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 Contractor under 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 10.07 also apply to the Resident Project Representative, if any.

10.08 *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 of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that 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, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. Changes in 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 11.05, (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 that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

- A. 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 11.07 regarding change of Contract Price.

- B. If Owner has issued a Work Change Directive and:
 - 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
 - 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

- A. 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.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *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. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work 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 must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates 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.

11.06 *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.C.2.

11.07 *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 must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must 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);
 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 11.07.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 11.07.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit will 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 will be 15 percent;
 - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 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 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.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 5 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 will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
 - d. No fee will 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 of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
 - f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *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 must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

B. *Change Proposal Procedures*

1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
2. *Supporting Data:* 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.
 - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
 - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must 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.

3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must 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.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *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 in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *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 are subject 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;
 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; and
 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- 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 rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, 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 will 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 will 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 will 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 will 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 will 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 will 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 will be incorporated in a Change Order or other written document 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. When needed 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 will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will 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 in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, 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, will 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 accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will 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, which 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 will 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 or retained for services specifically related to the Work.
 5. Other costs consisting of 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, 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.

- 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

- 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.
- 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
- 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on 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, must cease to accrue when the use thereof is no longer necessary for the changed 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 builder's risk or other property insurance established in accordance with Paragraph 6.04), 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 include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will 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 does not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, 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. The cost of purchasing, renting, or furnishing small tools and hand tools.
- 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 5. 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.
- 6. Expenses incurred in preparing and advancing Claims.
- 7. 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*

- 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
- 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

- E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

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 for any of the foregoing will be valid.
- C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's 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 for Work covered by allowances, and the Contract Price will 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, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

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 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 with such procedures and programs 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 will 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 will 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 will 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 written 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 will 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 additional 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, 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 will 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 defective Work as required by Engineer, then Owner may, after 7 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 for 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.
 - 2. 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 must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) 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.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. 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;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; 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 based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from 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 has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other 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; or
 - l. Other items entitle 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 will 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 will be treated as an amount due as determined by Paragraph 15.01.D.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 7 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 will 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 7 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 15.03.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 6.04 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 7.12), and other documents, Contractor may make application for final payment.
2. The final Application for Payment must 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 duly pending Change Proposals and Claims; 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 Final Application and Recommendation of Payment:* 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 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will 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. 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. *Notice of Acceptability:* In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *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 and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

- 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 as a Claim, 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 Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect 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 adjacent areas;
 - 2. correct such defective Work;
 - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, 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 from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, 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 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). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. 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.
- E. 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.

- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to 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 directly attributable to any such suspension. Any Change Proposal seeking such adjustments must 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) 10 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) written 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 7 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 will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

- A. Upon 7 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 for any loss of anticipated profits or revenue, post-termination overhead costs, 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 7 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, 7 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, pursuant to Article 12; and
 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise 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;
 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 requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
 2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
 3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

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 will not constitute a waiver of that provision, nor will 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 of the Contract or 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 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party 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.

18.09 *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.

18.10 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SECTION 00800
SUPPLEMENTARY CONDITIONS
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INTRODUCTORY STATEMENT

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC C-700, 2018 Edition). All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added—for example, "Paragraph SC-4.05."

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

SC-1.01.A.4 Add the following sentence to Paragraph 1.01.A.4:

The term "Offer" has the same meaning as the term "Bid".

SC-1.01.A.5 Add the following sentence to Paragraph 1.01.A.5

The term "Offeror" has the same meaning as the term "Bidder".

SC-1.01.A.10.e Add the following sentence to Paragraph 1.01.A.10.e

When submitted, a Claim must be signed by the Designated Authorized Representative.

SC-1.01.A.51 Add the following paragraph as reference 1.01.A.51:

Designated Authorized Representative — the representative authorized by the party filing the Claim to execute legally-binding agreements on behalf of that party. For Owner, the Designated Authorized Representative shall be the Chief Technical Officer, a Vice President, or President and Chief Executive Officer. For Contractor, the owner or its designee authorized pursuant to a power of attorney.

SC-1.01.A.52 Add the following paragraph as reference 1.01.A.52:

Health and Safety Plan — The part of the Contract Documents prepared by Contractor that describes safety procedures for the Work, identifies the Contractor's safety representative required by Paragraph 6.14.A, and certifies that the Contractor's employees have received or will receive training prior to the commencement of the Work on (1) basic health and safety issues; (2) the Health and Safety Plan; (3) the methods and techniques the Contractor will use on the Project; (4) procedures for Contractor entrance into and exit from the Site(s); and (5) informing Owner about any unique hazards presented by the Work or found as a result of the Work.

ARTICLE 2 - PRELIMINARY MATTERS

2.02 *Copies of Documents*

SC-2.02 Delete Paragraph 2.02.A in its entirety and insert the following in its place:

- A. Owner shall provide to Contractor an electronic version of a fully executed copy of the contract documents.

2.03 *Before Starting Construction*

SC-2.03.B Add the following new paragraph immediately after Paragraph 2.03.A.3

- B. *Health and Safety Plan.* Contractor shall submit a copy of Health and Safety Plan fifteen (15) days before mobilization. No Work shall proceed until the Owner has accepted the Health and Safety Plan.

2.04 *Pre-Construction Conference; Designation of Authorized Representatives*

SC-2.04.B Amend the first sentence of Paragraph 2.04.B to read as follows:

At or prior to this conference Owner and Contractor each shall designate, in writing by Owner and in writing by Contractor as a submittal, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract.

2.05 *Acceptance of Schedules*

SC-2.05.A Amend the first sentence of Paragraph 2.05.A to read as follows:

At the preconstruction conference indicated in Paragraph 2.04 or other time acceptable to the parties and Engineer, Engineer and Contractor will review the acceptability to Engineer, as provided below, of the schedules submitted in accordance with Paragraph 2.03.A.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

SC-3.01.C Delete Paragraph 3.01.C in its entirety.

SC-3.03.B.1 Add the following to new paragraph immediately after Paragraph 3.03.B:

SC-3.03.B.1 In resolving such conflicts, errors, and discrepancies, the Contract Documents will be given precedence in the following order: Change Orders, Field Orders, Addenda, Agreement, Performance Bond and Payment Bond, Supplementary Conditions, General Conditions, Specifications and Drawings. Numerical dimensions shown on the Drawings shall govern over scaled dimensions on the Drawings. This Paragraph SC-3.03.B.1 is not, however, a definitive enumeration of what comprises the "Contract Documents", which definitive enumeration is indicated in the Agreement.

ARTICLE 4 - COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

SC-4.01.A Amend the third sentence of paragraph 4.01.A by changing the word “60th” to read as “90th”.

4.03 *Reference Points*

SC-4.03.A Amend the third sentence of Paragraph 4.03.A to read as follows:

Contractor shall report to Engineer when a reference point, including property boundary stakes or monuments, or an elevation benchmark, is disturbed, lost, or destroyed, or requires relocation because of necessary changes in grades or locations. Contractor shall be responsible for accurately replacing or relocating such reference points by a professional land surveyor licensed by and registered in the State of Texas.

4.05 *Delays in Contractor’s Progress*

SC-4.05.C Amend Paragraph 4.05.C by adding the following subparagraphs:

5. Weather-Related Delays

- a. If “abnormal weather conditions” as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Time, such request must be documented by data substantiating each of the following: 1) that weather conditions were abnormal for the period of time in which the delay occurred, 2) that such weather conditions could not have been reasonably anticipated, and 3) that such weather conditions had an adverse effect on the Work as scheduled.
- b. The existence of abnormal weather conditions will be determined on a month-by-month basis in accordance with the following:
 - 1) Every workday on which one or more of the following conditions exist will be considered a “bad weather day”:
 - i) Total precipitation (as rain equivalent) occurring between 7:00 p.m. on the preceding day (regardless of whether such preceding day is a workday) through 7:00 p.m. on the workday in question equals or exceeds 1-inch over a 24-hour period of precipitation (as rain equivalent, based on the snow/rain conversion indicated in the table entitled *Foreseeable Bad Weather Days*; such table is hereby incorporated in this SC-4.05.C by reference).
 - ii) Ambient outdoor air temperature at 11:00 a.m. is equal to or less than the following low temperature threshold: wind chill factor equal or less than 25-degrees Fahrenheit; or, at 3:00 p.m. the ambient outdoor temperature is equal to or greater than the following high temperature threshold: equal or greater than 110-degrees Fahrenheit.
 - iii) Suspension (greater than 4 hours) or postponement of construction due to high wind advisory/warning that has been issued and does not allow construction activities to continue.
 - 2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by National Weather Service/NOAA closest to the **Euclid Street** weather monitoring station at **El Paso International Airport weather monitoring station**. Determination of actual bad weather days during performance of the Work will be based on the weather records measured and

recorded by the El Paso International Airport weather monitoring station located at 6701 Convair Road in El Paso, Texas.

- 3) Contractor shall anticipate the number of foreseeable bad weather days per month indicated in the Foreseeable Bad Weather Days table, Exhibit A included in SC-4.05.5.b.4.
- 4) Foreseeable Bad Weather Days:
 - i) Foreseeable Bad Weather Days (Standard Baseline) is defined as the normal number of calendar days for each month during which construction activity exposed to weather conditions is expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is included in the Work and is not eligible for extension of Contract Time.
 - ii) The Foreseeable Bad Weather Days are as follows:

Exhibit A

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4	3	3	2	3	4	8	8	6	5	3	4

- 5) In each month, every bad weather day exceeding the number of foreseeable bad weather days established in the Standard Baseline table in Exhibit A - Foreseeable Bad Weather Days will be considered as “abnormal weather conditions.” The existence of abnormal weather conditions will not relieve Contractor of the obligation to demonstrate and document that delays caused by abnormal weather are specific to the planned work activities or that such activities thus delayed were on Contractor’s then-current Progress Schedule’s critical path for the Project.

ARTICLE 5 - SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

SC 5.01.D Add the following new paragraph immediately after paragraph 5.01.C:

SC-5.01.D All work associated with special provisions of easements shall be performed in accordance with the Contract Documents, unless the Contract Documents indicate that easement provisions govern. Should the actions of Contractor or Subcontractors or Suppliers cause the Work to be delayed to the point that the ending date of an easement is exceeded, Contractor shall reimburse Owner for additional costs required to extend the period of rights to the easement to complete the Work. Such delay shall be considered to be within the control of Contractor, in accordance with paragraph 4.05.

5.02 *Use of Site and Other Areas*

SC-5.02.E Add the following new paragraph immediately after Paragraph 5.02.D:

SC-5.02.E *Dust Control*

1. Contractor shall not cause or allow dust-generating operations, earthmoving operation, use of property, or other operation that results in fugitive dust emissions that exceed the limits prescribed by the authority having jurisdiction, in accordance with Texas Administrative Code Title 30, Part 1, Chapter 111, Subchapter A, Division 4, Rule 111.145. Contact City of El Paso Environmental Management Division at (915) 212-6000 for additional information regarding nuisance fugitive dust emissions from the Site.
2. Provide necessary equipment and materials to apply sufficient dust suppressants, properly clean all vehicle “track-out” areas on and adjacent to the Site, and provide adequate physical stabilizations of soils to comply with requirements of earthmoving permits and approved dust control plan or activities, if any.
3. Contractor shall pay fines and civil penalties imposed by authorities having jurisdiction and incurred by Owner because of Contractor’s violation of earthmoving permits and dust control plans or activities.
4. Implement measures to control fugitive dust emissions from the Site in compliance with earthmoving permit and Laws and Regulations.

5.03 *Subsurface and Physical Conditions*

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.D:

- E. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data and specifically identifies the Technical Data in the report upon which Contractor may rely:

Report Title	Date of Report	Technical Data
Geotechnical subsurface investigation by CQC Testing	March 2022	Soil Investigation report

- F. The following table lists the drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data, and specifically identifies the Technical Data upon which Contractor may rely:

Drawings Title	Date of Drawings	Technical Data
Site Plan, Demolition Plan, topo and utility plan	March 2022	Topographic survey

- G. Contractor may examine copies of reports and drawings identified in SC-5.03.E and SC-5.03.F that were not included with the Bidding Documents at the El Paso Water Utilities' website:

www.epwater.org/business_center/purchasing_overview/bids

5.06 *Hazardous Environmental Conditions at Site*

SC-5.06 Add the following new paragraphs immediately after Paragraph 5.06.A.3:

4. The following table lists the reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and the Technical Data (if any) upon which Contractor may rely:

Report Title	Date of Report	Technical Data
No reports		

5. The following table lists the drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and Technical Data (if any) contained in such Drawings upon which Contractor may rely:

Drawings Title	Date of Drawings	Technical Data
No drawings		

SC-5.06 Delete Paragraphs 5.06.A and 5.06.B in their entirety and insert the following in its place:

SC-5.06.A No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

SC-5-06.B Not Used.

ARTICLE 6 - BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

SC-6.01.A Delete Paragraph 6.01.A and 6.01.B in their entirety and insert the following in place of:

SC-6.01.A Except as provided in this Paragraph SC-6.01.A, Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds and certificates of insurance as are required by the Contract Documents. Certificates of insurance shall be in the form prescribed by the Contract Documents. Conditions under which a payment bond and/or performance bond are required are as follows:

1. Payment bond is required when the contract award is in excess of \$50,000, and;
2. Performance Bond is required when the contract award is in excess of \$100,000.

(Note: Contract value is excess of \$100,000, both bonds are required.)

SC-6.01.B Delete Paragraph 6.01.C in its entirety and insert the following in its place:

SC-6.01.B. All bonds shall be in the form prescribed by the Contract Documents, except as provided otherwise by Laws and Regulations including, but not limited to, Chapter 2253 of the Texas Government Code and Article 7.19-1 of the Texas Insurance Code. The bonds shall be executed by surety which shall be authorized and admitted to do business in the State of Texas, licensed by the State of Texas to issue surety bonds, and carry an A.M. Best Key rating of not less than A VIII. If the amount of the bond is in excess of ten percent of surety's capital and surplus, surety shall furnish to Owner a written certification that surety has insured that portion of surety's risk that exceeds ten percent of surety's capital and surplus with one or more reinsurers who are duly authorized, accredited or trusted to do business in the State of Texas. If any portion of surety's obligation is reinsured, the amount reinsured shall not exceed ten percent of the reinsurer's capital and surplus. Surety and the reinsurer(s) shall furnish additional information and documentation, if any, required by Owner for Owner to determine whether surety or its reinsurer(s) comply with the requirements of this Paragraph SC-6.01.B. All bonds signed by an agent or attorney-in-fact shall be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

6.02 *Insurance - General Provisions*

SC-6.02.G Delete Paragraph 6.02.G in its entirety and insert the following in its place:

SC-6.02.G Not Used.

6.03 *Contractor's Insurance*

SC-6.03.C Add the following immediately after Paragraph 6.03.C.1:

- a. In addition to the individuals or entities specified above, include as additional insured, or loss payees as their interest may appear, the following:

- 1) None

SC-6.03.C Add the following immediately after Paragraph 6.03.C.5:

SC-6.03.C.5 If, at any time, the required insurance policies are canceled, terminated, or modified so that the insurance is not in full force and effect as required under the Contract Documents, Owner may terminate for cause in accordance with Paragraph 16.02 of the General Conditions or, where possible, obtain insurance coverage equal to that required by the Contract Documents, the full cost of which will be charged to Contractor and deducted from any payments due Contractor.

- a. Each Contractor shall require his subcontractors, at all tiers, to carry insurance coverages satisfactory to the Contractor and to provide evidence of such insurance as specified herein.

For purposes of this Bid, a Payment Bond will be required in an amount equal to the Bid Price and a Performance Bond (will) or (will not) be required in a like amount.

SC-6.03.C.6 Add the following immediately after Paragraph 6.03.C.5:

SC-6.03.C.6 Contractor shall furnish to Owner and each other additional insured identified in the Contract Documents, to whom evidence of insurance has been issued, evidence satisfactory to Owner and other such additional insured of continuation of such insurance at final payment and for a duration thereafter equal to the correction period required under Paragraph 15.08.

SC-6.03.D Add the following new Paragraph 6.03.D:

D. 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 Employer's Liability Insurance:

- a. State: Statutory

- b. Employer's Liability: In accordance with Table 00800-1 of these Supplementary Conditions.

- c. *Terminology:* The following terms are not defined but when used in this Paragraph SC-6.03.D for workers' compensation insurance, and have the meanings indicated below:

- 1) Certificate of coverage: A copy of a certificate of insurance, a certificate of authority to self-insure, issued by the Texas Workers Compensation Commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on the Project, for the duration of the Project. Contractor shall not execute TWCC Forms 83 or 85 or other form that

precludes coverage under Contractor's policy if Contractor hires a Subcontractor or service provider without worker's compensation insurance.

- 2) Duration of the Project: Is the time from the Contractor's beginning work on the Project until the time Contractor's and Subcontractor's obligations under the Contract Documents are fully complete.
 - 3) Contractor and Subcontractors (as indicated in Texas Labor Code §406.5096) includes all persons or entities performing all or part of the Work, regardless of whether that person or entity contracted directly with Contractor and regardless of whether that person or entity has employees. This includes, without limitation, independent contractors, Subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the Project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other services related to the Project. "Services" does not include activities unrelated to the Project, such as food or beverage vendors, office supply deliveries, and delivery of portable toilets or portable sanitary facilities.
- d. Comply with the following relative to Worker's Compensation and Employer's Liability insurance:
- 1) *Waiver of Subrogation Relative to Workers' Compensation Insurance*: The policy shall be endorsed to provide that insurer waives any right of subrogation that insurer may acquire against Owner, Engineer, Engineer's consultants, and others named in the Contract Documents as additional insured relative to Contractor's liability insurance, by reason of any payment made on account of injury, including death resulting therefrom, sustained by an employee of the insured.
 - 2) If workers employed on the Work will be employed through a leasing company, furnish evidence of leasing company's State of Texas license and a copy of leasing company's Worker's Compensation policy insuring its employees (including sole proprietors, partners, supervisors, and executive officers) who perform work in the State of Texas.
 - 3) Contractor shall furnish coverage, based on proper reporting of classification codes and payroll amounts and filing of coverage agreements, which meets the statutory requirements of Texas Labor Code §401.011(44) for all employees of Contractor performing the Work or services on the Project, for the duration of the Project.
 - 4) Contractor shall furnish to Owner a certificate of coverage prior to being awarded the Contract.

- 5) If the coverage period shown on the Contractor's current certificate of coverage ends during the Contract Times, Contractor shall, prior to the end of the coverage period, furnish to Owner a new certificate of coverage indicating that coverage has been extended; furnish updated certificate of coverage throughout the duration of the Project.
- 6) *Subcontractors and Workers' Compensation and Employee Liability Insurance:*
 - a) Contractor shall contractually require each Subcontractor to comply with the workers' compensation and employer's liability insurance requirements of the Contract Documents, to same extent such requirements are binding on Contractor.
 - b) Obtain from each Subcontractor and furnish to Owner a certificate of coverage, prior to that Subcontractor beginning work on the Project. Not later than seven days after receipt by Contractor, furnish updated, valid certificate of coverage for each Subcontractor throughout the duration of the Project.
- 7) Retain Contractor's and Subcontractors' required certificates of coverage for the duration of the Project.
- 8) Contractor shall notify Owner in writing, in accordance with Paragraph 18.01, within 10 days after Contractor knew or should have known, of a change that materially affects the provision of coverage of any entity performing work or services on the Contract.
- 9) Post at the Site a notice, in the text, form, and manner prescribed by the Texas Workers' Compensation Commission, informing persons performing work or services on the Contract that they are required to be covered, and stating how a person may verify coverage and report lack of coverage. Such posted notice does not satisfy other posting requirements imposed by the Act or other commission rules in the State of Texas. Such notice shall be printed with a title in text that is not less than 30-point bold type, with and other text in not less than 19-point non-bold type, and shall be in English, Spanish, and other languages, if any, common to the workers at the Site. Text for the notices shall be as indicated by the Commission on the sample notice without changes.
- 10) By executing the Agreement or furnishing or causing to be furnished a certificate of coverage, Contractor represents to Owner that employees of Contractor and Subcontractors who will perform work or services on the Contract will be covered by workers' compensation coverage for the duration of the Project; that such coverage will be based on proper reporting of classification codes and payroll amounts; and that coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's

Division of Self-Insurance Regulation. Furnishing false or misleading information may subject Contractor to administrative penalties of authorities having jurisdiction, criminal penalties, civil penalties of authorities having jurisdiction, and other civil actions.

- 11) Contractor's failure to comply with one or more workers' compensation insurance provisions is a breach of the Contract by Contractor, entitling Owner to terminate for cause in accordance with Paragraph 16.03, unless otherwise provided by Laws and Regulations.
 - 12) If any provision of the Workers' Compensation and Employee Liability insurance requirements of the Contract Documents, or its application to any person or circumstance, is held invalid, the invalidity does not affect other provisions or applications of this rule that can be given effect without the invalid provision or application, and to this end the provisions of this rule are declared to be severable.
2. Contractor's General Liability under Paragraphs 6.03 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of Contractor. General Liability coverage shall be for not less than the limits indicated in Table 00800-1 of these Supplementary Conditions.
 3. Automobile Liability under Paragraph 6.03 of the General Conditions: Shall be for not less than the limits indicated in Table 00800-1 of these Supplementary Conditions.
 4. Umbrella Liability:
 - a. Contractor shall purchase and maintain, until final payment by Owner, Umbrella Liability Insurance. Such insurance shall insure against all claims in excess of the limits provided under workers' compensation and employer's liability, general liability insurance, and automobile liability policies. The limits of umbrella liability shall be in accordance with Table 00800-1 of these Supplementary Conditions.
 5. *Table of Minimum Liability Insurance Coverage Limits:* The limits of liability insurance shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations. The limits of coverage under Paragraph 6.03 vary with the Contract Price as indicated in Table 00800-1:

TABLE 00800-1

LIMITS OF COVERAGE FOR ALL CONSTRUCTION PROJECTS	AUTOMOBILE (6.03) {Combined Single Limit} Per Accident	COMMERCIAL GENERAL LIABILITY (6.03) {Combined Single Limit} Per Project	WORKERS' COMPENSATION (6.03) {Employers' Liability} Per Accident Per Employee Per Disease	UMBRELLA (SC-6.03) {Combined Single Limit}
CONTRACT PRICE LESS THAN \$100,000: Occurrence *General Aggregate Products/Completed Operations Aggregate	\$300,000	\$ 500,000 \$ 500,000 \$1,000,000	\$ 500,000 \$ 500,000 \$ 500,000	Not applicable
CONTRACT PRICE EQUAL TO \$100,000 OR GREATER AND LESS THAN \$500,000: Occurrence *General Aggregate Products/Completed Operations Aggregate	\$500,000	\$ 500,000 \$1,000,000 \$1,000,000	\$ 500,000 \$ 500,000 \$ 500,000	Not applicable
CONTRACT PRICE EQUAL TO OR GREATER THAN \$500,000 AND UP TO AND INCLUDING \$10,000,000: Occurrence *General Aggregate Products/Completed Operations Aggregate	\$1,000,000	\$1,000,000 \$2,000,000 \$2,000,000	\$1,000,000 \$1,000,000 \$1,000,000	\$2,000,000 \$2,000,000
CONTRACT PRICE GREATER THAN \$10,000,000: Occurrence *General Aggregate Products/Completed Operations Aggregate	\$1,000,000	\$1,000,000 \$2,000,000 \$2,000,000	\$1,000,000 \$1,000,000 \$1,000,000	\$5,000,000 \$5,000,000

6.04 *Builder's Risk and Other Property Insurance*

SC-6.04 Delete Paragraph 6.04 in its entirety and insert the following in its place:

SC-6.04 *Property Insurance*

- A. Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of \$ 1,000,000. This insurance shall:
1. include the interests of Owner, Contractor, Subcontractors, Engineer, 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 as an insured, additional insured, or loss payee as their interest may appear;
 - a. In addition to the individuals or entities specified above, include as additional insured, or loss payees as their interest may appear, the following:
 - 1) MCA
 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, and shall insure against at least the following perils or causes of loss: collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood).
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.
- B. Contractor shall purchase and maintain equipment breakdown insurance which will include the interests of Owner, Contractor, Subcontractors, Engineer, and other individuals or entities identified as additional insured or loss payees in this Paragraph SC-6.04, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured, additional insured, or loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph

SC-6.04 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured or loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph SC-6.05.

- D. The risk of loss within any deductible amount applicable to the policies of insurance purchased in accordance with this Paragraph SC-6.04 will be borne by Contractor, Subcontractors, or others suffering such loss.

6.05 *Property Losses; Subrogation*

SC-6.05 Delete Paragraph 6.05 in its entirety and insert the following in its place:

SC-6.05 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph SC-6.04 will protect Owner, Contractor, Subcontractors, Engineer, and all other individuals or entities identified in Paragraph SC-6.04 to be listed as insureds or additional insured or loss payees (and the officers, directors, members, partners, employees, agents, and other consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of loss or damage the insurers will have no rights of recovery against any of the insureds or additional insured or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents and other consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, Engineer, and all other individuals or entities identified in Paragraph SC-6.04 to be listed as insureds or additional insureds or loss payees (and the officers, directors, members, partners, employees, agents and other consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, Engineer, and the officers, directors, partners, employees, agents, and other 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 and other perils whether or not insured by Owner, and;

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 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 SC-6.05.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, Engineer, and the officers, directors, members, partners, employees, agents and other consultants and subcontractors of each and any of them.

ARTICLE 7 - CONTRACTOR'S RESPONSIBILITIES

7.03 *Labor; Working Hours*

SC-7.03

- C. All work at the site must be performed during regular working hours – Contractor will not perform work on a weekend, or any legal holiday.

Add the following new subparagraphs immediately after Paragraph 7.03.C:

1. Regular working hours will be Monday through Friday 7:00am to 5:00pm
2. Owner's legal holidays are New Years, Martin Luther King Jr. Day, Memorial Day, Juneteenth Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, day after Thanksgiving, Christmas Day.

SC-7.03

Add the following new paragraph immediately after Paragraph 7.03.C:

- D. **[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-7.03

Add the following new subparagraph immediately after Paragraph SC-7.03.D:

1. For purposes of administering the foregoing requirement, additional overtime costs are defined as any hours outside of Regular working hours as stated in 7.03.1 above.

SC-7.03.E

Add the following new paragraph immediately after paragraph 7.03.D:

SC-7.03.E for work financed in whole or in part by loans or grants from, or loans insured or guaranteed by, the United States or any agency or instrumentality thereof under any statute of the United States providing wage standards for such work, the provisions of the Contract Documents are subject to the applicable provisions of the Contract Work Hours and Safety Standards Act, 40 U.S.C.A. §327 et seq. Contractor and Subcontractor shall not require or allow any laborer or mechanic to be employed on the Work in excess of forty hours in any work week unless such laborer or mechanic receives compensation at a rate not less than one-and-one-half times his or her basis rate of pay for hours worked in excess of forty hours in such work week. Except as may be otherwise required by law, all claims pertaining to the classification of labor employed on the project shall be decided by Owner's governing body or other duly designated official.

7.07 *Concerning Subcontractors and Suppliers*

SC 7.07.N Add the following new paragraphs immediately after Paragraph 7.07.M:

SC-7.07.N Contractor shall perform, with his organization and with the assistance of workers under Contractor's immediate superintendence, not less than 40 percent of the Contract Price, exclusive of Work not commonly found in contracts for similar construction which require specialized knowledge, craftsmanship, or equipment not ordinarily available in the organizations of contractors performing construction similar in nature to the Work. The value of the Work, exclusive of said items, will be interpreted as the value of labor, equipment, superintendence, and only those portions of materials and equipment incorporated into the Work that are related to the Contract's direct labor requirements.

7.09 *Permits*

SC-7.09.B Add the following new paragraph immediately after Paragraph 7.09.A:

SC-7.09.B TPDES Permit and Related Permits and Requirements

1. The Work is subject to the Texas Pollution Discharge Elimination System (TPDES) permitting requirements for the installation and maintenance of temporary and permanent erosion and sediment controls and stormwater pollution prevention measures throughout the construction period.
2. Contractor shall will file Owner's "Notice of Intent" to the Texas Commission on Environmental Quality (TCEQ). Owner will pay the TPDES stormwater application fee.
3. Contractor's responsibilities are as follows:
 - a. Prepare a Storm Water Pollution Prevention Plan (SWPPP) in compliance with Laws and Regulations.
 - b. Obtain a signed certification statement from all Subcontractors responsible for implementing erosion and sedimentation controls and other best management practices for the Site that are part of the SWPPP. Such

statement shall indicate that the Subcontractor understands the permit requirements. The certified statement forms shall be attached to and become part of the SWPPP.

- c. Fill out the TCEQ's "Construction Site Notice" form, which is Attachment 2 to the TPDES General Permit TXR150000 (form available from Owner or on the Internet at <http://www.tceq.state.tx.us/assets/public/permitting/waterquality/attachments/stormwater/txr152d2.pdf>), and post it near the main entrance of the Site, or at multiple postings if the Work is linear. Submit a copy of the completed Construction Site Notice form to Owner and Engineer.
- d. Maintain erosion/sedimentation controls and other protective measures identified in the SWPPP in effective operating condition.
- e. Perform inspections every 14 days and after every half-inch of rainfall, noting the following observations on an inspection form provided by Owner:
 - 1) Locations of discharges of sediment or other pollutants from the Site.
 - 2) Locations of stormwater, erosion, sedimentation controls that are in need of maintenance or repair.
 - 3) Locations of stormwater, erosion, sedimentation controls that are not performing, failing to operate, or are inadequate.
 - 4) Locations where additional stormwater, erosion, sedimentation controls are needed.
- f. Continuously maintain at the Site a copy of the SWPPP (with updates, as described below) and inspection reports.
- g. Update the SWPPP as necessary to comply with TPDES permitting requirements, which includes noting changes in erosion, and sedimentation controls and other best management practices that are part of the SWPPP and which may be necessary due to the results of inspection reports.
- h. Upon Substantial Completion or establishment of permanent cover over disturbed soil areas (if such cover is established after Substantial Completion), submit TPDES records to Owner.

File a "Notice of Termination" with TCEQ within 30 days of final stabilization of all areas of disturbed soil and disturbed soil cover. Form is available from Owner or on the Internet at <http://www.tceq.state.tx.us/assets/public/permitting/waterquality/forms/20023.pdf>.

- i. “Notice of Termination” shall be mailed to:

Texas Commission on Environmental Quality
Storm Water & General Permits Team; MC-228
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-4671

- j. Upon completion of the Work, submit to Owner TPDES records.

7.10 *Taxes*

SC-7.10.B Add the following new paragraph immediately after Paragraph 7.10.A:

SC-7.10.B Exemption from State of Texas sales tax may be obtained on materials and equipment incorporated into the Work and supplies required to perform the Work. Owner is an organization which qualifies for such exemption pursuant to provisions of Article 20.04(F) of the Texas Limited Sales, Excise and Use Tax Act. In accordance with Texas House Bill 11, Contractor may purchase, materials, equipment, and supplies consumed in the performance of the Work by issuing to Suppliers an exemption certificate in lieu of the tax, said exemption certificate complying with State of Texas Comptroller's Ruling No. 95-0.07. Such exemption certificate(s) issued by Contractor in lieu of the sales will be subject to the provisions of the State of Texas Comptroller's Ruling No. 95-0.09 as amended to be effective October 2, 1968. Exemption certificate may be obtained from Owner's Purchasing Agent.

7.11 *Laws and Regulations*

SC-7.11.C Remove last sentence on Paragraph 7.11.C. “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 written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim in its entirety.”

SC-7.11.D Add the following new paragraph immediately after Paragraph 7.11.C:

SC-7.11.D *Minimum Prevailing Wage Rates*

- 1. Wage rates paid to workers employed in performing the Work at the Site, including Contractor and Subcontractor employees, shall not be less than the following:
 - a. Minimum prevailing wage rates of the City of El Paso, Texas for 2016 Paving, and Street Construction, Dirt Work, Heavy Construction, pipeline work, Highway wage rates. The prevailing

minimum wage rate determination, comprised of 5 pages, applicable to the Project is part of the Contract Documents.

When a labor classification is included in both the City of El Paso and federal minimum prevailing wage rate determinations, Contractor shall pay the higher of the two minimum prevailing wage rates for that labor classification. Contractor shall be aware of changes in the minimum prevailing wage rates applicable to the Work and shall pay the minimum prevailing wages at no additional cost to Owner. Contractor shall post the schedule of classifications and wage rates at conspicuous locations at the Site. Such schedule shall also show deductions, if any, required by law to be made from wages earned by laborers and mechanics engaged on the Work.

2. Contractor shall give preference to hiring qualified local residents for work as laborers and mechanics on the Project. Employees shall be bona-fide residents of the United States of America.
3. Contractor and Subcontractors shall pay each of their employees, engaged in the Work in full, not less often than once per week, and without deductions or subsequent rebates on any account, except for deductions mandated by law.
4. Contractor, and Subcontractors shall keep a complete payroll record indicating the name, address, and Social Security number of each employee engaged in the Work, together with the classification of work in which the employee is engaged, the hourly wage rate paid, number of deductions made from such wages and total amount paid to the employee. Submit to Owner one copy of each such payroll record, for the period for which payment is requested, with each Application for Payment. Each payroll record shall bear the affidavit of the employer certifying, under oath, that such payroll is a true, complete, and accurate report of the wages earned and paid to each employee engaged in the Work, that no deductions from any wages due each employee, except as set out on the payroll, have been directly or indirectly made, and that no rebates, either direct or indirect, have been nor will be required of an employee.
5. Certified payroll reports shall indicate for each worker whether the labor performed was performed under the Building, Heavy, Highway, or Water and Sewer Line Prevailing Wage Rate scale. Certified payroll reports shall be submitted for the complete Contract period and, for weeks where no Work was performed, negative reports shall be submitted, marked "No Work Performed". Clearly mark "FIRST PAYROLL" on the first payroll submitted, and clearly mark "FINAL PAYROLL" on the last payroll submitted for the Contract.
6. Apprentices will be work only under a bona fide apprenticeship program registered with the U.S. Department of Labor. A copy of such program shall be submitted to Owner, together with current certification or evidence of registration with the U.S. Department of Labor, Bureau of Apprenticeship and Training, for each apprentice engaged in the Work.

7. Contractor shall, when requested by Owner, submit additional certification and documentation (such as copy of cancelled check or an Employee Restitution Receipt Form) indicating that employee has received back compensation due.
8. Contractor and Subcontractors in violation of this provision are subject to a penalty of \$60 per day for each worker that is paid less than the rate specified in the Project's applicable prevailing wage rates.

SC-7.11.E Add the following new paragraph immediately after Paragraph 7.11.D:

SC-7.11.E *Mandatory for Building Projects with Contract Price Over \$100,000 – Apprentices*

1. In accordance with resolution adopted on November 9, 1999 by the El Paso City Council regarding apprenticeship programs on City projects, Contractor and Subcontractors shall:
 - a. Sponsor or participate in a U.S. Department of Labor (DOL) certified apprenticeship program for all job classifications utilized on the Project which are apprenticeable occupations as defined by DOL regulations and which appear on the “schedule of categories of apprentices” kept on file in the office of the City of El Paso's Capital Improvement Department;
 - b. Pay wage rates and benefits in accordance with the applicable apprenticeship program;
 - c. Comply with the DOL requirements for ratio of apprentices to journeymen;
 - d. Hire registered apprentices enrolled in a DOL-certified apprenticeship program in all job classifications utilized on the Project which are apprenticeable occupations as defined by DOL regulations and which are designated for City projects on the “schedule of categories of apprentices” kept on file in the office of the City of El Paso Director of Capital Improvement Department. Helpers, unregistered apprentices, and other substitutes shall not perform apprentice-level work in place of registered apprentices.
2. Contractor shall post the applicable prevailing wage rate schedules at the Site in a prominent location readily accessible to the workers throughout the Project. Contractor shall post a notice to be provided by the City of El Paso Director of Capital Improvement Department regarding prevailing wage rates and the City of El Paso's apprenticeship program, in English and in Spanish, which shall be posted at the Site with the prevailing wage rates.

3. Contractor shall submit to Owner the names of all apprentices employed on the Work; verification of their status as registered apprentices; documentation regarding apprentice's proper wage rates; and documentation regarding journeyman-to-apprentice ratios for each trade as determined by the apprenticeship program.
4. No worker shall be discharged by Contractor or Subcontractor, or in any other manner be discriminated against, because such worker has filed an inquiry or complaint, instituted legal or equitable proceeding, or has testified or is about to testify in such proceeding under, or relating to, the apprenticeship program.
5. Contractor and Subcontractors shall allow immediate entry into all areas of the Site by Owner or Owner's agents and representatives displaying or presenting proper identification to Contractor's Site superintendent or their representative. Owner or their representative may visit the Site to determine adherence to these requirements, Contractor and Subcontractors shall allow access to personnel and apprenticeship program books and records and access to employees to be interviewed at random, at any time and for any reasonable duration to determine compliance with these provisions, including the apprenticeship programs.
6. Owner reserves the right to terminate for cause in accordance with Paragraph 16.02 if Contractor or Subcontractor breaches any of provisions of the Contract Documents regarding apprenticeship programs.
7. Apprentices shall be allowed to work at less than the predetermined rate for the work they performed when apprentice(s) are employed pursuant to, and individually-registered in, a bona-fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration Bureau; or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program but who has been certified by the Bureau of Apprenticeship & Training, or a state apprenticeship agency where appropriate, to be eligible for probationary employment as an apprentice.
8. The allowable ratio of apprentices to journeymen on the Work in any craft classification shall not be greater than the ratio permitted to the Contractor or Subcontractor as to the entire work force under the registered program. Any apprentice performing the Work in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the City Wage Scale for the work actually performed.
9. Contractor shall submit to Owner's Contract Administrator with sufficient information, which demonstrates that apprentices are employed pursuant to, and individually registered in, a bona-fide apprenticeship program. A copy of such program shall be submitted to Owner as well as the current certification for each individual assigned to the Work and appearing on the payrolls for that Contract. Every apprentice must be paid at not less than the rates specified in the registered program for the apprentice's level of

progress, expressed as a percentage of the journeyman's hourly rate specified in the City wage determination. Workers not registered in a bona-fide apprenticeship program shall be paid not less than the applicable wage rate in the City Wage Scale for the classification of work actually performed. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the program does not specify fringe benefits, they must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Bureau of Apprenticeship & Training determines that a different practice prevails for the applicable apprentice classification, fringe benefits shall be paid in accordance with that determination.

10. If the Bureau of Apprenticeship & Training or a state apprenticeship agency recognized by the Bureau, withdraws approval of a program, Contractor shall not employ apprentices at less than the applicable City rate for the work performed until an acceptable program is approved and evidence provided.

7.13 *Safety and Protection*

SC-7.13.B.1 Add following new subparagraph immediately after Paragraph 7.13.B:

SC-7.13.B.1 Contractor's safety representative shall be identified in submittal to Owner and Engineer for acceptance prior to commencement of Work at the Site. Name and qualifications of proposed substitute, if any, shall be submitted to Owner for acceptance.

SC-7.13.G Replace the word "safety program" with "Health and Safety Plan."

SC-7.13.H Replace the word "safety program" with "Health and Safety Plan."

SC-7.13.K Add the following new subparagraphs immediately after Paragraph 6.13.J:

SC-7.13.K Within twenty-four hours of receiving a request from Owner, Contractor shall furnish to Owner documentation substantiating representations made in the Health and Safety Plan including, but not limited to, that each of the Contractor's employees has received training on the Health and Safety Plan as well as any other training necessary to competently effectuate the Health and Safety Plan. Select Contractor project management staff shall complete the El Paso Water Online Contractor Orientation, (Course 19ELPWC) available at www.hasc.com, before start of construction.

SC-7.13.L Owner maintains a drug and alcohol-free workplace in accordance with the Drug-free Workplace Act of 1988. Contractor shall publicize a statement notifying employees on the Work that the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited in the workplace, including at the Site.

SC-7.13.M Owner maintains specific rules regarding smoking on Owner's properties. Contractor shall adhere to such rules at the Site.

SC-7.13.N Owner maintains specific rules regarding firearms and Contractor shall adhere to such rules at the Site.

SC-7.13.O Owner maintains specific rules regarding traffic safety on Owner's properties. Contractor shall adhere to such rules at the Site.

7.16 *Submittals*

SC-7.16.G Add the following new paragraphs immediately after Paragraph 7.16.F:

SC-7.16.G For each Contractor submittal required under the Contract Documents, Engineer will review one initial submittal and one resubmittal at no cost to Contractor. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, Samples, or other submittals requiring approval or acceptance, and Contractor shall reimburse Owner for Engineer's charges for labor and expenses for such time.

SC-7.16.H In the event that Contractor requests a change of a previously approved or previously accepted submittal, Contractor shall reimburse Owner for Engineer's charges for Engineer's review time unless the need for such change is beyond Contractor's control.

ARTICLE 9 - OWNER'S RESPONSIBILITIES

9.11 *Evidence of Financial Arrangements*

SC-9.11 Delete Paragraph 9.11 in its entirety and insert the following in its place:

SC-9.11 Not used

9.13 *Owner's Site Representative*

SC-9.13 Add the following new paragraph immediately after Paragraph 9.12 of the General Conditions:

9.13 *Owner's Site Representative*

- A. Owner will furnish an "Owner's Site Representative" to represent Owner at the Site and assist Owner in observing the progress and quality of the Work. The Owner's Site Representative is not Engineer's consultant, agent, or employee. Owner's Site Representative will be **Manuel Leanos**. The authority and responsibilities of Owner's Site Representative follow: **Inspection of the construction work performed to be in accordance with construction documents.**

ARTICLE 10 - ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.03 Add a new paragraph immediately after Paragraph 10.03.B that is to read as follows:

SC-10.03.C Resident Project Representative (RPR) will be Owner's or employee or agent at the Site, will act as directed by and under the supervision of Owner, and will confer with Owner regarding RPR's actions. RPR's dealings in matters pertaining to the Work in general shall be with Owner and Contractor keeping Owner advised as necessary. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner with the knowledge of and under the direction of Engineer.

1. Duties and Responsibilities to RPR:
 - a. Schedules: Review the Progress Schedule, Schedule of Submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.
 - b. 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.
 - c. *Safety Compliance*: Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.
 - d. Liaison:
 - 1) Serve as Engineer's liaison with Contractor, working principally through Contractor's superintendent, and assist in providing understanding of the intent of the Contract Documents.
 - 2) Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
 - 3) Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
 - e. Shop Drawings and Samples:
 - 1) Record date of receipt of Shop Drawings and Samples that are received at the Site.
 - 2) Receive Samples that are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.
 - 3) Advise Engineer and Contractor of the commencement of any Work requiring a Shop Drawing or Sample if the submittal has not been approved by Engineer.

- f. Review of Work, Rejection of Defective Work, Inspections, and Tests:
- 1) Conduct observations of the Work in progress on the Site to assist Engineer in determining if the Work is, in general, proceeding in accordance with the Contract Documents.
 - 2) Report to Engineer when RPR believes that any Work is unsatisfactory, faulty, or defective or does not conform generally to 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 Work that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection, or approval.
 - 3) Verify that tests, equipment, and systems startups, and operating and maintenance training are conducted in the presence of appropriate Owner's personnel and that Contractor maintains adequate records thereof; and observe, record, and report to Engineer appropriate details relative to the test procedures and startups.
 - 4) Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to those performed by public or other agencies having jurisdiction over the Work.
 - 5) Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections and report to Engineer.
- g. 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.
- h. Modifications: Consider and evaluate Contractor's suggestions for modifications to Drawings or Specifications and report with RPR's recommendations to Engineer. Transmit to Contractor decisions issued by Engineer.
- i. Records:
- 1) Maintain at the Site orderly files for correspondence, reports of job conferences, Shop Drawings and Samples, and reproductions of original Contract Documents including all Addenda, Change Orders, Field Orders, work change directives, additional Drawings issued subsequent to the execution of the Agreement, Engineer's clarifications and interpretations of the Contract Documents, progress reports, and other Project-related documents.
 - 2) Keep a record recording Contractor's hours on the Site, weather conditions, data relative to questions on Change Orders or changed conditions, list of visitors to the Site, 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.

- 3) Record names, addresses, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
- 4) The RPR shall prepare a daily report or keep a daily diary that records weather conditions, the contractor's daily work activities, and specific observations. The RPR shall regularly photograph the work. The RPR shall maintain orderly files of correspondence, reports of job conferences, change orders, field orders, work change directives, daily reports and/or diaries, photographs and other similar documents. These documents shall be filed in Consultant's project record file. They shall be made available to Owner upon receipt of request from Owner and, if available, uploaded to cloud-based construction management software applications (or any other construction management software applications made available).

j. Reports:

- 1) Furnish Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and Schedule of Submittals.
- 2) Consult with Engineer in advance of scheduled major tests, inspections, or start of important phases of the Work.
- 3) Prepare draft of proposed Change Orders, obtaining backup documents from Contractor, and provide recommendations to Engineer regarding Change Orders and Field Orders.
- 4) Report immediately to Engineer and Owner upon the occurrence of any Site accident, any Hazardous Environmental Condition, emergencies, or acts of God endangering the Work, or property damage by fire or other cause.

k. Payment Requests: Review Applications for Payment with Contractor for compliance with the established procedure for their submission, and submit 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.

l. Certificates, Maintenance and Operation Manuals: During the course of the Work, verify that certificates, maintenance and operation manuals, and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to Engineer for review and forwarding to Owner prior to final payment for the Work.

m. Completion:

- 1) Before Engineer issues a certificate of Substantial Completion, submit to Contractor a list of observed items requiring completion or correction.

- 2) Observe whether Contractor has arranged for inspections required by Laws and Regulations, including but not limited to those to be performed by public authorities having jurisdiction over the Work.
- 3) Conduct final inspection in the company of Engineer, Owner, and Contractor, and prepare a final list of items to be completed or corrected.
- 4) Observe that all items on final list have been completed or corrected and make recommendations to Engineer concerning acceptance of the Work.

2. The RPR shall not:

- a. Authorize any deviation from the Contract Documents or substitution of materials or equipment, including “or equal” items.
- b. Exceed limitations of Engineer’s authority as set forth in the Contract Documents.
- c. Undertake any of the responsibilities of Contractor, Subcontractors, or Contractor’s superintendent.
- d. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences, or procedures of construction, unless such advice or directions are specifically required by the Contract Documents.
- e. Advise on, issue directions regarding, or assume control over safety precautions and programs in connection with the Work.
- f. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
- g. Authorize Owner to occupy the Project in whole or in part.
- h. Authorize the use of any Unmanned Aircraft System (UAS or drone) without prior consent and authorization from Owner.
- i. Participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by Engineer.

ARTICLE 11 - CHANGES TO THE CONTRACT

11.02 *Change Orders*

SC-11.02.C Add the following new paragraph immediately after Paragraph 11.02.B:

SC-11.02.C Change Order requests shall be accompanied by Contractor’s time impact analysis for the Change Order request to be reviewed.

11.03 *Work Change Directives*

SC-11.03.A.1 Add the following new subparagraphs immediately after Paragraph 11.03.A:

SC-11.03.A.1 Without invalidating the Contract, OWNER may, by written Work Change Directive, using the Cost of the Work method, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Amount and Contract Time being adjusted as necessary. "Cost of the Work" means a basis of payment for the direct performance of Work with payment based on the actual cost of the labor, equipment and materials furnished and consideration for overhead and profit as set forth in Section 13.01, below. A Work Change Directive shall be used in the absence of complete and prompt agreement on the terms of a Change Order. Where practicable, any items of Work that may be agreed upon, prior to the performance of Work under this Section, will be included in a separate Change Order.

SC-11.03.A.2 If the Work Change Directive provides for an adjustment to the Contract Amount, the adjustment shall be based on the method provided in paragraph 13.01. The estimated value of the work issued under each individual Work Change Directive shall not exceed five (5) percent of the original contract price.

SC-11.03.A.3 A Work Change Directive shall be effective immediately and shall be recorded later by preparation and execution of an appropriate Change Order.

SC-11.03.A.4 Upon receipt of a Work Change Directive, CONTRACTOR shall promptly proceed with the change in the Work involved, provided, prior to the commencement of any Work under this section, the CONTRACTOR must submit its proposed Work plan, anticipated schedule, and a list of its work force and equipment proposed to be used in the Work for OWNER'S approval. Upon such approval, CONTRACTOR must promptly commence and make continuous progress in the Work. The OWNER reserves the right to withhold payment for low production or lack of progress.

11.07 *Change of Contract Price*

SC-11.07.C.2.c Delete 27 percent and replace with 25 percent.

SC-11.11 Add the following new paragraph immediately after Paragraph 11.10:

SC-11.11 Liquidated Damages:

- 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.
- B. Liquidated Damages Relative to Substantial Completion and Readiness for Final Payment: Owner and Contractor recognize that time is of the essence as stated in Paragraph SC-11.11.A above and that Owner will suffer financial loss if the Work is not completed within the Contract Times for Substantial Completion, completion and readiness for final payment, and Milestones (if any) specified in the Contract Documents, plus any changes thereof allowed in accordance with Article 11 of the General Conditions. The parties also recognize the delays, expense, and

difficulties involved in proving in a legal or arbitration preceding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$1216.59 for each day that expires after the time specified in the Contract Documents for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner \$968.96 for each day that expires after the time specified in the Contract Documents for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 12 - CLAIMS

SC-12.01.B Add the following immediately after Paragraph 12.01.B:

SC-12.01.B.1 In the event a delay Claim arises due to Standby Equipment Costs, Contractor must notify, through an RFI, Engineer and Owner no later than 72-hours in advance of such claim at which time Contractor, Engineer and Owner will evaluate the progress of the Work and determine if no other Work can be performed. Once that determination has been made, official response from Engineer and Owner acknowledging the delay at which point the Standby time will commence.

ARTICLE 13 - COST OF WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

SC-13.01 In Paragraph SC-13.01.A, delete the last sentence and replace with:

The provisions of this Paragraph 13.01 are used for **three** distinct purposes:

SC-13.01 Add the following new paragraph immediately after Paragraph 13.01.A.2:

SC-13.01.A.3 If neither of the methods defined in paragraphs 13.01.A.1 nor 13.01.A.2 can be agreed upon before a change in the Work is commenced which will result in an adjustment in the Contract Amount, then the change in the Work will be performed by Work Change Directive, using the Cost of the Work method, and payment will be made as described below:

SC-13.01 Supplement Paragraph 13.01.B.5.c.(2) by adding the following sentence:

The equipment rental rate book that governs the included costs for the rental of machinery and equipment owned by Contractor (or a related entity) under the Cost of the Work provisions of this Contract is the most current edition of **Rental Rate Blue book**. Equipment or machinery with a value of less than \$1,000 will be considered small tools.

SC-13.01 Add the following new subparagraphs immediately after Paragraph 13.01.B.5.i:

SC-13.01.B.5.j Standby Equipment Costs: Standby equipment time will not exceed more than eight (8) hours per twenty-four (24) hour day, forty (40) hours per week, and one hundred seventy-six (176) hours per month Payment for standby equipment will be made in accordance with 13.01.B.5.c except that:

SC-13.01.B.5.j.(1) Contractor-Owned Equipment. For Contractor-owned machinery, trucks, power tools, or other equipment, Standby will be paid at 50% (to account for the removal of operating costs) of the rate established under 13.01.B.5.c.(2). Standby costs will not be allowed during periods when the equipment would have otherwise been idle.

SC-13.01.B.5.j.(2) Equipment Not Owned by the Contractor. For equipment rented from a third party not owned by the Contractor, Standby will be paid at the invoice daily rental rate, excluding operating cost, which includes fuel, lubricants, repairs, and servicing. The Owner reserves the right to limit the daily standby rate to comparable rates established under 13.01.B.5.c.(2). Standby will be paid for equipment operators when included on the invoice and equipment operators are actually on standby. Standby costs will not be allowed during periods when the equipment would have otherwise been idle.

SC-13.01 Supplement Paragraph 13.01.C.2 by adding the following definition of small tools and hand tools:

- a. For purposes of this paragraph, “small tools and hand tools” means any tool or equipment whose current price if it were purchased new at retail would be less than \$1,000.

13.03 *Unit Price Work*

SC-13.03 Delete Paragraph 13.03.E in its entirety and insert the following in its place:

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the extended price of a particular item of Unit Price Work amounts to 10 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 **25** percent from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor’s unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor’s costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

SC-14.02 Add the following new subparagraphs to Paragraph 14.02.B:

1. Re-Inspection Fees
 - a. Pay fees to the Owner to compensate the Owner's Representative as identified in Article 10 of the General Conditions for reinspection of the Work required by the failure of the Work to comply with the claims of status of completion made by the Contractor.
 - b. Owner may withhold the amount of these fees from the Contractor's final payment as stipulated in Article 15 of the General Conditions.
 - c. Cost for additional inspections will be billed to the Owner by the Owner's Representative for the actual hours required for the reinspection and preparation of related reports in accordance with the rates provided in the Supplemental Conditions.
2. Fees for Inspections Outside Normal Working Hours
 - a. If some or all of the Work has been determined to be required to be performed outside the normal working hours and or beyond the standard 40-hour work week as defined by Article 7 of the General Conditions, the Contractor is required to:
 - 1) Notify the Owner in advance of their intent to work outside regular working hours or working days;
 - 2) Determine if the work to be performed will require observation by the Owner's Representative or other agencies prior to covering the Work;
 - b. Pay fees to the Owner to compensate the Owner's Representative as identified in Article 10 of the General Conditions for inspection of the Work performed outside normal working hours;
 - c. Owner may withhold the amount of these fees from the Contractor's final payment as stipulated in Article 15 of the General Conditions.
 - d. Cost for inspections will be billed to the Owner by the Owner's Representative for the actual hours required for the inspection and or observation of the work and preparation of related reports in accordance with the rates provided in the Supplemental Conditions.

ARTICLE 15 - PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD

15.01 *Progress Payments*

SC-15.01.D.1 Delete Paragraph 15.01.D.1 in its entirety and insert the following in its place:

SC-15.01.D.1 Thirty days after presentation of the Application for Payment to Owner by Contractor with Engineer's recommendation, the amount recommended will (subject to the

provisions of Paragraph 15.01.E) become due, and when due will be paid by Owner to Contractor.

SC-15.01.D.1.(a) The thirty days' time will commence immediately after Owner acknowledges receipt of the Application for Payment from Contractor.

SC-15.01.D.1.(b) If upon review of the Application for Payment the Owner encounters any error (including, but not limited to, clerical, grammatical, informational, etc...) or lacks documentation as required by the Contract Documents, the Application for Payment will be deemed incomplete and the Owner will reject the Application for Payment. The Owner will immediately notify the Contractor and Engineer the reason for the rejection of the Application for Payment. The thirty days' time allotted will reset and recommence once a corrected Application for Payment is received by Owner from Contractor.

SC-15.01.F Add the following new Paragraph 15.01.F:

SC-15.01.F For contracts in which the Contract Price is based on the Cost of Work, if Owner determines that progress payments made to date substantially exceed the actual progress of the Work (as measured by reference to the Schedule of Values), or present a potential conflict with the Guaranteed Maximum Price, then Owner may require that Contractor prepare and submit a plan for the remaining anticipated Applications for Payment that will bring payments and progress into closer alignment and take into account the Guaranteed Maximum Price (if any), through reductions in billings, increases in retainage, or other equitable measures. Owner will review the plan, discuss any necessary modifications, and implement the plan as modified for all remaining Applications for Payment.

15.03 *Substantial Completion*

SC-15.03 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, will 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 this Article 15.

15.06 *Final Payment*

SC-15.06.B Delete the first sentence and replace with the following:

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 10 days after receipt of the final Application for Payment, indicate in writing **to Owner** Engineer's recommendation of final payment and **inform**

Contractor Final Payment Application is ready to be submitted to Owner for payment.

SC-15.06.E Delete Paragraph 15.06.E in its entirety and replace with the following:

- E. Final Payment Becomes Due: Upon receipt from **Contractor of an approvable Application for Final Payment** and accompanying documentation, Owner shall set-off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including, but not limited to, set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Contractor. An approvable application for final payment shall include Contractor and Subcontractor payrolls for the period covered in the final Application for Payment; an update of progress against the accepted Progress Schedule; and such other items as the Engineer may reasonably require.

15.08 *Correction Period*

SC-15.08 Add the following new Paragraph 15.08.G:

- G. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be the number of years set forth in SC-6.01.B.1; or if no such revision has been made in SC-6.01.B, then the correction period is hereby specified to be **one** year after Substantial Completion.

ARTICLE 16 - SUSPENSION OF WORK AND TERMINATION

16.02 *Owner May Terminate for Cause*

SC-16.02.A.5 Add the following new paragraphs immediately after Paragraph 16.02.A.4:

SC-16.02.A.5 If the Contract or any part thereof is sublet or assigned to another party by Contractor, without the written consent of Owner and surety that issued the performance bond and payment bond.

ARTICLE 17 - FINAL RESOLUTIONS OF DISPUTES

SC-17.02 Add the following new paragraphs immediately after Paragraph 17.01:

17.02 *Arbitration*

- A. All matters subject to final resolution under this Article will be settled by arbitration administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules (subject to the conditions and limitations of this Paragraph SC-17.02). Any controversy or claim in the amount of \$100,000 or less will be settled in accordance with the American Arbitration Association's supplemental rules for Fixed Time and Cost Construction

Arbitration. This agreement to arbitrate 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 arbitration administrator, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the specific time required in Article 17, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event will 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.
- C. The arbitrator(s) must be licensed engineers, contractors, attorneys, or construction managers. Hearings will take place pursuant to the standard procedures of the Construction Arbitration Rules that contemplate in-person hearings. The arbitrators will have no authority to award punitive or other damages not measured by the prevailing party's actual damages, except as may be required by statute or the Contract. Any award in an arbitration initiated under this clause will be limited to monetary damages and include no injunction or direction to any party other than the direction to pay a monetary amount.
- D. The Arbitrators will have the authority to allocate the costs of the arbitration process among the parties, but will only have the authority to allocate attorneys' fees if a specific Law or Regulation or this Contract permits them to do so.
- E. The award of the arbitrators must be accompanied by a reasoned written opinion and a concise breakdown of the award. The written opinion will cite the Contract provisions deemed applicable and relied on in making the award.
- F. The parties agree that failure or refusal of a party to pay its required share of the deposits for arbitrator compensation or administrative charges will constitute a waiver by that party to present evidence or cross-examine witness. In such event, the other party shall be required to present evidence and legal argument as the arbitrator(s) may require for the making of an award. Such waiver will not allow for a default judgment against the non-paying party in the absence of evidence presented as provided for above.
- G. No arbitration arising out of or relating to the Contract will 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 will allow complete relief to be afforded among those who are already parties to the arbitration;
 - 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;
 - 3. such other individual or entity is subject to arbitration under a contract with either Owner or Contractor, or consents to being joined in the arbitration; and
 - 4. the consolidation or joinder is in compliance with the arbitration administrator's procedural rules.

- H. 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.
- I. Except as may be required by Laws or Regulations, neither party nor an arbitrator may disclose the existence, content, or results of any arbitration hereunder without the prior written consent of both parties, with the exception of any disclosure required by Laws and Regulations or the Contract. To the extent any disclosure is allowed pursuant to the exception, the disclosure must be strictly and narrowly limited to maintain confidentiality to the extent possible.

17.03 *Attorneys' Fees*

SC-17.03 Add the following new paragraph immediately after Paragraph 17.02:

17.03 *Attorneys' Fees*

- A. 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-18.11 Add the following new paragraph immediately after Paragraph 18.10:

SC-18.11 *Use of Unmanned Aerial/Aircraft Systems (UAS)*

- A. The use of an UAS on all Owner property is strictly prohibited unless the following are met:
 - 1. The proposed flight is solely for purposes of Utility operations
 - 2. Authorization has been received from Owner to operate on or above Owner property
 - 3. All of the necessary federal, state, and local approvals have been acquired
 - 4. Compliance with federal, state, and local laws are met
 - 5. The Contractor has filed a flight plan with [AirMap](#) or any other Owner-approved Unmanned Aircraft System Traffic Management (UTM) ecosystem for uncontrolled operations that is separate from, but complementary to, the FAA's Air Traffic Management (ATM) system prior to flight operations
 - 6. The proposed flight does not photograph, video, or monitor in any way areas where members of the general public would have a reasonable expectation of privacy

- B. Any person or vendor, including but not limited to third parties seeking to operate a UAS on or above Owner property or at an Owner-sponsored event must submit a completed UAS (Drone) Use Approval Form to the Owner at least 10 business days in advance.
- C. The applicable Owner Representative (PM) who is an employee of the Owner will process the request for UAS use. After review and assessment of the request, the requestor will be notified of a decision or receive a request of additional information within five (5) business days.
 - 1. If approved, the PM will email a copy of the approved form to the Owner's Utility Security and Emergency Response (USER) Coordinator.
- D. The USER Coordinator will advise El Paso Police Department (EPPD) and Airport Operations (if the UAS will be near or entering restricted flight space) of UAS activity for situational awareness.
 - 1. If approved, a copy of the UAS Approval Form must be in possession by the pilot in command at all times during flight activity and must be presented to any EPWater official or representative with control or jurisdiction over the activity, upon request.
- E. The USER Coordinator will maintain a copy of the UAS (Drone) Use Approval Forms.
- F. Exceptions and Deviations
 - 1. Contractors will be limited to the collection, use, retention, or dissemination of images and videos of Owner's critical infrastructure acquired by UAS.
 - 2. The Owner's Utility Chief Operations Officer may waive the 10-business day notification requirement as deemed necessary.
 - 3. UAS operators must only conduct approved flights under favorable conditions. If unforeseen circumstances develop (e.g. adverse weather) under which operations cannot be conducted in a safe manner, the operation must postpone the flight and request an extension from the Project Manager within 3 business days of the original date. If the extension is not requested within three (3) business days, a new UAS Approval Form must then be completed and submitted.
 - 4. The use of UAS for hobby or recreational use on all EPWater property is always strictly prohibited. Using a UAS to take photographs or videos for personal use is considered recreational use and is prohibited.

SC-18.12 Add the following new paragraph immediately after Paragraph 18.10:

A. *Construction Adjacent to High Voltage Electric Lines:*

1. Contractor shall comply with Laws and Regulations, including U.S. Occupational Safety and Health Administration (OSHA) safety standards regarding construction adjacent to high-voltage electric lines and facilities, including trenching, crane operations, final grading, and other associated work which may result in impaired clearance to an existing electrical line or facility.
2. It is a violation of OSHA regulations to operate equipment in a manner that results in persons or equipment coming within ten feet of an energized electric line. Such Laws and Regulations are enforced by OSHA, and violators are subject to penalties imposed under federal Law.
3. Texas Law prohibits function or activity where it is possible for the person performing such activity to come within six feet of an overhead power line.
4. Contractor shall notify the El Paso Electric Company in writing of Contractor's anticipated dates and times when such work is scheduled. Written notification of El Paso Electric Company shall be at least six working days prior to each scheduled activity near El Paso Electric Company power lines and facilities, so that El Paso Electric Company personnel can coordinate with Contractor to provide proper clearance of energized electric lines. No other type of notice will be acceptable and work shall not be initiated until proper clearance and arrangements are confirmed by Contractor with the El Paso Electric Company.
5. Submit written notification to:

Raul Guel, Distribution Engineering Design
El Paso Electric Company
P. O. Box 982
El Paso, Texas 79960
(915) 543-4015
6. Simultaneously submit one copy of the notification letter to Owner's Contracts Development Manager and retain copy in Contractor's file.
7. Below are selected El Paso Electric Company phone numbers:

Claims Director (915) 543-4158
Trouble & Emergencies (915) 543-5720
Field Services/Power Consultants (915) 543-2255

B. Construction Adjacent to Gas Lines: Contractor shall comply with the One-Call Notification and System Protection Program developed by Southern Union Gas Company, and with State Damage Prevention Law, HB 2295:

- Contact Texas Gas Co. not less than two working days before commencing excavation activities
- Determine exact location of all underground utilities by safe and acceptable means
- Employ the two-foot safety rule
- Utilize "Professional Excavator's Manual" as revised

SC-18.13 Add the following new paragraph immediately after Paragraph 18.12:

SC-18.13 *EPCWID #1 Dewatering Permit Requirements*

- A. A license agreement for "Discharge of Foreign Waters into District Drain Ditches" is required between Owner and the El Paso County Water Improvement District (EPCWID) #1 before Contractor may begin dewatering operations. Contractor shall be a co-licensee with Owner. Terms and conditions of the license agreement are applicable to Contractor, who will function, relative to the license EPCWID #1 agreement only, as an agent of Owner, by preparing an approvable plan and carrying out the terms of the plan and the EPCWID #1 license agreement. Contractor shall, to the extent permitted by law, defend and hold harmless Owner, its employees, insurers and agents; and the Engineer and Engineer's consultants, and their employees, officers, insurers, and agents from claims arising out of damages caused by actions, or inactions, of Contractor or as a result of EPCWID's exercise of any or all options given it under the license agreement.
- B. Contractor shall prepare and submit to Engineer a "Dewatering Plan", a "Final Schedule for Dewatering", and an estimate of fees due EPCWID #1. Submit "Dewatering Plan" within 15 days of the date that the Contract Times commence running. "Dewatering Plan" shall include the estimated quantities of dewatering for each month of the Contract, the design capacity and number of pumps to be used by Contractor, and the point(s) of dewatering pump discharge. Engineer will review for acceptability the "Dewatering Plan" and, when the submittal is acceptable to Engineer, Engineer will forward it, through Owner, to EPCWID #1. Prepare and submit the submittal and schedule the Work so that Owner receives the "Dewatering Plan" submittal not less than 14 days before the start of dewatering operations at the Site. Owner will pay the fees as estimated in the "Dewatering Plan".

- C. Estimate the dewatering fees on the following basis:
1. Drain maintenance fee of \$1,000 for each six months a discharge occurs. Fee for maintenance is non-refundable. Subsequent semi-annual fee payments are payable to Owner by Contractor in advance of each respective six-month period.
 2. Dewatering fee at the rate of \$150 per acre-foot of water discharged. For a month in which the discharge exceeds the amount estimated under the “Dewatering Plan”, Contractor shall advise Owner and Engineer in writing, that such excess fees may be due so that the Owner may consider its liability for, and take action to make payment of, such excess fees to EPCWID #1. Owner will pay such excess fees only to the extent that such fees are incurred through no fault of Contractor.
- D. Samples of the discharge water shall be tested by a qualified testing laboratory hired by Contractor. Submit to Engineer results of total dissolved solids (TDS) tests, which Engineer will transmit to EPCWID #1. Submit to Engineer and Owner monthly reports of discharge quantities and quality (TDS and sulfates), which specific requirements may be more particularly indicated in the Specifications and in the associated discharge permit; Engineer will transmit monthly reports to EPCWID #1.
- E. Contractor will not be eligible for final payment by Owner until final dewatering fees based upon actual quantities and damages (if any) due EPCWID # 1 have been paid and payment due from Contractor has been made. A “Final Release” from EPCWID # 1 shall be received by Owner as a condition precedent to Contractor applies for final payment.

SC-18.14 Add the following new paragraph(s) immediately after Paragraph 18.12:

SC-18.14 *Railroads*

- A. *Union Pacific Railroad Company Contractor’s Right of Entry:* Contractor shall acquire and pay all associated expenses (including railroad company inspection fees), Contractor's right-of-entry from, the Union Pacific Railroad Company. Refer to Union Pacific Railroad’s “Contractor's Right of Entry” form and its exhibits, included in the Project Manual following these Supplementary Conditions. Right-of-entry requirements are interrelated with the railroad liability insurance requirements and both are Contractor's cost responsibility. Contractor shall acquire railroad company's authorization prior to commencing work in the railroad right-of-way. Submit to Owner and Engineer executed copies of Contractor’s “Right of Entry” form prior to commencing work on railroad property.
- B. *Railroad Liability Insurance:* Contractor shall obtain Railroad Liability Insurance in the form and amount required by the Union Pacific Railroad Company. Such insurance shall be in effect and cover all necessary work and operations required of Contractor within the railroad right-of-way.

Refer to the railroad's "Contractor's Right of Entry" form and its exhibits. Insurance requirements of this paragraph are interrelated with the right-of-entry requirements in Paragraph SC-18.14.A and is Contractor's responsibility.

- C. For clarification of the requirements and costs of railroad permits and insurance, contact:

Manager Utilities Work
Union Pacific Railroad Company
Contracts and Real Estate Department
1400 Douglas Street STOP 1690
Omaha, Nebraska 68179-1690
Phone: (402) 544-8620
Fax: (402) 501-1519

SC-18.15 Add the following new paragraph immediately after Paragraph 18.14:

SC-18.15 Texas Water Development Board (TWDB) contracts require that all Contractors and subcontractors maintain project costs in a manner consistent with generally accepted accounting principles. All records are to be maintained for a minimum period of three years and beyond that minimum period if litigation, a claim, or an audit is in process, or if audit findings are not resolved. The three-year period will begin upon completion of final payment.

***** END OF SUPPLEMENTARY CONDITIONS *****

REQUIRED WORKERS' COMPENSATION COVERAGE

(Title must be 30 point font & bold lettering)

(19 point font from here on)

The law requires that each person working on this site or providing services related to this construction project must be covered by workers' compensation insurance. This includes persons providing, hauling, or delivering equipment or materials, or providing labor or transportation or other service related to the project, regardless of the identity of their employer or status as an employee."

"Call the Texas Workers' Compensation Commission at 512-440-3789 to receive information on the legal requirements for coverage, to verify whether your employer has provided the required coverage, or to report an employer's failure to provide coverage."

* The above sign to be provided in both English and Spanish without any additional words or changes and shall be posted at the Project Site. Refer to Paragraph SC-6.03.D.1 of the Supplementary Conditions (Document 00800 in the Contract Documents).

Contractor Insurance Check List



Project	COORS CHANNEL DRAINAGE IMPROVEMENTS		
Bid Number			
Job Description			
Contract Cost			
Final Completion			
Contractor			
Engineer			
Insurance Agent			
Performance & Payment Bonds	Bond Limit :		
	Surety:		
	Certified copy of Authority to Act	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	Countersigned by Agent	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Workers' Compensation	Insurance Company / A.M. Best Rating		
	Policy Period	From:	To:
	Employers Liability Limits required		
	Employers Liability Limits provided		
	Waiver of Subrogation	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	30 Days Notice of Cancellation	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	If Employees Leased:		
	- Employee Leasing Company	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- Texas State License	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- Copy of Workers' Compensation Policy	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Commercial General Liability	Insurance Company / A.M. Best Rating		
	Policy Period	From:	To:
	Limits required		
	Limits provided		
	Products/Completed Operations – 2 Years after completion	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	Personal Injury – Employment Exclusion deleted	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	Contractual	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	Broad Form Property Damage	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	XCU	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	Additional Insured	<input type="checkbox"/> Yes	<input type="checkbox"/> No
30 Days Notice of Cancellation	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Business Auto	Insurance Company / A.M. Best Rating		
	Policy Period	From:	To:
	Limits required		
	Limits provided		
	Symbol 1	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	Additional Insured	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	30 Days Notice of Cancellation	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Umbrella	Insurance Company / A.M. Best Rating		
	Policy Period	From:	To:
	Limits required		
	Limits provided		
	Follow Form – Additional Insureds and Waivers of Subrogation	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	30 Days Notice of Cancellation	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Contractor Insurance Check List



Builder's Risk/Installation Floater	Insurance Company / A.M. Best Rating		
	Policy Period	From:	To:
	Limits required		
	Limits provided		
	Deductible		
	- All Risk	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- Flood	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- Earthquake	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- Testing	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- Offsite Storage	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- Transit	<input type="checkbox"/> Yes	<input type="checkbox"/> No
- Additional Interests	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
- Waiver of Subrogation	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Boiler & Machinery	- If required		
Certificates of Insurance	- All coverages		
Certified Copies of Policies	- All policies		
Requirements	Additional Insureds – Owner, Engineer and Engineer's Consultants on:		
	- CGL	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- Auto	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- Umbrella	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	Waiver of Subrogation (Workers' Compensation) – Owner, Engineer and Engineer's Consultants		
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
	30 Days Notice of Cancellation to Owner & Engineer by Certified Mail on:		
	- WC	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- CGL	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- Auto	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- Umbrella	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- Builder's Risk	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	- B&M (If required)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	Builder's Risk/Installation Floater – Include Additional Insured interests & Waiver of Subrogation in favor of :		
	- Owner	<input type="checkbox"/> Yes	<input type="checkbox"/> No
- Contactor	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
- Subcontractor	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
- Engineer	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
- Engineer's Consultants	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Other			

Notice: This checklist is provided as a guide only and is not a substitute for the insurance requirements included in the EPWU contract. EPWU strongly advises contractors provide a copy of the contract insurance requirements to their insurance agents, consultants and providers to ensure their insurance coverages meet the contract insurance requirements.

APPLICATION FOR PAYMENT NO. _____	Check One: PARTIAL ____ FINAL ____
--	------------------------------------

OWNER: El Paso Water Utilities Public Service Board 1154 Hawkins Blvd. El Paso, Texas 79925	PROJECT: _____ BID NO.: _____ PURCHASE ORDER: _____
--	---

ORIGINAL CONTRACT AMOUNT: \$ _____	CONTRACT SUM TO DATE: \$ _____
NET CHANGE BY CHANGE ORDERS: \$ _____	THROUGH CHANGE ORDER NO. _____

NOTICE TO PROCEED: _____	CONTRACT COMPLETION DATE: _____
CONTRACT TIME: _____ Calendar Days	REVISED COMPLETION DATE: _____
REVISED: _____ Calendar Days	SUBSTANTIAL COMPLETION DATE: _____
ELAPSED TIME: _____ Calendar Days	FINAL COMPLETION DATE: _____

WORK COMPLETED:	\$ _____	<i>See Attached Pay Item Schedule</i>
MATERIALS STORED:	\$ _____	<i>Attach Invoices, Documentation</i>
TOTAL EARNED:	\$ _____	
LESS RETAINED: ____ %	- \$ _____	
LESS PREVIOUS PAYMENTS:	- \$ _____	
NET DUE THIS ESTIMATE:	\$ _____	<i>Attach Certified Payroll LCP Tracker Report this Period</i>

CONTRACTOR'S CERTIFICATION:

The undersigned CONTRACTOR certifies that (1) all previous progress payments received from OWNER on account of work done under the contract referred to above have been applied to discharge in full all obligations of CONTRACTOR incurred in connection with work covered by prior applications for payment; and (2) title to all 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, claims, security interests and encumbrances (except such as covered by bond acceptable to OWNER).

CONTRACTOR: _____	By: _____
	Title: _____
	Date: _____

RECOMMENDED: CONSTRUCTION MANAGER: _____ By: _____ Date: _____	APPROVED: By: _____ Title: _____ Date: _____
---	--

AIA Document G702, APPLICATION AND CERTIFICATE FOR PAYMENT, containing Contractor's signed Certification is attached.
 In tabulations below, amounts are stated to the nearest dollar.
 Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NUMBER:
 APPLICATION DATE:
 PERIOD TO:
 ARCHITECT'S PROJECT NO:

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED		MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G+C)	BALANCE TO FINISH (C-G)	RETAINAGE
			FROM PREVIOUS APPLICATION (D+E)	THIS PERIOD					



PAY APPLICATION CHECK LIST

REQUIRED ITEM/PROCESS	INCLUDED
1. Three original Pay Applications are included/submitted and are on the standard EPWU form (CM 11343A in the bid document).	
2. Substantial and Final Completion due dates listed match the bid document.	
3. Project adjustments (e.g., price, quantity, time, etc.) reflected in Work Directives or unexecuted Change Orders are NOT included in the Pay Application.	
4. If charges for paid materials are included in the Pay Application, include paid invoices for the stored material.	
5. Updated Construction Schedule is included	
6. Payrolls to be entered in the Utility Automated Payroll Software program, which include the following:	
a. For 'Negative Payrolls' during week(s) of no work performed, state, "No Work Performed" on those payrolls.	
b. If apprentices are used, submit DOL certification, apprenticeship programs and training periods for each apprentice. (Note: The DOL certificates expire every 90 days and must be renewed and current. If a current DOL certificate is not submitted for each apprentice, the employee must be paid the Journeyman's rate).	

If all requirements are not met or included in the Pay Application package, the Pay Application will be returned for revisions, and payment will not be made until EPW's receipt of 'approvable' Pay Application.

SECTION 00840

GENERAL WAGE REQUIREMENTS

The following Wage Decision(s) will be utilized for this project. A Wage Rate for one or both Wage Decisions for a construction type(s) included in the Contract Document, the Contractor is required to indicate on his Certified Payroll Reports, the Wage Decision description/construction type under which the works being reported. **The wage decision(s) is/are attached to this form.**

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	100%

TEXAS DEPARTMENT OF INSURANCE, DIVISION OF WORKERS' COMPENSATION
7551 Metro Center Drive, Suite 100
Austin, Texas 78744

If you are not certain whether all parties meet the requirements for entering into this agreement, you may wish to consult an attorney.

AGREEMENT BETWEEN GENERAL CONTRACTOR AND SUBCONTRACTOR
TO PROVIDE WORKERS' COMPENSATION INSURANCE

Notice of Agreement

The undersigned General Contractor and the undersigned Subcontractor hereby agree that the General Contractor will withhold will not withhold the cost of workers' compensation insurance coverage from the Subcontractor's contract price and that, for the purpose of providing workers' compensation insurance coverage, the General Contractor will be the employer of the Subcontractor and the Subcontractor's employees. This agreement makes the General Contractor the employer of the Subcontractor and the Subcontractor's employees only for the purposes of workers' compensation laws of Texas and for no other purpose.

TERM (DATES) OF AGREEMENT: FROM: _____
TO: _____

LOCATION OF EACH AFFECTED JOB SITE (OR STATE WHETHER THIS IS A BLANKET AGREEMENT):

ESTIMATED NUMBER OF EMPLOYEES AFFECTED: _____

THIS AGREEMENT SHALL TAKE EFFECT NO SOONER THAN THE DATE IT IS SIGNED.
Texas Labor Code, Texas Workers' Compensation Act, Section 406.123

General Contractor's Affirmation

If the General Contractor's workers' compensation carrier changes during the effective period of coverage, it is advisable for the General Contractor to file this form with the new insurance carrier.

Federal Tax I.D. Number

Signature of General Contractor

Date

Address (Street)

Printed Name of General Contractor

Address (City, State, Zip)

Subcontractor's Affirmation

Federal Tax I.D. Number

Signature of Subcontractor

Date

Address (Street)

Printed Name of Subcontractor

Address (City, State, Zip)

The General Contractor should retain the original. Legible copies of this agreement should be filed with the general contractor's workers' compensation insurance carrier and the Division within 10 days of the date of execution. If the General Contractor is certified self-insured, a copy should be filed with the Division's Self-Insurance Regulation service area. An agreement is not considered filed if it is illegible or incomplete. Filing may be accomplished by mail or facsimile transmission. The Subcontractor must also retain a copy of the agreement.

Division Date Stamp Here



TEXAS DEPARTMENT OF INSURANCE, DIVISION OF WORKERS' COMPENSATION
7551 Metro Center Drive, Suite 100
Austin, Texas 78744

If you are not certain whether all parties meet the requirements for entering into this agreement, you may wish to consult an attorney.

CHECK BOX OF STATEMENT THAT APPLIES

AGREEMENT BETWEEN MOTOR CARRIER
AND OWNER OPERATOR TO PROVIDE
WORKERS' COMPENSATION INSURANCE COVERAGE

Notice of Declaration

The undersigned Motor Carrier and the undersigned Owner Operator agree that the Motor Carrier will provide workers' compensation insurance coverage to the Owner Operator and the Owner Operator's employees. The Motor Carrier will deduct will not deduct the actual premiums, based on payroll, that are paid or incurred by the Motor Carrier for coverage from the contract price or any other amount owed to the Owner Operator by the Motor Carrier.

TERM (DATES) OF AGREEMENT: FROM: _____
TO: _____

ESTIMATED NUMBER OF WORKERS AFFECTED: _____
Texas Labor Code, Texas Workers' Compensation Act, Section 406.123.

AGREEMENT TO REQUIRE OWNER OPERATOR
TO ACT AS EMPLOYER

Notice of Agreement

The undersigned Motor Carrier and the undersigned Owner Operator agree that the Owner Operator assumes the responsibilities of an employer for the performance of work.

TERM (DATES) OF AGREEMENT: FROM: _____
TO: _____

ESTIMATED NUMBER OF WORKERS AFFECTED: _____
Texas Labor Code, Texas Workers' Compensation Act, Section 406.122.

THIS AGREEMENT SHALL TAKE EFFECT NO SOONER THAN THE DATE IT IS SIGNED.

MOTOR CARRIER'S AFFIRMATION

If the Motor Carrier's workers' compensation carrier changes during the effective period of coverage, it is advisable for the Motor Carrier to file this form with the new insurance carrier.

Federal Tax I.D. Number

Signature of Motor Carrier

Date

Address (Street)

Printed Name of Motor Carrier

Address (City, State, Zip)

OWNER OPERATOR'S AFFIRMATION

Federal Tax I.D. Number

Signature of Motor Owner Operator

Date

Address (Street)

Printed Name of Owner Operator

Address (City, State, Zip)

The Motor Carrier should retain the original. Legible copies of this agreement must be filed with the Motor Carrier's workers' compensation insurance carrier and the Division within 10 days of the date of execution. An agreement is not considered filed if it is illegible or incomplete. Filing may be accomplished by mail or facsimile transmission. The Owner Operator must also retain a copy of the agreement.

Division Date Stamp Here



TEXAS DEPARTMENT OF INSURANCE, DIVISION OF WORKERS' COMPENSATION
7551 Metro Center Drive, Suite 100
Austin, Texas 78744

If you are not certain whether all parties meet the requirements for entering into this agreement, you may wish to consult an attorney.

Texas Workers' Compensation Act, Texas Labor Code, Section 406.141(2) defines "independent contractor" as follows: (2) "Independent contractor" means a person who contracts to perform work or provide a service for the benefit of another and who: (A) is paid by the job, not by the hour or some other time-measured basis; (B) is free to hire as many helpers as he desires and to determine what each helper will be paid; and (C) is free to work for other contractors, or to send helpers to work for other contractors, while under contract to the hiring employer.

CHECK BOX OF STATEMENT THAT APPLIES

JOINT AGREEMENT TO AFFIRM INDEPENDENT
RELATIONSHIP FOR CERTAIN BUILDING
AND CONSTRUCTION WORKERS

Notice of Declaration

The undersigned Hiring Contractor and the undersigned Independent Contractor hereby declare that the Independent Contractor meets the qualifications of an Independent Contractor under Texas Workers' Compensation Act, Texas Labor Code, Section 406.141, that the Independent Contractor is not an employee of the Hiring Contractor, and that:

- (A) the Independent Contractor and the Independent Contractor's employees shall not be entitled to workers' compensation coverage from the Hiring Contractor; and
- (B) the Hiring Contractor's workers' compensation insurance carrier shall not require premiums to be paid by the Hiring Contractor for coverage of the Independent Contractor or the Independent Contractor's employees, helpers, or subcontractors.

THIS DECLARATION TAKES EFFECT UPON RECEIPT BY THE TEXAS DEPARTMENT OF INSURANCE, DIVISION OF WORKERS' COMPENSATION. THIS DECLARATION APPLIES TO ALL HIRING AGREEMENTS EXECUTED BY THE HIRING CONTRACTOR AND THE INDEPENDENT CONTRACTOR DURING THE YEAR AFTER THIS DECLARATION IS FILED UNLESS A SUBSEQUENT HIRING AGREEMENT IS MADE TO WHICH THE DECLARATION DOES NOT APPLY. IN THE EVENT THAT A HIRING AGREEMENT TO WHICH THIS DECLARATION DOES NOT APPLY IS MADE, THE HIRING CONTRACTOR AND INDEPENDENT CONTRACTOR SHALL SO NOTIFY THE TEXAS DEPARTMENT OF INSURANCE, DIVISION OF WORKERS' COMPENSATION AND THE HIRING CONTRACTOR'S WORKERS' COMPENSATION INSURANCE CARRIER (IF ANY) IN WRITING WITHIN 10 DAYS AFTER THE NON-APPLYING AGREEMENT IS MADE. ONCE THIS AGREEMENT IS SIGNED, THE SUBCONTRACTOR AND THE SUBCONTRACTOR'S EMPLOYEES SHALL NOT BE ENTITLED TO WORKERS' COMPENSATION COVERAGE FROM THE HIRING CONTRACTOR UNLESS A SUBSEQUENT WRITTEN AGREEMENT IS EXECUTED, AND FILED ACCORDING TO WORKERS' COMPENSATION RULES, EXPRESSLY STATING THAT THIS AGREEMENT DOES NOT APPLY.
Texas Labor Code, Texas Workers' Compensation Act, Section 406.145.

AGREEMENT TO ESTABLISH EMPLOYER-
EMPLOYEE RELATIONSHIP FOR CERTAIN
BUILDING AND CONSTRUCTION WORKERS

Notice of Agreement

The undersigned Hiring Contractor and the undersigned Independent Contractor hereby agree that the Hiring Contractor will withhold will not withhold the cost of workers' compensation insurance coverage from the Independent Contractor's contract price and that the Hiring Contractor will purchase workers' compensation insurance coverage for the Independent Contractor and the Independent Contractor's employees. Once this agreement is signed, for the purpose of providing workers' compensation insurance coverage, the Hiring Contractor will be the employer of the Independent Contractor and the Independent Contractor's employees. This agreement makes the Hiring Contractor the employer of the Independent Contractor and the Independent Contractor's employees only for the purposes of workers' compensation laws of Texas and for no other purpose.

TERM (DATES) OF AGREEMENT: _____ FROM: _____
TO: _____

LOCATION OF EACH AFFECTED JOB SITE (OR STATE WHETHER THIS IS A BLANKET AGREEMENT):

ESTIMATED NUMBER OF EMPLOYEES AFFECTED: _____

THIS AGREEMENT SHALL TAKE EFFECT NO SOONER THAN THE DATE IT IS SIGNED.

Texas Labor Code, Texas Workers' Compensation Act, Section 406.144.

Hiring Contractor's Affirmation

If the Hiring Contractor's workers' compensation carrier change during the effective period of coverage, it is advisable for the Hiring Contractor to file this form with the new insurance carrier.

Signature of Hiring Contractor _____ Date _____

Printed Name of the Hiring Contractor _____

_____ Federal Tax I.D. Number

_____ Address (Street)

_____ Address (City, State, Zip)

Independent Contractor's Affirmation

Signature of Independent Contractor _____ Date _____

Printed Name of the Independent Contractor _____

_____ Federal Tax I.D. Number

_____ Address (Street)

_____ Address (City, State, Zip)

The Hiring Contractor should retain the original. Legible copies of this agreement should be filed with the hiring contractor's workers' compensation insurance carrier and the Division within 10 days of the date of execution. An agreement is not considered filed if it is illegible or incomplete. Filing may be accomplished by mail or facsimile transmission. The Independent Contractor should also retain a copy of the agreement.

Division Date Stamp Here



TEXAS DEPARTMENT OF INSURANCE, DIVISION OF WORKERS' COMPENSATION
7551 Metro Center Drive, Suite 100
Austin, Texas 78744

EXCEPTION TO APPLICATION OF JOINT AGREEMENT TO AFFIRM INDEPENDENT
RELATIONSHIP FOR CERTAIN BUILDING AND CONSTRUCTION WORKERS

NOTICE OF DECLARATION

The undersigned Hiring Contractor and the undersigned Independent Contractor declare that the Joint Agreement to Affirm Independent Relationship for Certain Building and Construction Workers (as recorded on DWC FORM-83) does not apply to the subsequent hiring agreement between the Hiring Contractor and Independent Contractor. Nothing in this declaration otherwise nullifies the Joint Agreement to Affirm Independent Relationship for Certain Building and Construction Workers as it applies to other hiring agreements made during the term of the joint agreement.

DATE OF JOINT AGREEMENT TO AFFIRM INDEPENDENT
RELATIONSHIP FOR CERTAIN BUILDING AND CONSTRUCTION
WORKERS

DATE OF SUBSEQUENT HIRING AGREEMENT TO WHICH THIS
FORM APPLIES

LOCATION OF SPECIFIC JOB SITES NOT AFFECTED BY JOINT AGREEMENT: _____

NAME OF HIRING CONTRACTOR

NAME OF INDEPENDENT CONTRACTOR

Texas Labor Code, Texas Workers' Compensation Act, Section 406.145.

Hiring Contractor's Affirmation

If the Hiring Contractor's workers' compensation carrier changes
during the effective period of coverage, it is advisable for the Hiring Contractor to file
this form with the new insurance carrier.

Federal Tax I.D. Number

Signature of Hiring Contractor

Date

Address (Street)

Printed Name of Hiring Contractor

Address (City, State, Zip)

Independent Contractor's Affirmation

Federal Tax I.D. Number

Signature of Independent Contractor

Date

Address (Street)

Printed Name of Independent Contractor

Address (City, State, Zip)

The Hiring Contractor should retain the original. Legible copies of this agreement should be filed with the hiring contractor's workers' compensation insurance carrier and the Division within 10 days of the date of execution. An agreement is not considered filed if it is illegible or incomplete. Filing may be accomplished by mail or facsimile transmission. The Independent Contractor should also retain a copy of the agreement.

Division Logo Stamp Here



TEXAS DEPARTMENT OF INSURANCE, DIVISION OF WORKERS' COMPENSATION
7551 Metro Center Drive, Suite 100
Austin, Texas 78744

If you are not certain whether all parties meet the requirements for entering into this agreement, you may wish to consult an attorney.

Texas Workers' Compensation Act, Texas Labor Code, Section 406.121(2) defines "independent contractor" as follows: (1) "Independent contractor" means a person who contracts to perform work or provide a service for the benefit of another and who ordinarily: (A) acts as the employer of any employee of the contractor by paying wages, directing activities, and performing other similar functions characteristic of an employer-employee relationship; (B) is free to determine the manner in which the work or service is performed, including the hours of labor or of method of payment to any employee; (C) is required to furnish or have his employees, if any, furnish necessary tools, supplies, or materials to perform the work or service; and (D) possesses the skills required for the specific work or service.

AGREEMENT BETWEEN GENERAL CONTRACTOR AND SUBCONTRACTOR
TO ESTABLISH INDEPENDENT RELATIONSHIP

Notice of Agreement

The undersigned General Contractor and the undersigned Subcontractor hereby declare that:

- (A) the Subcontractor meets the qualifications of an Independent Contractor under Texas Workers' Compensation Act, Texas Labor Code, Section 406.121;
- (B) the Subcontractor is operating as an independent contractor as that term is defined under Section 406.121 of the Act;
- (C) the Subcontractor assumes the responsibilities of an employer for the performance of work; and
- (D) the Subcontractor and the Subcontractor's employees are not employees of the General Contractor for purposes of the Act.

TERM (DATES) OF AGREEMENT: FROM: _____
TO: _____

Name of General Contractor

Name of Subcontractor

LOCATION OF EACH AFFECTED JOB SITE (OR STATE WHETHER
THIS IS A BLANKET AGREEMENT):

Estimated number of employees affected:

THIS AGREEMENT SHALL TAKE EFFECT NO SOONER THAN THE
DATE IT IS SIGNED.

Texas Labor Code, Texas Workers' Compensation Act, Section 406.122 .

General Contractor's Affirmation

If the General Contractor's workers' compensation carrier changes during the effective period of coverage, it is advisable for the General Contractor to file this form with the new insurance carrier.

Federal Tax I. D. Number

Signature of General Contractor

Date

Address (Street)

Printed Name of General Contractor

Address (City, State, Zip)

Subcontractor's Affirmation

Federal Tax I. D. Number

Signature of Subcontractor

Date

Address (Street)

Printed Name of Subcontractor

Address (City, State, Zip)

The General Contractor should retain the original. The Subcontractor should also retain a copy of the agreement. This form is not required to be filed with the Division, and may be provided to the insurance carrier.

Division Data Stamp Here





CITY OF EL PASO, TEXAS
2016 Paving and Street Construction, Dirt Work,
Heavy Construction, Pipeline Work, Highway Wage Rates

CLASSIFICATION	BASE WAGE PER HOUR	TOTAL FRINGES PER HOUR	HOURLY PREVAILING WAGE RATE	(8 HOURS) PER DIEM WAGE RATE
Asphalt Distributor Operator	14.64	0.00	14.64	117.12
Asphalt Paving Machine Operator / Spreader Box Operator	14.20	0.00	14.20	113.60
Asphalt Raker	12.99	0.00	12.99	103.92
Backhoe Operator	15.95	0.00	15.95	127.60
Concrete Finishers (Paving and Structures)	13.88	0.00	13.88	111.04
Crane Operator, Lattice Boom	17.50	0.00	17.50	140.00
Crane Operator, Hydraulic	17.50	0.00	17.50	140.00
Electrician	23.09	0.00	23.09	184.72
Excavator Operator	16.10	0.00	16.10	128.80
Form Builder/Setter	15.02	0.00	15.02	120.16
Form Setter (Paving and Curb)	12.86	0.00	12.86	102.88
Front End Loader	14.82	0.00	14.82	118.56
Laborer	11.89	0.00	11.89	95.12
Laborer (Skilled)(Utility)	13.65	0.00	13.65	109.20
Mechanic	17.50	0.00	17.50	140.00
Motor Grader Operator (Fine)	17.54	0.00	17.54	140.32
Pipe Layer	12.94	0.00	12.94	103.52
Reinforcing Steel Setter (Structure and Paving)/ Structural Steel Worker	17.00	0.00	17.00	136.00
Rock Mason	12.00	0.00	12.00	96.00
Roller Operator	13.70	0.00	13.70	109.60
Servicer	14.33	0.00	14.33	114.64
Truck Driver, Single Axle	13.19	0.00	13.19	105.52
Truck Driver, Tandem Axle	15.32	0.02	15.34	122.72
Utility Operator Grade 1	12.00	0.00	12.00	96.00
Utility Operator Grade 2	13.95	0.00	13.95	111.60
Welder, Certified/ Structural Steel Welder	13.83	0.00	13.83	110.64

All persons required to be licensed or certified must meet those qualifications to be paid the associated rate.

2016 HEAVY / HIGHWAY DEFINITIONS

1	Asphalt Distributor Operator	Drives distributor truck, sets spray bars and operates valves and levers to control distribution of bituminous material for highway surfacing. May oil, grease or otherwise service and make adjustments to equipment as needed. Performs other related duties.
2	Asphalt Paving Machine Operator/Spreader Box Operator	Operates paving machine that spreads and levels asphaltic concrete on highway. Controls movement of machine, raises and lowers screed, regulates width of screed. Operates spreader box by adjusting hopper and strike-off blade so that gravel, stone or other material may be spread to a specific depth on road surface during seal coat and surface treatment operations. May oil, grease, service and make adjustments to equipment as needed. Performs other related duties.
3	Asphalt Raker	Distributes asphaltic materials evenly over road surface by hand-raking and brushing material to correct thickness; may control screed to regulate width and depth of materials; directs Laborers (skilled and unskilled) when to add or take away material to fill low spots or to reduce high spots.
4	Backhoe Operator	Operates a rubber-tired machine mounted with a backhoe bucket on one end and a loader bucket on the other end. Used for excavating ditches and structures, laying pipe and precast concrete structures, carrying material in the loader bucket, and general excavation and backfill. May also be equipped with hydraulic attachments. May oil, grease or otherwise service and make necessary adjustments to equipment as needed. Performs other related duties.
5	Concrete Finisher (Paving and Structures)	Finishes the exposed surfaces of fresh concrete paving, median barrier and every element of concrete structures. Operates bridge deck finishing machine. Forms and finishes edges and joints. Finishes concrete curbs and gutters. Finishes exposed surface of concrete after forms have been removed by patching imperfections with fresh concrete, rubbing surface with abrasive stone, and directing others in removing excess or defective concrete with power tools. Performs other related duties.
6	Crane Operator, Lattice Boom	A worker who operates a lattice boom type crane to hoist and move materials, raise and lower heavy weights and perform other related operations. May be crawler type or rubber tired. May include placement of rock riprap, clamshell, dragline, pipe and pile driving operations. May oil, grease or otherwise service and make necessary adjustments to equipment as needed. Performs other related duties.
7	Crane Operator, Hydraulic	A worker who operates a hydraulic telescoping boom type crane to hoist and move materials, raise and lower heavy weights and perform other related operations. May be crawler type or rubber-tired. May oil, grease or otherwise service and make necessary adjustments to equipment as needed. Performs other related duties.

8	Electrician	Plan and execute the layout and installation of electrical conduit, switch panels, buss bars, outlet boxes, electrical wires and cables, lighting standards, lighting fixtures, receptacles, switches, and other electrical devices and apparatus necessary for the complete installation of wiring systems, works on overhead distribution systems and underground distribution systems. Includes installation of photovoltaic solar panels.
9	Excavator Operator	Operates a crawler or rubber-tired machine mounted with an excavator bucket. Used for excavating ditches and structures, laying pipe and precast concrete structures, loading trucks and placing rock riprap. May also be equipped with various hydraulic attachments. May oil, grease or otherwise service and make necessary adjustments to equipment as needed. Performs other related duties.
10	Form Builder/Setter	Works from plans to build, assemble, fit together, align, plumb, and set in place forms for molding concrete structures. Forms may be wood, steel, aluminum, fiberglass or any other type of material. Checks forms while concrete is being placed. May install miscellaneous materials integral to concrete structures. May set precast concrete elements. Prepares for slipforming traffic rail and median barrier. May install permanent metal deck forms. May work with power tools. Performs other related duties. Includes guardrail installation.
11	Form Setter (Paving and Curb)	Fits together, aligns and sets to grade metal and wooden forms for placement for concrete paving and curbs. Works with survey crew to set stringline for paving, curb and gutter and curb. Performs other related duties.
12	Front End Loader	Operates a rubber-tired, skid steer or crawler type tractor with an attached scoop type bucket on front end. Machine is used to load materials from stockpiles, excavation, charging batch plants, loading and unloading trucks. May be used with attachments in lieu of the bucket. May oil, grease or otherwise service and make necessary adjustments to equipment as needed. Performs other related duties.
13	Laborer	A general term used on construction work covering many unskilled classifications requiring work of a physical nature. Performs a variety of work ranging from pick and shovel work to cleaning up lumber with hammer, shoveling and placing concrete, uses air tools, under the supervision of qualified personnel. Cleans concrete joints and fills joints with sealing compound from bucket or with hose and nozzle from a central source, applies coating of oil to inside face of forms and strip forms, unloads and transports reinforcing steel, cures newly poured concrete, assists pipelayers, works with dirt crew keeping construction layout stakes out of the way of dirt-moving equipment. May fine grade excavation and ditches, shovels hot asphalt material. May use power tools and other necessary equipment in demolition work under the supervision of qualified personnel. Does not ordinarily perform work permitting exercise of independent judgment or without close direction by other workers. Installs and maintains erosion control. Performs other related duties.

14	Laborer (Skilled) (Utility)	Performs a variety of manual duties, usually working in a utility capacity by working on multiple projects and tasks where demands require workmen with varied experience and ability to work without close direction. Unloads and transports reinforcing steel. Directs laborers in pouring concrete. Erects trench shoring and bracing. Installs, operates, and maintains watering systems. May assist equipment operators in positioning machines, verifying grades and signaling operators to dumping positions to maintain grades as directed. Uses power tools and air tools. May work as lead man in a labor crew. Is more or less a general utility construction worker. May be a second step in learning a skill. Includes Concrete/Granite Pump Operator, Concrete Saw Operator, Fence Erector, Flagger, and Sign Erector. Performs other related duties.
15	Mechanic	Assembles, assist set up, adjusts and maintains and repairs all types of construction equipment and trucks. May perform the duties of a welder in repair of equipment. Performs other related duties.
16	Motor Grader Operator (Fine)	Operates motor grader. Performs many of the same duties of Motor Grader, Rough, but in addition performs finish grade work to bluetops or other close specification control. This work is subject to strict inspection and must conform closely to specifications. May oil, grease or otherwise service and make necessary adjustments to equipment as needed. Performs other related duties.
17	Pipe Layer	Installs concrete, clay, steel, ductile iron, plastic, corrugated pipe and any other type of pipe for storm drainage, water lines, gas lines and sanitary sewer lines. Lays underground communication and electrical ducts. May install and set electrical ground boxes, hand holes, manholes, inlets and other structures. Caulks joints, makes threaded and flanged connections. Installs valves and other accessories. Performs other related duties.
18	Reinforcing Steel Setter (Structure and Paving)/ Structural Steel Worker	Works from plans to lay out and install reinforcing steel within forms or in mats of concrete paving. Erects and places reinforcing steel and fabricated structural steel members, such as girders, plates, diaphragms, lateral bracing, and unites them permanently to form a completed structural steel unit, including reinforcing members. Fastens steel members together by welding or bolting. May include dismantling and erecting large units of equipment. Gives direction to reinforcing steel worker apprentice or utility laborers. Performs other related duties.
19	Rock Mason	Constructs partitions, fences, walls, using rock. Cutting, grouting and pointing of materials listed above which is necessary shall be part of this classification. May also build or repair rock retaining walls, cutting or placing of rock in mortar or other similar material.
20	Roller Operator	Operates a self-propelled machine with either steel wheels or pneumatic tires which is used to compact and smooth bituminous and flexible base materials and compact earth fills, subgrade, and all other types of materials. May oil, grease or otherwise service and make necessary adjustments to equipment as needed. Performs other related duties.

21	Servicer	Drives a truck which carries various fuels, oils, greases and filters. Must have knowledge of and is responsible for the correct oiling and greasing and changing of filters on equipment according to manufacturers' specifications. Uses compressed air grease guns, wrenches and other tools. May make adjustments to clutches, brakes and other mechanical items. Keeps record of service for preventive maintenance records. . May require a Commercial Driver's License if driving truck on public highways. Performs other related duties.
22	Truck Driver, Single Axle	Drives a light capacity truck for transporting loads of construction material. The truck is of single rear axle type, may have various kinds of beds attached such as dump, flat bed, tank, etc. May require CDL license for driving on highway. May service and make necessary adjustments for proper operation of equipment. Performs other related duties.
23	Truck Driver, Tandem Axle	Drives a tandem axle powered vehicle. Hauls dirt, rock, aggregates or other material. May require CDL license for driving on highway. May service and make necessary adjustments for proper operation of equipment. Performs other related duties.
24	Utility Operator Grade 1	Clam, ditching machine, side booms (except those in Grade 2), operator on dredges, cleaning machine, coating machine, , blending machine, water-kote machine, equipment welder, track tractor, derrick, dragline, shovel, motor grader rough grade, Crawler tractor, foundation drill operator, crawler and truck mounted, and piledriver.
25	Utility Operator Grade 2	Pipe, gin truck or winch truck with poles when used for hoisting, side boom (cradling rock drill), tow tractor, farm tractor road boring machine, fork lift (industrial type), pot fireman (power agitated), straightening machine, boring machine, bombardier (track or tow rig), , hydrostatic testing operator, scraper, staking machine, plant mix pavement roller operator, plant mix pavement, pneumatic motor operator. Concrete paving curing, float, texturing machine, subgrade trimmer, slip-form machine, milling machine, self-propelled sweeping machine, trenching machine, directional drill, , trenching, screening plant, and joint sealer. Off Road Hauler, Pavement Marking Machine Operator Reclaimer/Pulverizer Operator, Slurry Seal or Micro-Surfacing Machine Operator.
26	Welder, Certified/ Structural Steel Welder	Certified by the American Welding Society to perform structural steel welding. Operates welding equipment. Welds structural steel girders and diaphragms. May weld permanent metal deck forms. Cuts, lays-out, fits and welds metals or alloyed metal parts to fabricate or repair equipment. Welds the joints between lengths of pipe for oil, gas or other types of pipelines. May assist in welding of permanent metal deck forms. Performs other related duties.

COORS CHANNEL DRAINAGE IMPROVEMENTS

EL PASO WATER STORMWATER PROJECT

TECHNICAL SPECIFICATIONS SECTION



CONDE INC.



6080 Surety Drive, Suite 100



**el paso
WATER**

TECHNICAL
SPECIFICATIONS

DIVISION 1

GENERAL DESCRIPTION

**COORS CHANNEL DRAINAGE IMPROVEMENTS
EL PASO WATER – STORMWATER PROJECT**

TECHNICAL SPECIFICATIONS INDEX

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1.1 GENERAL DESCRIPTION OF THE PROJECT

The work contemplated under this contract consists of the furnishing of all labor, materials, equipment, and tools necessary for the construction of the project titled as follows:

COORS CHANNEL DRAINAGE IMPROVEMENTS

2.1 CONTRACT DRAWINGS OR PLANS

The details for the above mentioned work is shown on a set of drawings dated March 2022 and numbered sheets 1 through 30. These drawings together with these specifications and contract documents form the Contract. Where members are shown on the drawings, they shall take precedence over any scaled distances or dimensions.

In the event of any discrepancies between the plans and these specifications, the decision of the Engineer will be final. The written dimensions on the plans are to be taken as correct, but the Contractor is required to check carefully all dimensions before beginning work thereon. Should any errors or omissions be discovered, the Engineer's attention shall immediately be called to the same in writing and the proper corrections made. All notes on the plans shall be carefully observed by the Contractor and are a part of the Contract.

3.1 COMMON REFERENCE STANDARDS

Reference in the Specifications to known standards such as codes, specifications, etc., promulgated by professional or technical specifications, institutes and societies, are intended to mean the latest edition of each such standard adopted and published as of the date of the invitation to bid on this project except where otherwise specifically indicated. EACH such standard referred to shall be considered a part of the specifications to the same extent as if reproduced there in full.

4.1 EQUIPMENT

Equipment of a condition and design sufficient to ensure a thorough and workmanlike prosecution of the project shall be used at all time and any equipment which, in the opinion of the Engineer, has outlived its efficiency or is inadequate in design, shall be removed from the project within forty-eight (48) hours after receipt of written notice from the Engineer.

5.1 MATERIALS AND APPLIANCES

If at any time before the commencement, or during the progress of the work, the materials and appliances used appear to the Owner, or his representative, as insufficient and improper for securing the quality of the work required, he may order the Contractor to improve their characteristics and the Contractor shall conform to such order. The failure of the Owner to demand any improvement shall not release the Contractor from his obligation to secure the quality of the work as specified.

6.1 DISPOSAL OF WASTE MATERIALS

All waste materials shall be disposed at designated points approved by the Owner, or his representative.

7.1 INSPECTION AND TESTING OF MATERIALS AND WORKMANSHIP

The Contractor shall notify the Owner, or his representative, in sufficient time in advance of delivery of materials to be supplied by him under this Contract, in order that the Owner may arrange, if desired, inspection and testing of same. All final tests of materials or workmanship required by the Owner or his representative shall be performed by a recognized commercial testing laboratory and shall be paid by the Contractor.

Incorporate into the work only material that has been inspected, tested, and accepted by the Owner. Remove, at the Contractor’s expense, materials from the work locations that are used without prior testing and approval or written permission of the Engineer. The material requirements and standard test methods in effect at the time the proposed Contract is advertised govern. Unless otherwise noted, the Contractor will perform testing at its expense. In addition to facilities and equipment required by the Contract, furnish facilities and calibrated equipment required for tests to control the manufacture of construction Items. If requested, provide a complete written statement of the origin, composition, and manufacture of materials. All materials used are subject to inspection or testing at any time during preparation or use. Material which that has been tested and approved at a supply source or staging area may be re-inspected or tested before or during incorporation into the work and rejected if it does not meet Contract requirements. Copies of test results are available upon request. Do not use material that, after approval, becomes unfit for use. Unless otherwise noted in the Contract, all testing must be performed within the United States and witnessed by the Engineer.

8.1 TRAFFIC

Safe and reasonable access for this site must be maintained at all times during the life of the Contract. In accordance with the approved traffic control plan and as specified in the Contract, keep existing roadways open to traffic or construct and maintain detours and temporary structures for safe public travel. Maintain the work in passable condition, including proper drainage, to accommodate traffic. Maintain necessary access to adjoining property. However, during operations pertinent to the various items of the work, one-way traffic will be permitted subject to the conditions stated in Paragraph 9 – SAFETY.

9.1 SAFETY

Any cavity remaining open during nonworking hours must be guarded by flasher type barricades with stringers placed between the tops of the barricades as an additional safety measure.

10.1 COORDINATION

There are many existing underground facilities within the work areas; therefore, close coordination with the various agencies, utility companies and other entities is mandatory. Utility companies must be notified 36 hours prior to commencement of construction.

El Paso Water Utilities
Public Service Board
1154 Hawkins 79925

Gabriel Gonzalez
594-5785

Spectrum/Charter Communications
7010 Airport 79906

Edgar Arroyo (Charter Communications)
775-74263

El Paso Electric Co.
P.O. Box 982 79960

Michael Archuleta
351-4288

A T & T 11200 Pellicano 79925	Richard Harris 595-5100
Texas Gas 4700 Pollard 79930	David Valenzuela 319-9360
Texas Department of Transportation	Anahi Sotelo 790-4270
City of El Paso – Land Development #2 Civic Center Plaza 79901	Kareem Dallo 212-1576

A minimum of thirty-six (36) hour notice must be given the pertinent responsible authority prior to commencing operations in the proximity of their facilities to appraise them of this condition, unless otherwise specified.

11.1 TPDES PERMITTING

- A. The contractor is required to comply with the Texas Pollution Discharge Elimination System permit requirement of the TCEQ. Discharge of storm water runoff from this small construction activity is regulated and requires compliance for this contract.

This site will be regulated under Small Construction Activities. The SWP3 plans must to be provided by the Contractor. Also SWP3 measures must be furnished and installed by the Contractor. A Notice of Intent is not required for small construction projects but a Construction site notice must be placed on site with SWP3 plan. Following is a brochure on Steps to Obtain a Construction Permit for Storm Water discharges as well as a sample of the Small Construction Site Notice. More information is available on line at the following website:
http://www.tceq.texas.gov/permitting/stormwater/wq_construction.html

12.1 WATER FOR CONSTRUCTION

The contractor will be responsible to provide water during the life of the project for all construction items as per contract and plans and specifications including but not limited to: trenching, water line installation, storm sewer installation, pond excavation, landscape placement, filling and testing for pipe, roadway construction, dust control, compaction and clean up. At no time will un-metered water consumption be allowed. The contractor will not be allowed to utilize an existing fire hydrant for construction purposes without applying for a permit. The contractor will obtain a permit from El Paso Water Utilities by submitting request in writing and paying necessary fees and deposit to the utility. The fire hydrant meter will not be removed from the assigned fire hydrant by anyone other than utility personnel. An outlet valve will be provided with the fire hydrant meter for contractors use. A water loss fee will be assessed to the Contractor for each occurrence that violates the above. Charges will be deducted from the deposited amount. Charges in excess of the deposit amount must be paid before the project will be accepted into the utilities system. Any excess deposit will be refunded.

Construction water drawn through fire hydrants meters will be charged to the Contractor. Fire hydrant meters will be installed and removed by EPWU’s personnel only. Fire hydrant meters have a locking device and a built-in backflow preventer.

The Contractor may, with the approval of the Engineer, make other arrangements and secure water for construction purposes from a source of his own choosing, including but not limited to Reclaimed Water from the Wastewater Treatment Plants, which is available at a reasonable cost. The contractor shall obtain information, terms and conditions of service, application process, and other requirements from the EPWU’s Developer Service Section. Issuance of a construction meter or stand-pipe requires a deposit. Standard forms are available at the EPWU’s Developer Service Section. The contractor shall provide such facilities as may be required for transporting and utilizing this water at his own cost.

Upon completion of the project the Contractor must call the Engineering Developer Services Section at 594-5545 or 594-5635 to have the meter removed. Upon meter removal, the Contractor will be assessed for the water consumed plus any damages to the fire hydrant and/or fire hydrant meter assembly.

13.1 FINAL CLEANUP

Upon completion of the work final cleanup includes: remove litter, debris, objectionable material, temporary structures, excess materials, and equipment from the work locations. Clean and restore property damaged by the Contractor’s operations during the prosecution of the work. Leave the work locations in a neat and presentable condition. This work will not be paid for directly but will be considered subsidiary to Items of the Contract. Remove from the right of way material and fabrication plants, temporary structures, excess materials, and debris resulting from construction. Clean structures to the flow line or the elevation of the outfall channel, whichever is higher. Dispose of all excess material in accordance with federal, state, and local regulations.

14.1 CONFORMITY WITH PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS

Furnish materials and perform work in reasonably close conformity with the lines, grades, cross-sections, dimensions, details, gradations, physical and chemical characteristics of materials, and other requirements shown in the Contract (including additional plans for non-site-specific work). Reasonably close conformity limits will be as defined in the respective Items of the Contract or, if not defined, as determined by the Engineer. Obtain approval before deviating from the plans and approved working drawings. Do not perform work beyond the lines and grades shown on the plans or any extra work without the Engineer’s authority. Work performed beyond the lines and grades shown on the plans or any extra work performed without authority is considered unauthorized and excluded from pay consideration. The Owner will not pay for material rejected due to improper fabrication, excess quantity, or any other reasons within the Contractor’s control.

15.1 COORDINATION OF PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS

The specifications, accompanying plans (including additional plans for non-site specific work), special provisions, change orders, and supplemental agreements are intended to work together and be interpreted as a whole. Numerical dimensions govern over scaled dimensions. Special provisions govern over plans (including general notes), which govern over standard specifications and special specifications. Job-specific plan sheets govern over standard plan sheets. However, in the case of conflict between plans (including general notes) and specifications regarding responsibilities for hazardous materials and traffic control as per approved Traffic Control Plan for Barricades, Signs, and Traffic Handling, special provisions govern over standard specifications and special specifications, which govern over the plans. Notify the Engineer promptly of any omissions, errors, or discrepancies discovered so that necessary corrections and interpretations can be made. Failure to promptly notify the Engineer will constitute a waiver of all claims for misunderstandings or ambiguities that result from the errors, omissions, or discrepancies discovered.

16.1 SANITARY PROVISIONS

Provide and maintain adequate, neat, and sanitary toilet accommodations for employees, including State employees, in compliance with the requirements and regulations of the Texas Department of Health or other authorities having jurisdiction

17.1 BARRICADES, WARNING AND DETOUR SIGNS, AND TRAFFIC HANDLING

Contractor shall provide Traffic Control plan approved by the Owner as part of the contract. The contractors shall provide, install, move, replace, maintain, clean, and remove all traffic control devices as shown on the plans and as directed. If details are not shown on the plans, provide devices and work in accordance with the TMUTCD and as directed. When authorized or directed, provide additional signs or traffic control devices not required by the plans. If an unexpected situation arises that causes the Contractor to believe that the traffic control should be changed, make all reasonable efforts to promptly contact the Engineer. Take prudent actions until the Engineer can be contacted. If the Engineer determines that any of the requirements of this Article have not been met, the Engineer may take any necessary corrective action. However, this will not change the legal responsibilities set forth in the Contract. The cost for this work will be deducted from any money due or to become due to the Contractor. The Engineer may authorize or direct in writing the removal or relocation of project limit advance warning signs. When project limit advance warning signs are removed before final acceptance, traffic control in accordance with the TMUTCD may be used for minor operations as approved. Removal or relocation of project limit advance warning signs does not imply final acceptance.

18.1 CHANGES IN THE WORK

The Engineer reserves the right to make changes in the work including addition, reduction, or elimination of quantities and alterations needed to complete the Contract. Perform the work as altered. These changes will not invalidate the Contract nor release the Surety. If the changes in quantities or the alterations do not significantly change the character of the work under the Contract, the altered work will be paid for at the Contract unit price. If the changes in quantities or the alterations significantly change the character of the work, the Contract will be amended by a change order. If no unit prices exist, this will be considered extra work and the Contract will be amended by a change order. Provide cost justification as requested, in an acceptable format. Payment will not be made for anticipated profits on work that is eliminated. Agree upon the scope of work and the basis of payment for the change order before beginning the work. If there is no agreement, the Engineer may order the work to proceed by making an interim adjustment to the Contract. In the case of an adjustment, the Engineer will consider modifying the compensation after the work is performed.

19.1 AS BUILTS

As part of the contract requirements the Contractor will provide As Built construction documents at the close out of the project. The as built will reflect all deviations from the original construction documents. These changes to include any and all, horizontal, vertical elevations and locations. All changes of material and unit type, all addenda items and field changes. This item will be considered subsidiary to the contract.

END OF SECTION

PART 1 – GENERAL

1. DESCRIPTION

Break, Remove, and Salvage or Dispose of existing hydraulic cement concrete.

2. CONSTRUCTION

Remove existing hydraulic cement concrete from locations shown on the plans. Avoid damaging concrete that will remain in place. Saw-cut and remove the existing concrete to neat lines. Replace any concrete damaged by the Contractor at no expense to the department. Unless otherwise shown on the plans, accept ownership and property dispose of broken concrete in accordance with federal, state, and local regulations.

A. METHODS

Existing concrete shall be broken into pieces not greater than 18 inches in any dimension by air-driven machinery or other suitable means. Existing concrete can consist of, but is not limited to sidewalks, driveways, ADA ramps, parkway, curb and gutter, riprap, foundations, and slabs.

In projects where only a portion of the existing concrete is to be removed, Contractor shall take special care to avoid damaging concrete that will remain. Contractor shall adhere to the construction limit lines shown on the plans and/or established by the Director of Engineering or his/her designated representative in saw cutting the existing concrete. Any concrete removed beyond the established limit lines which is damaged by these operations shall be replaced at no additional costs to the owner.

Existing concrete that is removed, as is removed, as indicated, on plans shall be hauled, and disposed of at designated points approved by the director of engineering or his/her designated representative.

- 1) Execute work in an orderly and careful manner, with due consideration for neighbors and public
Demolish masonry in small sections to avoid damage to adjacent structure that is to remain
sprinkle rubbish and debris to lay out dust as necessary.
- 2) Promptly remove materials, rubbish and debris from the property. Keep the paved and parking areas reasonably clean, sweeping as required and/or directed.

**** END OF SECTION ****

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project description.
- B. Contractor’s use of site and premises.
- C. Temporary Construction Easements.
- D. Damage to Private Property.
- E. Contractor’s Superintendence.

1.2 PROJECT DESCRIPTION

The project scope shall include the following items of work for the construction of the Coors Channel Drainage Improvements.

BASE BID:

Mobilization and demobilization, removal of existing curb, concrete channel, concrete flume, headwall, rockwall and rock rip rap, chainlink fence, rubble on slopes, concrete pipes, saw cut pavement and replace pavement, existing hot box and irrigation meter removal and pole hold and coordination for the power poles, anchors and electrical service connections along Euclid. Coordination with Texas Gas for the removal and replacement of their gas line. Furnish and Installation of the following concrete structures: Concrete box culvert, concrete pipes, concrete junction boxes, concrete manholes, manhole rings and covers, depth gauge, inlets, thrust blocks, desilting basins, two sack backfill, pond excavation, wrought iron gate, wrought iron fence, rockwalls, rock rip rap, per plans and specifications complete in place. SWPPP measures, traffic control, project clean-up and various items relevant to said project. The subject project will provide for the construction, testing, project coordination, mobilization demobilization, permits and permit fees, traffic control and any appurtenant items required for satisfactory completion of the project to include warranties as required.

- A. The contractor shall furnish all labor, materials, equipment, tools and incidentals necessary to complete the construction of the project parameter as per the Drawings and as described in the Specifications.

1.3 CONTRACTOR’S USE OF SITE AND PREMISES

- A. Confine operations to areas within Project limits indicated. The area beyond the construction limits shall remain undisturbed.
- B. The Contractor shall keep the construction disturbances to a minimum.
- C. Keep all streets and parking lots serving the premises clear and available to the owner’s at all times. No parking, stockpiling or storage of materials shall be placed on site. Contractor shall coordinate with Owners to provide vehicular and pedestrian access at all times during construction.

- D. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
- E. The project area shall be swept within 24-hrs of completion of a rain event.
- F. It will be the responsibility of the Contractor to schedule and perform his/her work so as to provide safe passage of any storm water during the course of his/her operations. All labor, tools, equipment and supervision required to assure such proper passage of runoff water and any removal or handling of water in order to maintain dry conditions shall be considered as incidental to the remainder of the work and shall be at the expense of the Contractor. Contractor shall perform his work in stage but is ultimately responsible for the entire project area.
- G. The Contractor shall coordinate the work with all utility companies having facilities within the area of work. Therefore, 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 also apply to any subcontractors.

1.4 DAMAGE TO PRIVATE PROPERTY

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.

1.5 CONTRACTOR’S SUPERINTENDENCE

- A. Contractor shall keep at all times a qualified competent Project Superintendent, satisfactory to the Engineer. The 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 well 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 in a proper and skillful manner, or is disrespectful, intemperate, disorderly or otherwise objectionable, shall at the written request of the Engineer be forthwith reassigned or discharged and shall not be deployed again on any portion of the work without written consent of the Engineer.

- 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. 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.

1.6 EMERGENCY COMMUNICATION

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.

END SECTION

PART 1 - GENERAL

1.1. SECTION INCLUDES

A.-This section includes procedures for measurement and payment plus conditions for nonconformance assessment and nonpayment for rejected products.

1.2. AUTHORITY

A.- Measurement methods delineated in specification sections are intended to complement the criteria of this section. In the event of conflict, the requirements of the specific specification section shall govern.

1.3. UNIT QUANTITIES SPECIFIED

- A.- Quantity and measurement estimates stated in the Bid Form are for contract purposes only.
- B.- Quantities and measurements supplied or placed in the Work and verified by the City Engineer or designated representative shall determine payment as stated in the General Conditions.
- C.- If the actual Work requires greater or lesser quantities than those quantities indicated in the Bid Form, the Contractor shall provide the required quantities at the unit prices contracted, except as otherwise stated in the General Conditions, the contract drawings, or other sections within the specifications.

1.4. METHODS OF MEASUREMENT OF QUANTITIES

A.-Measurement by Volume:

- A.1.- Stockpiles: Measured by cubic dimension using mean length, width, and height or thickness.
- A.2.- Excavation and Embankment Materials: Measured by cubic dimensions using the average end area method.

B.- Measurement by Area: Measured as a square dimension using either mean length and width or radius of a circle (or portion of a circle).

C.- Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

D.-Stipulated Price Measurement: Measured by unit designated in the agreement.

E.- Other: Includes items measured by weight, volume, area or lineal means or combinations, as appropriate, as a completed item or unit of the Work.

1.5. REQUIREMENTS

A.- The general scope of work under each bid item includes all labor, equipment and materials required for construction of completely functional and operational facilities as shown on the Drawings and in these Specifications.

MEASUREMENT AND PAYMENT.....SECTION 01 20 00

- B.- All estimated quantities for unit price bid items stipulated in the bid proposal are approximate and are to be used only (a) as a basis for estimating the probable cost of the work and (b) for the purpose of comparing the bids submitted for the work. The actual amount of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for unit price work and materials will be the actual amount of work done and material furnished as measured by the City Engineer or designated representative.
- C.- All measurements and payments will be based on completed and accepted work performed in strict accordance with the Drawings and Specifications and in accordance with contract unit bid prices. Incidental work and items not listed in the contract-unit bid price schedule will not be paid for separately, but will be included in the payment for the listed item or items and shall be full compensation for all labor, equipment, materials, testing and incidentals necessary to perform the work in accordance with these contract documents.
- D.- Separate payment will not be made for related items of subsidiary work, but will be considered as part of the bid items in the proposal. Payment will be made for all work covered in this section at the contract unit price bid items or be included in the lump sum bid item prices for items in the proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

1.1 GENERAL

A.-Two general classes of pay items exist consisting of:

A.1.-Unit price items: Payment for the various unit price items will be made at the particular contract price per unit as shown on the proposal. The unit price for the individual pipeline items shall specifically include all costs associated with the following: construction staking, construction facilities, coordination, site preparation, excavation, thrust restraint, backfilling and compacting for utilities, protection of adjacent utilities and pertinent structures, fittings, removal and reinstallation of mailboxes and traffic signs, protection of irrigation ditches, all pipe bedding, all pipe and accessories, joint bonding and test stations, concrete, and all other items of the project not indicated as being covered compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications.

A.2.- Lump Sum Items: Lump sum items are to be paid for at a lump sum price per job, not in measured increments. Lump sum items shall include all work and materials involved in the installation, construction or performance of Work, including incidental and subsidiary items as may be required to complete that item as shown on the drawings and designated in the specifications.

B.- 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,

MEASUREMENT AND PAYMENT.....SECTION 01 20 00

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.

- C. Contractor is responsible for all damage or distress to adjacent properties, structures (buildings, fences, sidewalks, storage sheds) and utilities.

1.2. MEASUREMENT AND PAYMENT

Item 1: Insurance, Bonds, Mobilization and Demobilization (Not to exceed 5%) of Items 2-43

Shall include all costs for Contractor's mobilization and demobilization, insurance and bond, construction permits and fees, job trailers, site administration expenses, and utilities to the job trailers including power, telephone, etc. Shall include all costs for contract closeout, site cleanup, and all costs associated with Contractor's demobilization from the site. Payment for mobilization and demobilization shall be on a Lump Sum basis as noted in the Bid Schedule. Mobilization Bid Item shall be limited to five (5) percent of the total bid price. To be paid 50% at mobilization and 50% at demobilization.

Item 2: Video Taping of Project Pre and Post construction

Videotaping – Pre and post construction video recording of the project limits including all abutting rockwalls, buildings, sidewalks, landscaping, drainage structures, fences, and all other appurtenant structures. This item shall be paid on a lump sum price as stated in the Bid schedule. Two copies of the video in DVD format shall be furnished to the Engineer prior to construction and two copies in DVD format will be furnished to the Engineer post construction. These DVD's shall be labeled with the project name, Bid No. and date recorded.

Item 3: SWPPP Install and Management

Furnish and Install SWPPP Measures - Shall be paid for on a monthly basis and shall include but not limited to the installation and maintenance throughout the project of all silt fence, stabilized construction entrances, inlet protection, dust and erosion control measures and all associated items at the locations shown on drawings. The work is subject to the TPDES permitting requirements for temporary and permanent erosion controls and SWPP measures during the life of the project. See section 00800- SC 7.09B for compliance measures.

Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials and for all work performed in accordance with the Construction Drawings, specifications and all requirements of the storm water prevention plan permit.

Item 4: Barricades and Traffic Control install and management

Traffic control shall be paid for monthly and shall include coordinating traffic control requirements with the governing agencies as called out in the drawings and specifications. Prepare traffic control plans in conformance with the Texas Manual on Uniform Traffic Control Devices For Streets And Highways (latest edition); submitting traffic control plans to the governing agencies (City of El Paso); coordinating traffic control plan with TxDOT if required, obtaining approval of the traffic control plans prior to beginning construction in areas affecting traffic; providing two approved copies of the traffic control plans to the City Engineer or designated representative. Construct, grade, maintain in transitable condition during construction and remove when permanent improvements are completed temporary dirt roads as necessary. Provide and install all traffic control devices and personnel as required to implement and maintain the traffic control plans for the duration of pipe or other facility installation; and providing all equipment, materials, on-going coordination, and manpower as required for the project. No measurement of the work or material included in this item shall be made. All materials and work associated with this item shall be included with the price of the item. Payment includes full compensation for the complete performance of the work in accordance with the Project's drawings and the provisions of these specifications.

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Item 5: Trench Safety System, Trench Box, Shoring sheet Bracing Methods

This item to cover temporary bracing and shoring if necessary for construction of concrete box culverts, channel or junction boxes in order to assure safe of earthen slopes during construction. Including all labor, equipment, materials and maintenance complete in place. Measurement shall be per linear foot of shoring, bracing provided. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials and Work in accordance with the Construction Drawings and Specifications.

Item 6 – Pavement restriping and marking

Measurement shall be as per lump sum of pavement markings installed as per plans. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for installing the necessary material. Payment includes full compensation for the complete performance of this work item

Item 7 : Earthwork, cut, fill and disposal of excess

Excavation cut to waste - Earthwork shall be to the extents and limits shown on the plans. The work shall include the excavation to subgrade elevations, transportation and haul/disposal to an approved site. Pond excavation, fill for the channel, road work to bring subgrade to require lines and grades shown on plans are included in this item. Measurement for earthwork shall be per cubic yard in place complete. Payment shall be made at the price as stated in the bid schedule and will be full compensation for the complete performance of the work in accordance with the drawings and provisions of these specifications.

Item 8: Demolish and Dispose - Chainlink fence

Removal, haul and disposal of chainlink fence including posts and footings. Measurement shall be per linear foot of fencing removed and disposed of. This includes all costs for labor, and equipment necessary. All costs for this work shall be included in the Contractor's price and shall be complete compensation for complete performance of this work.

Item 9: Demolish and Dispose – Channel rock rip rap

Demolish, remove, haul and disposal of rock rip rap channel Lining. Measurement shall be the actual square foot of existing rock rip rap channel removed and properly disposed including saw cutting and shall not exceed the lines and limits shown on the drawings.

Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for the necessary labor, materials, equipment and work in accordance with the Construction Drawings and Specifications.

Item 10: Demolition and Dispose - Existing Concrete Channel

Demolish, remove, haul and disposal of concrete channel Lining. Measurement shall be the actual square foot of existing concrete channel lining removed and properly disposed including saw cutting and shall not exceed the lines and limits shown on the drawings.

Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for the necessary materials, equipment and work in accordance with the Construction Drawings and Specifications.

Item 11: Removal and Dispose -Rubble along slope

– there is existing concrete rubble and trash above the concrete channel on the earthen slopes that need removal, haul and disposal. Measurement shall be the actual square foot of existing slope where rubble is located removed and properly disposed shall not exceed the lines and limits shown on the drawings.

Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for the necessary labor, materials, equipment and work in accordance with the Construction Drawings and Specifications.

Item 12: Remove and replace existing landscape materials (trees, shrubs, rocks) and irrigation lines

This item to govern the removal and replacement of the existing trees, shrubs, rock and irrigation lines, valves, rotors, bubblers, emitters, etc. that are located in the landscape areas of the parking lot and Frutas Street. The locations are designated on the plans and are landscape islands. Measurement for this item shall be lump sum for all the island locations. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for the necessary labor, materials, equipment and work in accordance with the Construction Drawings and Specifications.

Item 13: Remove & replace Landscape boulders

This item to govern the removal and replacement of the existing boulders that are located in the landscape islands of the parking lot. The landscape island locations are designated on the plans. Measurement for this item shall be for each boulder removed and replaced.

Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for the necessary labor, materials, equipment and work in accordance with the Construction Drawings and Specifications.

Item 14: Saw Cut Concrete Channel abutting existing retaining wall at billboard and headwalls

This item shall consist of the saw cutting of the existing concrete channel lining abutting the retaining wall where the large pylon sign is located. Also Saw cut channel at the terminus at the headwalls in order to remove the channel and implement new structures. This item shall be per each saw cut location for the full width of the channel base and side slopes. Measurement shall be per linear foot of saw cutting performed. This item shall include all personnel, equipment and materials necessary to perform the saw cut. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary labor, materials and Work in accordance with the Construction Drawings and Specifications.

Item 15: Saw Cut asphalt pavement and base course in parking lot and Frutas street

This item shall govern the saw cutting of the pavement and base course in the MCA parking lot and Frutas Street. The measurement shall be per linear foot of saw cut as annotated on the plan. This item shall include all personnel, equipment and materials necessary to perform the saw cut. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary labor, materials and Work in accordance with the Construction Drawings and Specifications.

Item 16: Demolish and dispose - pavement and base course

Remove existing asphalt pavement and base course over proposed pipeline location as per plans. Measurement shall be per square yard of asphalt/base course removed, hauled and properly disposed of. This item shall include all personnel, equipment and materials necessary to perform the removal of the HMAC/base course. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary labor, materials and Work in accordance with the Construction Drawings and Specifications.

Item 17: Demolish & Dispose - Concrete Curb & Gutter

Measurement shall be the actual linear foot of existing concrete curb and/or curb & gutter removed, hauled and properly disposed including saw cutting and shall not exceed the lines and limits shown on the drawings. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for the necessary labor, materials, equipment and work in accordance with the Construction Drawings and Specifications.

Item 18: Demolish & Dispose - Concrete Sidewalk

Measurement shall be the actual square foot of existing concrete sidewalk removed manually and properly disposed of including saw cutting, haul and separate from existing sidewalk without spalling and shall not exceed the lines and limits shown on the drawings.

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Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for the necessary labor, materials, equipment and work in accordance with the Construction Drawings and Specifications.

Item 19: Demolition and Dispose – ADA ramps and tile

Remove, haul and dispose of concrete handicap ramps as per limits depicted on plans and specs. Measurement shall be per each ramp and tile removed, hauled and properly disposed and shall not exceed the lines and limits shown on the drawings. Tile if removed in good condition may be stored for reuse and replacement.

Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for the necessary labor, materials, equipment and work in accordance with the Construction Drawings and Specifications.

Item 20: Demolish and Dispose - Retaining Rockwall

Rockwall Retaining wall Demolition – removal, haul and disposal and haul of existing retaining wall along south parking lot as per drawings. Measurement shall be per cubic yard of wall removed to include concrete footing. This includes all cost for material, labor, transportation which is considered subsidiary to the item.

Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary labor, materials and Work in accordance with the Construction Drawings and Specifications.

Item 21: Remove and dispose - 24 inch Concrete Pipe

Removal, disposal and haul of concrete pipe as per plans and specifications to lines and limits depicted on the plans and specifications. Measurement shall be per linear foot of pipe removed. This includes all costs for labor, personnel and equipment necessary. All costs for this work shall be included in the Contractor's price and shall be complete compensation for complete performance of this work.

Item 22: Adjust - Butterfly Valve Manhole Ring and cover complete in place.

This item shall cover the adjustment of the water valve manhole due to pavement elevation change from existing grades. Measurement shall be per each manhole adjusted and shall cover all necessary material, labor for completion of this item. Payment includes full compensation for the complete performance of this work item.

Item 23: Furnish and Install Manhole Ring and Cover on Junction Boxes, complete in place

This item shall be to provide manhole ring and cover on top of the Junction Boxes to allow access to the Junction Box. Measurement shall be per each manhole ring and cover installed including all necessary material and labor for completion of this item. Payment includes full compensation for the complete performance of this work item.

Item 24: Furnish and Install Retaining Rockwall, complete in place

Furnish and Install retaining rockwall as per plans and specifications. Measurement shall be per perch of wall placed including all subgrade preparation, concrete footing, reinforcement, backfill, and trenching. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary personnel, materials and Work in accordance with the Construction Drawings and Specifications

Item 25: Furnish and Install 3” HMAC/BASE COURSE w/12” cement stabl. backfill and subgrade prep

Includes surface preparation, subgrade preparation, compaction to specs, materials, placement equipment, labor and incidentals. Measurement shall be the actual amount of HMAC including BASE COURSE placed in square yards throughout the project and within the limits shown on Drawings. Compaction of HMAC and BASE COURSE materials is subsidiary to this item. Subgrade Preparation shall not be measured but shall be incidental to costs for the placement of the base course complete in place and will be compensated in full for furnishing and installing the necessary materials including tack coat,

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compaction and Work in accordance with the Construction Drawings and Specifications. Payment shall be made at the unit price as stated in the bid schedule.

Item 26: Furnish and Install 6" Curb & Gutter, complete in place

Measurement shall be the actual amount of concrete curb/gutter in linear feet placed and compacted and shall include all associated items, as detailed, installed complete in place throughout the project.

Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials, full subgrade compaction, and for all work performed in accordance with the Construction Drawings and Specifications.

Item 27: Furnish and Install Concrete Sidewalk 4 inches thick

Furnish and Install concrete sidewalks including subgrade preparation and compaction as per plans and specifications. Measurement shall be the actual amount of concrete sidewalk in square feet installed throughout the project and within the limits shown on Drawings. Compaction of sub grade materials to accept the concrete sidewalk placement and forming is subsidiary to this item. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary labor, materials and for all work performed in accordance with the Construction Drawings and Specifications.

Item 28: Furnish and Install - ADA ramps with tile, Complete in place

Measurement shall be for each ADA accessible ramps placed including truncated dome tile and shall include the proper and complete installation including subgrade prep and compaction, per the drawings and specifications. All costs for this work shall be included in the Contractor's price and shall be complete compensation for complete performance of this work. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials, subgrade compaction, ADA approved tiles, forming, and Work in accordance with the Construction Drawings and Specifications.

Item 29: Furnish and Install Concrete Junction Box #1 complete in place

Cast in Place Junction Box #1 - Shall be paid for each and shall include the complete installation, forming, steel placement and concrete placement and all associated items of the junction box installation as detailed in the drawing and specifications. Preparation of subgrade materials to accept the junction box structure, forming, reinforcement, backfill, and trenching; trench safety system is subsidiary to this item. All costs for this work shall be included in the Contractor's price and shall be complete compensation for complete performance of this work. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials and Work in accordance with the Construction Drawings and Specifications.

Item 30: Furnish and Install Concrete Junction Box #2 complete in place

Cast in Place Junction Box #2 - Shall be paid for each and shall include the complete installation, forming, steel placement and concrete placement and all associated items of the junction box installation as detailed in the drawing and specifications. Preparation of subgrade materials to accept the junction box structure, forming, reinforcement, backfill, and trenching; trench safety system is subsidiary to this item. All costs for this work shall be included in the Contractor's price and shall be complete compensation for complete performance of this work. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials and Work in accordance with the Construction Drawings and Specifications.

Item 31: Furnish and Install Concrete Junction Box #3 complete in place

Cast in Place Junction Box #3 - Shall be paid for each and shall include the complete installation, forming, steel placement and concrete placement and all associated items of the junction box installation as detailed in the drawing and specifications. Preparation of subgrade materials to accept the junction box structure, forming, reinforcement, backfill, and trenching; trench safety system is subsidiary to this item.

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All costs for this work shall be included in the Contractor's price and shall be complete compensation for complete performance of this work. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials and Work in accordance with the Construction Drawings and Specifications.

Item 32: Furnish and Install Concrete Junction Box #4 complete in place

Cast in Place Junction Box #4 - Shall be paid for each and shall include the complete installation, forming, steel placement and concrete placement and all associated items of the junction box installation as detailed in the drawing and specifications. Preparation of subgrade materials to accept the junction box structure, forming, reinforcement, backfill, and trenching; trench safety system is subsidiary to this item. All costs for this work shall be included in the Contractor's price and shall be complete compensation for complete performance of this work. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials and Work in accordance with the Construction Drawings and Specifications.

Item 33: Furnish and Install Concrete Box Culvert 4'x 4' complete in place

Measurement shall be per linear foot of box culvert placed and shall include the complete installation whether cast in place including forming, steel placement and concrete placement and all associated items of the concrete box culvert installation as detailed in the drawing and specifications. Box culverts may be precast and installed with proper subgrade preparation. Preparation of subgrade materials to accept the junction box structure, forming, reinforcement, backfill, and trenching; trench safety system is subsidiary to this item. All costs for this work shall be included in the Contractor's price and shall be complete compensation for complete performance of this work. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials and Work in accordance with the Construction Drawings and Specifications.

Item 34: Furnish and Install Concrete Box Culvert 5'x 3' complete in place

Measurement shall be per linear foot of box culvert placed and shall include the complete installation whether cast in place including forming, steel placement and concrete placement and all associated items of the concrete box culvert installation as detailed in the drawing and specifications. Box culverts may be precast and installed with proper subgrade preparation. Preparation of subgrade materials to accept the structure, forming, reinforcement, backfill, and trenching; trench safety system is subsidiary to this item. All costs for this work shall be included in the Contractor's price and shall be complete compensation for complete performance of this work. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials and Work in accordance with the Construction Drawings and Specifications.

Item 35: Furnish and Install Concrete Box Culvert 8'x4' complete in place

Measurement shall be per linear foot of box culvert placed and shall include the complete installation whether cast in place including forming, steel placement and concrete placement and all associated items of the concrete box culvert installation as detailed in the drawing and specifications. Box culverts may be precast and installed with proper subgrade preparation. Preparation of subgrade materials to accept the structure, forming, reinforcement, backfill, and trenching; trench safety system is subsidiary to this item. All costs for this work shall be included in the Contractor's price and shall be complete compensation for complete performance of this work. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials and Work in accordance with the Construction Drawings and Specifications.

Item 36: Furnish and Install Type I Inlet – 2 grate complete in place

Shall include the complete installation and all associated items of the Concrete Type I inlet with 2 grate installation as detailed in the drawing and specifications. Preparation of subgrade materials to accept the inlet box structure, forming, inlet grate, reinforcement, backfill, and trenching; trench safety system is subsidiary to this item. Measurement shall be for each inlet placed. All costs for this work shall be

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included in the Contractor's price and shall be complete compensation for complete performance of this work. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials and Work in accordance with the Construction Drawings and Specifications.

Item 37: Furnish and Install – 24” Reinforced concrete pipe

Furnish and Install 24 inch Class III concrete pipe as per plans and specifications complete in place. Measurement shall be per linear foot of pipe installed including all preparation of subgrade materials to accept the pipe structure, backfill, concrete pipe collars and trenching; trench safety system is subsidiary to this item. All costs for this work shall be included in the Contractor's price and shall be complete compensation for complete performance of this work. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary labor, materials and Work in accordance with the Construction Drawings and Specifications.

Item 38: Furnish and Install Concrete Collars for 24 inch RCP

Measurement for this shall be for each concrete pipe collar placed for the 24 inch RCP pipes. Preparation of subgrade materials to accept concrete pipe collar, forming, reinforcement, backfill, and trenching; trench safety system is subsidiary to this item. All costs for this work shall be included in the Contractor's price and shall be complete compensation for complete performance of this work. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary labor, materials and Work in accordance with the Construction Drawings and Specifications.

Item 39: Furnish and Install – 6’Rockwall/wrought iron fence to include footing

Furnish and Install rockwall and wrought iron fence as per plans and specifications. Measurement shall be per perch of wall placed including all subgrade preparation, wrought iron sections, concrete footing, reinforcement, backfill, and trenching. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary personnel, materials and Work in accordance with the Construction Drawings and Specifications.

Item 40: Furnish and Install New Pond warning signs

Measurement shall be for the placement of each new pond warning signs complete in place as per the drawings and specifications. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials including brake away base and Work in accordance with the Construction Drawings and Specifications.

Item 41: Furnish and Install – Depth Gauge, Complete in place

Measurement shall be per each depth gauge placed. Pond Depth Gauges – as per plans complete in place per each depth gauge furnished and installed. Includes foundation and erection as per plans complete in place. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary labor, materials and Work in accordance with the Construction Drawings and Specifications.

Item 42: Furnish and Install Concrete thrust Block complete in place

Cast in place Concrete Thrust Block for pond - Furnish and Install new reinforced concrete thrust block. Measurement shall be per each thrust block placed to include all reinforcing and tying to concrete pislopes walls, turndown footings installed as shown on the drawings. All excavation and subgrade preparation for installation of concrete ramp is subsidiary to this bid item. Expansion, contraction and construction joints and material are subsidiary to this item.

Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for furnishing and installing the necessary materials and for all work performed in accordance with the Construction Drawings and Specifications.

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Item 43: Furnish 12” rock rip rap install Desilting Basin

Furnish and install Stone and Gravel for rip-rap outfall desilting basins structures as per plans complete in place. Measurement shall be for each cubic yard of stone/gravel placed including haul, installation and compaction. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for the necessary labor, materials, equipment and work in accordance with the Construction Drawings and Specifications.

Item 44: Furnish 3” Screening material on maintenance road

Furnish and install 3” screening material as per plans complete in place. Measurement shall be for each square yard of stone screening placed including haul, installation and compaction. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for the necessary labor, materials, equipment and work in accordance with the Construction Drawings and Specifications.

Item 45: Furnish 8” crushed aggregate base course material on pond access ramp

Furnish and install crushed aggregate base course material as per plans complete in place. Measurement shall be for each square yard of stone/gravel placed including haul, installation and compaction. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for the necessary labor, materials, equipment and work in accordance with the Construction Drawings and Specifications.

Item 46: Subsurface Trash Removal, Haul and disposal, NTE \$10,000

Remove, haul and dispose of trash and debris that may be located below the surface of the site and may be encountered during trenching for the box culverts, junction boxes and pond. A lump sum amount not to exceed is provided as payment for this line item but contractor will be required to provide documentation per cubic yard of material removed. (Reference geotechnical report). The not to exceed amount is the maximum anticipated for possible trash removal. Payment shall be made at the unit price as stated in the bid schedule and will be compensated in full for the necessary labor, materials, equipment and work in accordance with the Construction Drawings and Specifications.

1.3.- PAYMENT INCLUDES

- A.- Full compensation for all required supervision, labor, products, tools, equipment, plant, transportation, services, and incidentals; and erection, application, or installation of an item of the Work; and Contractor’s overhead and profit.
- B.- Total compensation for required Unit Price Work shall be included in the Unit Price bid. Claims for payment as Unit Price Work, but not specifically covered in the list of unit prices of the bid items will not be accepted.

END OF SECTION

PART 1 - GENERAL

1.1 PROJECT MANAGEMENT AND COORDINATION

- A. Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work.
- B. Requests for information (RFIs): On discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI. Use forms acceptable to Engineer and Owner.
- C. Schedule and conduct progress meetings at Project site at intervals to be determined at completion of Construction Documents. Notify Owner and Engineer of meeting dates and times. Require attendance of each subcontractor or other entity concerned with current progress or involved in planning, coordination, or performance of future activities.
 - 1. The Resident Project Representative will record minutes and distribute to everyone concerned, including Owner and Engineer during weekly construction site meetings.

1.2 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 1. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 2. Submit copies of each action submittal. Electronic submittals are preferred. Engineer will return electronic copies.
 - 3. Submit three copies of each informational submittal. Engineer will not return copies.
 - 4. Engineer will return submittals, without review, received from sources other than Contractor.
- B. Place a permanent label or title block on each submittal for identification. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor’s review and approval markings and action taken by Engineer. Include the following information on the label:
 - 1. Project name.
 - 2. Date.
 - 3. Name and address of Contractor.
 - 4. Name and address of subcontractor or supplier.
 - 5. Number and title of appropriate Specification Section.
- C. Identify deviations from the Contract Documents on submittals.
- D. Contractor’s Construction Schedule Submittal Procedure: Submit three copies of schedule within seven days after date established for Commencement of the Work.

PART 2- PRODUCTS

2.1 ACTION SUBMITTALS

- A. Product Data: Mark each copy to show applicable products and options. Include the following:
 - 1. Manufacturer’s written recommendations, product specifications, and installation instructions.
 - 2. Printed performance curves and operational range diagrams.
 - 3. Testing by recognized testing agency.
 - 4. Compliance with specified standards and requirements.

- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard print data. Submit on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 42 inches (762 by 1067 mm). Include the following:
 - 1. Dimensions and identification of products.
 - 2. Fabrication and installation drawings and roughing-in and setting diagrams.
 - 3. Wiring diagrams showing field-installed wiring.
 - 4. Notation or coordination requirements.
 - 5. Notation or dimension established by field measurement.

- 1. Samples: Submit for samples for review of kind, color, pattern, and texture and for a comparison of these characteristics between submittal and actual component as delivered and installed. Include name of manufacturer and product name on label.
 - 1. If variation is inherent in material or product, submit at least three sets of paired units that show variations.

2.2 INFORMATION SUBMITTALS

- A. Qualifications Data: Include lists of completed projects with project names and addresses, names and addresses of Engineers and owners, and other information specified.
- B. Product Certificates: Prepare written statements on manufacturer’s letterhead certifying that product that product complies with requirements in the Contract Documents.

2.3 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit four copies of a statement, signed and sealed by the responsible design professional, for each

product and system specifically assigned to Contractor to be designed or certified or by a design professional.

- 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

2.4. CONTRACTOR’S CONSTRUCTION SCHEDULE

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type schedule within 30 days of date established for commencement of the Work.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

PART 3 – EXECUTION

3.1 SUBMITTAL REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Engineer will review each action submittal, make marks to indicate corrections or modifications required, will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- C. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

3.2 CONTRACTOR’S CONSTRUCTION SCHEDULE

- A. Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribute copies of approved schedule to Owner, Engineer, subcontractors, testing and inspecting agencies, and parties identified by Contractor with a need-to-know schedule responsibility. When revisions are made, distribute updated schedules to the same parties.

END OF SECTION

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 data, samples, video tapes, construction and submittal schedules, and work plans as required under specific sections of the Specifications. Detailed submittal requirements will be specified in the Technical Specifications 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

- 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 so as to prevent delays in 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, and he shall certify on the cover sheet of each submittal that he has done so. Shop Drawings found to be inaccurate, lacking the required certification 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 compliance and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams,

production operating and maintenance instructions, and recommended spare parts listings 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.

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.

- C. The Contractor shall utilize an eight-character submittal identification numbering system in the following manner:
 - 1. The first five digits shall be the applicable Specification Section Number.
 - 2. The next three digits shall be the 001 to 999 to sequentially number each initial separate item or drawing submitted under each specific Section number.

- 3. The last character shall be a letter, A to Z, indicating the submission or resubmission of the same drawing, i.e., “A = first submission, B = second submission, C = third submission, etc.” A typical submittal number would be as follows:

03 30 00-008-B

03 30 00= Specification Section for Concrete
 008 = the eighth initial submittal under this specification section
 B = the second submission (first resubmission) of that particular Shop Drawing

- 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/her 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 therefor.
- 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 1.03C 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 approved schedule and in such sequence as to cause no delay in the Work or in 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.

- 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 resubmittals.
 - 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 performing work in a safe manner.
- C. If the Shop Drawings, data, or samples as submitted describe variations and show 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 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 a confirmation of the notations and comments IS NOT 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.

- Code 3 “REVISE AND RESUBMIT” This code is assigned when notations and comments are extensive enough to require a resubmittal 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 resubmittal is received, reviewed, and approved. This resubmittal is to address all comments, omissions, and nonconforming 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 resubmittal.

- 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 manufacture/vendor to meet the Contract Documents.

Codes 1 through 4 designate the status of the reviewed submittal.

- E. Resubmittals will be handled in the same manner as first submittals. On resubmittals, the Contractor shall direct specific attention, in writing on the letter of transmittal and on 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 to 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 “REJECTED” 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. Submittals are required until approved.

2. Any need for more than one resubmission, or any other delay in obtaining the Engineer’s review of submittals, will not entitle Contractor to 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. 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 resubmittal (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)

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

The Contractor shall keep itself fully informed of all local ordinance as well as state and federal laws, which in any manner affect the work herein specified. The Contractor shall at all times comply with said ordinance, Laws and regulations.

1.2 PERMITS TO BE OBTAINED BY OWNER AND CONTRACTOR

The contractor shall prepare and submit to the proper authority all information required for the issuance of permits and shall pay all costs therefor, including agency inspections unless specifically provided otherwise in these contract documents. The contractor shall provide a copy of each such permit to the engineer.

- A. The Owner shall obtain the following permits for the project:
 - 1) None
- B. The contractor shall obtain and pay for the fees for the following permits for the project:
 - 1) TPDES Permit.
 - 2) City of El Paso Construction Permit
 - 3) SWPPP

The Contractor shall obtain and pay for all necessary permits to successfully complete the project. These permits may not be mentioned in the specifications or construction drawings.

1.3 POSTING PERMITS AND EASEMENTS

All permits and easements shall be posted at the site of the work.

1.4 WASTE DISPOSAL

All existing pavement, curb, soil, vegetation, and granular material which is removed under this contract shall be disposed of off-site at the contractor’s expense. The Contractor shall be responsible for obtaining necessary permits prior to disposing of waste.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

**** END OF SECTION ****

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedure requirements for quality control services.
- B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Engineer or Construction Manager.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
 - 1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
 - 2. Inspections, test and related actions specified are not intended to limit the Contractor’s quality control procedures that facilitate compliance with Contract Document requirements.
 - 3. Requirements for the Contractor to provide quality control services required by the Architect, Construction Manager or Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 RESPONSIBILITIES

- A. Contractor Responsibilities: The OWNER shall provide the testing laboratory for inspections, tests and similar quality control services, specified in individual Specification Sections and required by governing authorities, these services include those specified to be performed by an independent agency and not by the Contractor.
 - 1. The Owner shall employ and pay an independent agency, to perform specified quality control services.
 - 2. Retesting: The Contractor is responsible for retesting costs where results of required inspections, test or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor’s responsibility.
 - a. Cost of retesting construction revised or replaced by the Contractor is the Contractor’s responsibility.
 - 3. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested.

Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:

- a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
- b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
- c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
- d. Security and protection of samples and test equipment at the Project site.

B. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Construction Manager and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.

- 1. The agency shall notify the Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
- 2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
- 3. The agency shall not perform any duties of the Contractor.

C. Coordination: The Contractor and each agency engaged to perform inspections, tests, and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

- 1. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.3 SUBMITTALS

A. The Construction Manager shall submit a certified written report of each inspection, test or similar service, to Contractor, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.

- 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
- 2. Reports Data: Written reports of each inspection, test or similar service shall include, but not be limited to:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.

- e. Names of individuals making the inspection or test.
- f. Designation of the Work and test method.
- g. Identification of product and Specification Section.
- h. Complete inspection or test data.
- i. Test results and an interpretation of test results.
- j. Location of sample or test in project.
- k. Ambient conditions at the time of sample-taking and testing.
- l. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
- m. Name and signature of laboratory inspector.
- n. Recommendation on retesting.

1.4 QUALITY ASSURANCE

- A. Qualification for Service Agencies: The Owner will engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with “Recommended Requirements for Independent Laboratory Qualification” by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.
 - 1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

1.5 TRADESMEN & WORKMANSHIP

- A. Ensure that tradesmen performing work at site are skilled and knowledgeable in methods and craftsmanship needed to produce required quality levels for workmanship in completed work. Remove and replace work which does not comply with workmanship standards as specified and as recognized in the construction industry for applications indicated. Remove and replace other work damaged or deteriorated by faulty workmanship or its replacement.

1.6 COORDINATION

- A. Coordination: The Contractor shall coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
 - 1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
 - 2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.

1.7 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for “Cutting and Patching.”
- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Repair and protection is the Contractor’s responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

1.8 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer’s Instructions: Comply with manufacturer’s installation instructions and recommendations, to the extent that those instructions are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to Architect for final decision.
- F. Recheck measurement and dimensions, before starting each installation.
- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Engineer for final decision.

1.9 REPLACEMENT OF WORK

- A. Within 24 hours after rejection of work pursuant to the General Conditions, remove all materials and equipment so rejected and immediately replace work, at the Contractor’s cost, to the

satisfaction of the Project Engineer and Construction Manager. Should the work of the Owner or other contractors be damaged by such removal or replacement, the Contractor shall reimburse the Owner or other Contractors for all costs incurred for correcting damage.

END OF SECTION

PART 1 – GENERAL

1.1 DESCRIPTION

This section describes the responsibilities pertaining to testing and inspections of all parties.

1.2 INSPECTIONS AND TESTING

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. Tests specified in the Technical Specifications shall fall into four categories: (1) those required for approval of materials prior to use, which serve the same purpose as shop drawings or samples; (2) those required by law; (3) those necessary for acceptance of equipment, 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.**

The Contractor shall furnish the materials for any samples and shall fully cooperate with the Engineer or Testing Laboratory in securing such samples. Any re-work necessary by the Contractor to obtain passing test shall be at the Contractor’s cost and no time extension for delays will be considered by the Owner.

The Contractor shall provide an independence testing agency to take samples and perform moisture content, gradation, compaction and density tests, flowable fill and HMAC, as well as all labor, equipment and apparatus necessary for testing of concrete aggregate, concrete mix, concrete strength, pipelines, pipe bedding, trench and/or structural backfill, subgrade, base coarse, and hot mix, proctor tests and Atterberg Limits for pipe bedding, equipment, site utilities, electrical utilities, mechanical systems, electrical systems, instrumentation and control systems, vibration levels and others items necessary to demonstrate compliance with the specifications, drawings and any applicable permits and codes. The Contractor shall submit qualifications of geotechnical testing laboratory to the Engineer prior to engaging such services. The testing agent shall facsimile (FAX) all results directly to the Engineer on the same day the results are available.

The Owner may conduct independent inspection and QA/QC testing of construction, materials and equipment throughout the duration of construction.

1.3 COST PAID BY THE CONTRACTOR:

All labor, equipment and apparatus required shall be paid by the Contractor. Re-tests and re-inspections by the Engineer for all testing required due to defective work and testing, will be back-charged to Contractor.

1.4 CONTRACTOR’S RESPONSIBILITIES

Cooperate with laboratory personnel; provide access to the work and manufacturer’s operations. Provide samples of materials to be tested, in the required quantities, to the laboratory representative at the Contractor’s expense. Monitor quality control over suppliers, manufacturer’s products,

services, site conditions and workmanship to produce work of specified quality. Comply fully with manufacturer’s instructions, including performing each step in sequence.

Should manufacturer’s instructions conflict with Contract Documents, request a clarification from Engineer before proceeding. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes or specified requirements indicate higher standards or more precise workmanship. Perform work by persons qualified to produce workmanship of specified quality. Furnish copies of mill test reports to the laboratory.

Furnish labor and facilities:

1. For access to work to be tested.
2. To obtain and handle test samples at the site.
3. To facilitate inspections and tests.
4. For laboratory’s exclusive use for storage and curing of test samples until removed to the laboratory.
5. To repair any test holes in order to match original conditions.

Testing shall not be cause for claims for delay by the Contractor, and all expenses accruing there from shall be deemed to be incidental to the Contract.

1.5 MANUFACURER’S FIELD SERVICES AND REPORTS

When specified in individual specifications sections, suppliers or manufacturer’s shall provide qualified personnel to observe site conditions, installations and quality of workmanship, as applicable and to initiate instructions when necessary. Submit report to the Engineer for review within seven days of observations.

PART 2 – PRODUCTS: NOT USED

PART 3- EXECUTION: NOT USED

END OF SECTION

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.1 DESCRIPTION OF REQUIREMENTS:

Definitions: "Products" is defined to include purchased items for incorporation into the work, regardless of whether specifically purchased for project or taken from Contractor's stock of previously purchased products. "Materials", is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined or otherwise fabricated, processed, installed or applied to form units of work. "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, etc.). Definitions in this paragraph are not intended to negate the meaning of other terms used in contract documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," "special construction," and similar terms, which are self explanatory and have recognized meanings in the construction industry.

Substitutions: The requirements for substitutions do not apply to specified Contractor options on products and construction methods. Revisions to contract documents, where requested by Owner, Architect or Engineer, are "changes" not "substitutions." Substitutions requested during bidding period, which have been accepted prior to Contract Date, are included in contract documents and are not subject to requirements for substitutions as specified herein. Contractor's determination of an compliance with governing regulations and orders issued by governing authorities do not constitute "substitutions;" and do not constitute a basis for change orders, except as provided for in contract documents. Otherwise, Contractor's requests for changes in products, materials and methods of construction required by contract documents after the bidding period are considered requests for "substitutions," and are subject to requirements hereof.

Standards: Refer to Division 1 section "Definitions and Standards" for applicability of industry standards to products of project, and for acronyms used in text of specification sections.

1.2 QUALITY ASSURANCE:

Source Limitations: To the greatest extent possible, for each unit of work, provide products, materials or equipment of a singular generic kind and from a single source.

Compatibility of Options: Where more than one choice is available as options for Contractor's selection of a product or material, select an option which is compatible with other products and materials already selected (which may have been from among options for those other products and materials). Total compatibility among options is not assured by limitations within contract documents, but must be provided by Contractor. Compatibility is a basic general requirement of product/material selections.

1.3 SUBMITTALS:

Requests for Substitutions: Submit 3 copies, fully identified for product or method being replaced by substitution, including related specification section and drawing number(s), and fully documented to show compliance with requirements for substitutions. Include product data/drawings, description of methods, samples where applicable, Contractor's detailed comparison of significant qualities between specified item and proposed substitution, statement of effect on construction time and coordination with other affected work, cost information or proposal, and Contractor's statement to the effect that proposed substitution will result in overall work equal to or better than work originally indicated.

1.4 PRODUCT DELIVER STORAGE HANDLING:

General: Deliver, handle and store products in accordance with manufacturer's recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Control delivery schedules to minimize long term storage of products at site and overcrowding of construction spaces. In particular, provide delivery/installation coordination to ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other sources of loss.

1.5 WARRANTIES (GUARANTEES):

Categories of Specific Warranties: Warranties on the work are in several categories, including those of General Conditions, and including (but not necessarily limited to) the following specific categories related to individual units of work specified in sections of Divisions 2 through 16 of these specifications:

Special Project Warranty (Guarantee): A warranty specifically written and signed by Contractor for a defined portion of the work; and, where required, countersigned by subcontractor, installer, manufacturer or other entity engaged by Contractor.

Specified Product Warranty: A warranty which is required by contract documents, to be provided for a manufactured product incorporated into the work; regardless of whether manufacturer has published a similar warranty without regard for specific incorporation of a product into the work, or has written and executed a special product warranty as a direct result of contract document requirements.

Coincidental Product Warranty: A warranty which is not specifically required by contract documents (other than as specified in this Section); but which is available on a product incorporated into the work, by virtue of the fact that manufacturer of product has published warranty in connection with purchases and uses of product without regard for specific applications except as otherwise limited by terms of warranty.

Refer to individual sections of Divisions 2 through 16 for the determination of units of work which are required to be specifically or individually warranted, and for the specific requirements and terms of those warranties (or guarantees).

General Limitations: It is recognized that specific warranties are intended primarily to protect Owner against failure of the work to perform as required, and against deficient, defective and faulty materials and workmanship, regardless of sources. Except as otherwise indicated, specific warranties do not cover failures in the work which result from: 1.) Unusual and abnormal

phenomena of the elements, 2.) The Owner's misuse, maltreatment or improper maintenance of the work, 3.) Vandalism after time of substantial completion, or 4.) Insurrection or acts of aggression including war.

Related Damages and Losses: In connection with Contractor's correction of warranted work which has failed, remove and replace other work of project which has been damaged as a result of such failure, or must be removed and replaced to provide access for correction of warranted work.

Consequential Damages: Except as otherwise indicated or required by governing regulation, special project warranties and product warranties are not extended to cover damage to building contents (other than work of Contract) which occurs as a result of failure of warranted work.

Reinstatement of Warranty Period: Except as otherwise indicated, when work covered by a special project warranty or product warranty has failed and has been corrected by replacement or restoration, reinstate warranty by written endorsement for the following time period, starting on date of acceptance of replaced or restored work.

A period of time is equal to original warranty period of time.

Replacement Cost, Obligations: Except as otherwise indicated, costs of replacing or restoring failing warranted units or products is Contractor's obligation, without regard for whether Owner has already benefited from use through a portion of anticipated useful service lives.

Rejection of Warranties: Owner reserves the right, at time of substantial completion or thereafter, to reject coincidental product warranties submitted by Contractor, which in opinion of Owner tend to detract from or confuse interpretation of requirements of contract documents.

Contractor's Procurement Obligations: Do not purchase, subcontract for, or allow others to purchase or sub subcontract for materials or units of work for materials or units of work for project where a special project warranty, specified product warranty, certification or similar commitment is required, until it has been determined that entities required to countersign such commitments are willing to do so.

Specific Warranty Forms: Where a special project warranty (guarantee) or specified project warranty is required, prepare a written document to contain terms and appropriate identification, ready for execution by required parties. Submit draft to Owner (through Architect/Engineer) for approval prior to final executions.

PART 2 PRODUCTS

2.1 GENERAL PRODUCT COMPLIANCES:

General: The compliance requirements, for individual products as indicated in contract documents, are multiple in nature and may include generic, descriptive, proprietary, performance, prescriptive, compliance with standards, compliance with codes, conformance with graphic details and other similar forms and methods of indicating requirements, all of which must be complied with. Also "allowances" and similar provisions of contract documents will have a bearing on selection process.

Procedures for Selecting Products: Contractor's options for selecting products are limited

by contract document requirements, and governing regulations, and are not controlled by industry and governing regulations, and are not controlled by industry traditions or procedures experienced by Contractor on previous construction projects.

Required procedures include, but are not necessarily limited to, the following for various indicated methods of specifying:

Single Product/Manufacturer Name: Provide product indicated, except advise Architect/Engineer before proceeding, where known that named product is not a feasible or acceptable selection.

Two or More Product/Manufacturer Names: Provide one of the named products, at Contractor's option; but excluding products which do not comply with requirements. Do not provide or offer to provide an unnamed product, except where none of named products comply with requirements or are a feasible selection; advise Architect/Engineer before proceeding.

"Or Equal": Where named products in specifications text are accompanied by the term "or equal", or other language of similar effect, comply with those contract document provisions concerning "substitutions" for obtaining Architect/Engineer's approval (by change order) to provide an unnamed product. This product must meet or exceed the original specified product specifications. "Named", except as otherwise indicated, is defined to mean manufacturer's name for product, as recorded in published product literature, of latest issue as of date of contract documents. Refer requests to use products of a later (or earlier) model to Architect/Engineer's for acceptance before proceeding.

Standards, Codes and Regulations: Where only compliance with an imposed standard, code or regulation is required, selection from among products which comply with requirements including those standards, codes and regulations, is Contractor's option.

Performance Requirements: Provide products which comply with specific performances indicated, and which are recommended by manufacturer (in published product literature or by individual certification) for application indicated. Overall performance of a product is implied where product is specified with only certain specific performance requirements.

Prescriptive Requirements: Provide products which have been produced in accordance with prescriptive requirements, using specified ingredients and components, and complying with specified requirements for mixing, fabricating, curing, finishing, testing and similar operations in manufacturing process.

2.2 SUBSTITUTIONS:

Conditions: Contractor's request for substitution will be received and considered when extensive revisions to contract documents are not required and changes are in keeping with general intent of contract documents; when timely, fully documented and properly submitted; and when one or more of following conditions is satisfied, all as judged by Architect/Engineer. Otherwise, requests will be returned without action except to record non compliance with these requirements.

Where required product, material or method cannot be provided in a manner which is compatible with other materials of the work, or cannot be properly coordinated therewith, or cannot be warranted as required, or cannot be used without adversely affecting Owner's insurance coverage on completed work, or will encounter other substantial non compliance which are not possible to

otherwise overcome except by making requested substitution, which Contractor thereby certifies to overcome such non compatibility, non coordination, non warranty, non insurability or other non compliance as claimed.

Work Related Submittals: Contractor's submittal of (and Architect/Engineer's acceptance of) shop drawings, product data or samples which relate to work not complying with requirements of contract documents, does not constitute an acceptable or valid request for a substitution, nor approval thereof.

2.3 GENERAL PRODUCT REQUIREMENTS:

General: Provide products which comply with requirements, and which are undamaged and unused at time of installation, and which are complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for intended use and effect.

Standard Products: Where available, provide standard products of types which have been produced and used previously and successfully on other projects and in similar applications.

Nameplates: Except as otherwise indicated for required approval labels, and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on exterior of the work.

Labels: Locate required labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.

Equipment Nameplates: Provide permanent nameplate on each item of service connected or poser operated equipment. Indicate manufacturer, product name, model number, serial number, capacity, speed, ratings and similar essential operating data. Locate nameplates on an easily accessed surface which, in occupied spaces, is not conspicuous.

PART 3 EXECUTION (not applicable)

END OF SECTION

PART 1: GENERAL

1.1 RELATED REQUIREMENTS

- A. General Conditions – Section 01000: Warranty and guarantee; tests and inspection; corrections, removal, or acceptance of defective work.

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. 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 of erosion after backfilling or placement.
 - 3. Except as noted on the plans 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.
 - 4. The Contractor shall be responsible for 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 such reconstruction. 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 repair.
 - 5. In the event the Contractor fails to proceed to remedy the defects of which he has been notified within 15 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.
 - 6. All special 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.

PART 2: PRODUCTS (Not used)

PART 3: EXECUTION (Not used)

END OF SECTION

DIVISION 2

EXISTING CONDITIONS

PART 1 - GENERAL:

1.1 SUBMITTALS:

The procedures proposed for the accomplishment of salvage and demolition work shall be submitted for approval. The procedures shall provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations.

1.2 GENERAL REQUIREMENTS:

The work includes demolition or removal of all construction indicated or specified. All materials resulting from demolition work, except as indicated or specified otherwise, shall become the property of the Contractor and shall be removed from the limits of the property. Rubbish and debris shall be removed from the property daily unless otherwise directed so as to not allow accumulation inside or outside the building. Materials that cannot be removed daily shall be stored in areas specified by the Architect.

1.3 DUST CONTROL:

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the building and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution.

1.4 PROTECTION:

Protection of Existing Work: Before beginning any cutting or demolition work, the Contractor shall carefully survey the existing work and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to insure against damage to existing work to remain in place, to be reused, or to remain the property of the owner, and any damage to such work shall be repaired or replaced as approved by the Engineer at no additional cost to the owner. The Contractor shall carefully coordinate the work of this section with all other work and construct and maintain shoring, bracing and supports, as required. The Contractor shall insure that structural elements are not overloaded and be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under any part of this contract.

1.4. Environmental protection: All work and Contractor operations shall comply with the requirements of TPDES and EPA requirements for dust, stormwater pollutions, discharge of hazard waste material.

1.5 BURNING: The use of burning at the project site of the disposal of refuse and debris will not be permitted.

1.6 USE OF EXPLOSIVES: Use of explosives will not be permitted.

PART 2 - EXECUTION:

2.1 EXISTING FACILITIES:

1. Structural, Walls, and Partitions: Existing walls and partitions indicated shall remain.

2.2 DISPOSITION OF MATERIAL:

1. Title of Materials: Title to all materials and equipment to be demolished, excepting owners salvage and historical items, is vested in the Contractor upon receipt of notice to proceed. The owner will not be responsible for the condition, loss or damage to such property after notice to proceed.

2. Material for Contractor Salvage: Material for salvage shall be stored as approved by the Engineer and Owner. Salvage materials shall be removed form Owner's property before completion of the Contract.

2.3 CLEAN UP:

1. Debris and Rubbish: Debris created by the demolition of existing roofs shall be removed form site and buildings.

2. Debris Control: Debris shall be removed and transported in a manner as to prevent spillage on streets or adjacent areas.

3. Regulations: Local regulations regarding hauling and disposal apply.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Site preparation shall include furnishing necessary equipment and labor to remove vegetation and rubbish and the placement of approved excess excavation in conformity with the lines, grades, dimensions, and details shown on the Contract Documents.
- B. Within limits shown on the Contract Documents, or in areas where existing grade is altered, strip existing topsoil to a depth of 6-inches and stockpile in approved areas for subsequent replacement. Contractor to remove and dispose of all excess materials.

1.2 RELATED SECTIONS

- A. Section 02 06 00 - Demolition

1.3 REFERENCES

- A. ASTM D698-1991: Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft [600 kN-m/m]).

1.4 DEFINITIONS

- A. Borrow. Material taken from designated areas to make up any deficit of excavated material.

1.5 SUBMITTALS AND WORK

- A. Coordinate activities with other work being performed so as not to cause any interruption of activities being completed under other Sections of the Contract Documents.

1.6 REGULATORY REQUIREMENTS

- A. Work under this Section shall conform to applicable City Regulations for disposal of debris, including safety requirements during performance of the work.
- B. Work under this Section shall be coordinated with utility companies and any the management of any existing facilities in order to prevent any disruption in operation and/or utility service.
- C. Permits, fees, disposal charges and licenses shall be secured and paid by Contractor.

PART 2 - PRODUCTS

2.1 MANUFACTURER(S) (not used)

2.2 EQUIPMENT

- A. The Contractor may use equipment and materials necessary to properly complete the tasks described under this Section.

2.3 MATERIALS

A. Fill:

1. Source: Obtain embankment fill from required excavation or, if excavated material is insufficient, from borrowed areas approved by the Geotechnical Engineer.
2. Suitability: Use the best material available from excavation or borrow. Suitability of fill material is subject to the Geotechnical Engineer's approval.
3. Quality: Fill material must be free of excessive silts. Do not use soil containing brush, roots, sod or similar perishable material.
4. Excess Excavation: Use excess excavation or borrowed material with prior approval of the Engineer. Borrow material from the approved source and excavate. On completion of work borrowed area to be cleaned and dressed. Reuse of material stripped from borrow site is not allowed unless specifically indicated on the Drawings.

2.4 FABRICATION (not used)

2.5 QUALITY CONTROL

- A. Fill materials to be acquired as specified in Plans and/or by the Geotechnical Engineer.

PART 3 - EXECUTION

3.1 GENERAL

- A. Verify existing plant life designated to remain and tag as such.
- B. Locate, identify and protect all utilities.
- C. Locate, identify and protect bench marks and existing structures.
- D. Maintain surface drainage on site during construction. Remove unsatisfactory fill material and waste vegetation from jobsite and dispose of properly.

3.2 PRESERVATION AND RESTORATION

- A. Protect trees that are to remain in the project area or in adjacent areas. Take special care not to damage trees outside limits of construction.
- B. Fill depressions made by grubbing with suitable material to make new surface conform to the existing adjacent ground surface.
- C. Final Cleanup: Level washes, ruts, depressions, and mounds to give areas smooth finish.

3.3 CLEARING

- A. Remove designated trees and shrubs along with stumps, roots, rubbish and other objectionable material from the designated areas.
- B. Remove grass and weeds to a depth of two (2) inches below existing soil line.

- C. Remove stumps, roots, muck and spongy materials within the area to a depth of eighteen (18) inches.
- D. For areas where paving will be built remove stumps and roots within pavement section to depth of two feet below finish subgrade elevation.
- E. Provide demolition as required and specified in Section 02115 and the Drawings.

3.4 REMOVING MATERIAL

- A. Unless otherwise specified, cleared and grubbed material shall become property of the Contractor and be removed from the work site or disposed of in manner not to damage the Owner.
- B. Burning of cleared and grubbed material on the Owner's property is not permitted.

END OF SECTION

PART 1 – GENERAL

1.01 SCOPE

- A. The work covered by this section consists of furnishing all labor, equipment, and material required to provide a video tape record of all the project area before construction begins in each area. One copy of the video tape(s) shall be presented to the owner for their records.
- B. The Purpose of the video tape(s) is to aid the owner in determining the extent of the construction damage to property in and abutting the project area.
- C. The video taping shall be performed pre and post construction.

PART 2 – PRODUCTS

2.01 VIDEO TAPE

- A. The Video tape shall be a standard DVD similar or equal to those produced by Sony, Fuji, or Scotchbrand.

PART 3 – EXECUTION

- A. Contractor shall use a quality video camera with sound available. The Camera must have zoom capabilities, date record, and produce a clear, concise color of picture of the easement area.
- B. Before construction begins, Contractor shall video record each easement by walking along the sewer alignment, recording all topographic features (i.e. trees, sheds, gardens, pools, fences, shrubs, building, walls, etc.) on line and also to the left and right of the centerline. The limits shall be determined by the contractor and the engineer as the area estimated to be disturbed by the construction.
- C. Contractor shall add sound to the video tape by denoting the line number, date and time, and stations at manholes or names and addresses or property owners.
- D. Contractor shall especially record and denote areas of existing damage prior to the construction (i.e. existing cracks in walls).

END OF SECTION

DIVISION 3

CONCRETE

PART 1 – GENERAL

1. DESCRIPTION

This item shall govern for the furnishing and placing of reinforcing steel, deformed and smooth, of the size and quantity designated on the plans and in accordance with these qualifications.

PART 2 – PRODUCTS

2. MATERIALS

Unless otherwise designated on the plans, all bar reinforcement shall be deformed, and shall conform to ASTM Designation A 615, Grades 40, 60, or 75, and shall be open hearth, basic oxygen, or electric furnace new billet steel.

Large diameter new billet steel (Nos. 14 and 18), Grade 75 will be permitted for straight bars only.

Where bending of bar sizes No. 14 or No. 18 of Grades 40 or 60 is required, bend testing shall be performed on representative specimens as described for smaller bars in the applicable ASTM Specification. The required bend shall be 90 degrees around a pin have a diameter of 10 times the nominal diameter of the bar.

Spiral reinforcement shall be smooth (not deformed) bars of wire of the minimum diameter shown on the plans, and shall be made by one or more of the following processes: open hearth, basic oxygen, or electric furnace. Bars shall be rolled from billets reduced from ingots and shall comply with ASTM Designation: A 306, Grade 65 minimum (Reference to ASTM Designation: A 29 is voided. Dimensional tolerances shall be in accordance with ASTM Designation: A 615, or ASTM Designation A 615, Grade 40 or 60, except for deformations. Wire shall be cold-drawn from rods that have been hot-rolled from billets and shall comply with ASTM Designation: A 82.

Wire for fabric reinforcement shall be cold-drawn from rods hot-rolled from open hearth, basic oxygen, or electric furnace billets. Wire shall conform to the requirements of the Standard Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement, ASTM Designation: A 82. Wire fabric, when used as reinforcement, shall conform to ASTM Designation: A 185.

In cases where the provisions of this item are in conflict with the provisions of the ASTM Designation to which reference is made, the provisions of the item shall govern.

Report of chemical analysis showing the percentages of carbon, manganese, phosphorus and sulphur will be required for all reinforcing steel, when it is to be welded.

The nominal size and area and the theoretical weight of reinforcing steel bars covered by this specification are as follows:

BAR SIZE NUMBER	NOMINAL DIAMETER IN.	NOMINAL AREA SQ. IN.	WEIGHT PER LINEAR FT.
2	0.250	0.05	0.167
3	0.375	0.11	0.376
4	0.500	0.20	0.668
5	0.625	0.31	1.043
6	0.750	0.44	1.502
7	0.875	0.60	2.044
8	1.000	0.79	2.670
9	1.128	1.00	3.400
10	1.270	1.27	4.303
11	1.410	1.56	5.313
14	1.693	2.25	7.65
18	2.257	4.00	13.60

Smooth round bars shall be designated by size number through No. 4. Smooth bars above No. 4 shall be designated by diameter in inches.

When wire is ordered by gauge numbers, the following relation between number and diameter, in inches, shall apply unless otherwise specified.

EQUIVALENT		EQUIVALENT	
GAUGE NUMBER	DIAMETER INCHES	GAUGE NUMBER	DIAMETER INCHES
0	0.3065		
1	0.2830	8	0.1620
2	0.2625	9	0.1483
3	0.2437	10	0.1350
4	0.2253	11	0.1205
5	0.2070	12	0.1055
6	0.1920	13	0.0915
7	0.1770	14	0.0800

Bending. The reinforcement shall be bent cold, true to the shapes indicated on the plans. Bending shall preferably be done in the shop. Irregularities in bending shall be cause for rejection.

Unless otherwise shown on the plans, the inside diameter for bar bends, in terms of the nominal bar diameter (d), shall be as follows:

Bends of 90° and greater in stirrups, ties and other secondary bars that enclose another bar in the bend.

	Grade 40	Grade 60
#3, #4, #5	3d	4d
#6, #7, #8	4d	6d

All bends in main bars and in secondary bars not covered above.

	Grade 40	Grade 60	Grade 75
#3 through #8	5d	6d	---
#9, #10	5d	8d	---
#11	5d	8d	8d
#14, #18	10d	10d	---

Tolerances. Fabricating tolerances for bars shall not be greater than shown in Figure 1.

3. STORING

Steel reinforcement shall be stored above the surface of the ground upon platforms, skids, or other supports and shall be protected as far as practicable from mechanical injury and surface deterioration caused by exposure to conditions producing rust. When placed in the work, reinforcement shall be free from dirt, paint, grease, oil, or other foreign materials. Reinforcement shall be free from injurious defects such as cracks and laminations. Rust, surface seams, surface irregularities or mill scale will not be cause for rejection, provided the minimum dimensions, cross-sectional area and tensile properties of a hand wire brushed specimen meets the physical requirements for the size and grade of steel specified.

4. SPLICES

No splicing or bars, except when provided on the plans, or specified herein, will be permitted without written approval of the Engineer.

Splices not provided for on the plans will be permitted, but not included for measurement, in Grade 40 bars only, sizes No. 8 and smaller, subject to the following:

For bars exceeding 40 feet in plan length, the distance center to center of splices shall not be less than 40 feet and no individual bar length shall be less than 10 feet. Splices will not be permitted in bars less than 40 feet in plan length. Splices which are not shown on the plans, but permitted hereby, shall be made in accordance with Table 1 below. The specified concrete cover shall be maintained at such splices and the bars placed in contact and securely tied together.

Splices will not be permitted in main reinforcement at points of maximum stress. When permitted in main bars, splices in adjacent bars will be staggered a minimum of two splice lengths.

Horizontal bars with 12 inches of concrete or less below the bar.	20 Bar Diameters*
Horizontal Bars with more than 12 inches on concrete below the bar.	35 Bar Diameters*
Vertical Bars	30 Bar Diameters*

*12 Inch Minimum

TABLE 1
Minimum Lap Requirements

(Bar Sizes through #8, Grade 40 only)

Welding or reinforcing bars may be used only where shown on the plans or as permitted herein. All welding operations, processes, equipment, materials, workmanship, and inspection shall conform to the requirements of the plans and of the THD Standards for "Structural Welding". All splices shall be of such dimension and character as to develop the full strength of the bar being spliced.

End preparation for butt welding reinforcing bars, shall be done in the field. Delivered bars shall be of sufficient length to permit this practice.

For box culvert extensions with less than one foot of fill, the existing longitudinal bars shall have a 20 diameter lap with the new bars. For extensions with more than one foot of fill, a minimum of 6 inch lap will be required.

Unless otherwise shown on the plans, dowel bars transferring tensile stresses, shall have a minimum embedment equal to the minimum lap requirements shown in Table 1. Shear transfer dowels shall have a minimum embedment of 12 inches.

PART 3 – EXECUTION

5. PLACING

Reinforcement shall be placed as near as possible in the position shown on the plans. Unless otherwise shown on the plans, dimensions shown for reinforcement are to the centers of the bars. In the plane of the steel parallel to the nearest surface of concrete, bars shall not vary from plan placement by more than one-twelfth of the spacing between bars. In the plane of the steel perpendicular to the nearest surface of concrete, bars shall not vary from the plan placement by more than one-quarter inch. Cover of concrete to the nearest surface of steel shall meet the above requirements but shall never be less than one inch.

Vertical stirrups shall always pass around the main tension members and be attached securely thereto. The reinforcing steel shall be spaced its required distance from the form surface by means of approved galvanized metal spacers, metal spacers with plastic coated tips, stainless steel spacers, plastic spacers, or approved pre-cast mortar or concrete blocks. For approval of plastic spacers on a project, representative samples of the plastic shall show no visible indications of deterioration after immersion in a 5 percent solution of sodium hydroxide for 120 hours.

All reinforcing steel shall be tied at all intersections, except that where spacing is less than one foot in each direction, alternate intersections only, need be tied.

END OF SECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION OF WORK

- A. Extent of concrete work shown on drawings.

1.3 RELATED WORKS

- A. SECTION 07 90 00 - JOINT SEALANTS
- B. SECTION 03 37 00 – PLACING FINISHING AND CURING CONCRETE

1.4 SUBMITTALS

- A. Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, curing compounds, and others as requested by the Engineer.
- B. Shop Drawings, Reinforcement: Submit original shop drawings prepared under the direction of a registered Professional Engineer for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures. Shop drawings shall include a full elevation of each slab showing all reinforcing required, and all special or additional reinforcing and all embedded plates. These details shall include the diagrammatic elevation of all slabs, at a scale sufficiently large to show clearly the position of all marginal bars around openings, dowels, splices, etc., for these bars. The ends of reinforcing bars shall be located by appropriate dimensions in the shop drawings. Approval shall extend only to general arrangement and correspondence with the Contract Documents, and shall not relieve the Contractor from complying with the requirements of the Contract Documents as to dimension, laps, lengths, fit, spacing, size, etc.
- C. Shop Drawings, Formwork: Submit shop drawings for forms for specific finished concrete surfaces. Show form construction including jointing, special form joint or reveals location and pattern of form tie placement, and other items, which affect exposed concrete visually.
- D. Samples: Submit samples of materials as requested by the engineer, including names, sources and descriptions.
- E. Laboratory Test Reports: Submit laboratory test reports by the Contractor's Testing Agency for concrete materials and mix design test.

- F. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by the Owner. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- G. Mill Certificates: Submit steel producer's certificates of mill analysis, tensile and bend tests for all reinforcement steel to be used on the project.

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. Concrete Reinforcing Steel Institute, (CRSI) "Manual of Standard Practice".
- B. Concrete Testing and Inspection Laboratory: The Contractor shall engage and pay for a Testing and Inspection Laboratory to perform all tests specified herein for determining quality or acceptability of materials and work specified in these documents.
- C. The Contractor shall engage and pay for a Testing Agency approved by the Owner to perform material evaluation tests and to prepare the concrete mix designs.
- D. Materials and installed work: Materials and installed work may require testing and retesting as directed by the Owner, at anytime during the progress of work. Allow free access to material stockpiles and facilities. Test, not specifically indicated to be done at the Owner's expense, including the retesting of rejected materials for installed work shall be done at the Contractor's expense.

1.6 PROJECT CONDITIONS

- A. Protection of Footings against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against possibility of freezing; maintain cover for time period as necessary.
- B. Protect adjacent finish materials against spatter during concrete placement.

PART 2 PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- B. Form Coatings: Provide commercial formulation form-coating compounds on forms to be removed, that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

- C. Forms Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spilling concrete upon removal. Provide units which will leave no metal closer than 1-1/2" to surface.
 - 1. Provide ties which, when removed, will leave holes not larger than 1" diameter in concrete surface.
- D. Earth as Forms: Excavated footings may be formed by using the excavated earth surfaces. Earth forms may be used only if the cut earth surfaces can maintain their shape without danger of cave-in. Sides and bottoms of earth forms shall be smooth, even and true vertical or horizontal planes.
- E. The Subgrade under slabs shall be fine graded and compacted, as specified in SECTION 31 20 00 – EARTHWORK
- F. Expansion Joint Filler: Expansion joint filler shall be performed bituminous material consisting of mineral fibers impregnated with asphalt conforming to ASTM D 994. Joint material shall extend the full depth of the slab or joint and shall be of the thickness indicated on the drawings.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185 welded steel wire fabric.
- D. Welded Deformed Steel Wire Fabric: ASTM A 497.
- E. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.
 - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class I) or stainless steel protected (CRSI, Class 2).

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
- B. Fly-Ash: ASTM C 618, Type C, not to exceed 20% replacement of cement, by weight.
- C. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.

- D. Pea Gravel: ASTM C33, washed clean, hard, rounded gravel, except graded so 90% passes 3/8 inch screen and 90% is retained in 1/4 inch.
- E. Water: Potable.
- F. Air-Entraining Admixture: ASTM C 260 certified by manufacturer to be compatible with other required admixtures.
- G. Water Reducing Admixture: ASTM C 494, Type A, and containing not more than 0.1 percent chloride ions.

Available Products: Subject to compliance with requirements, products, which may be incorporated in the work, include, but are not limited to, the following:

"WRDA Hycol"; W.R. Grace.

"Eucon WR-75"; Euclid Chemical Co.

"Pozzolith 322N"; Master Builders.

"Plastocrete 160;" Sika Chemical Corp.

"Chemtard"; Chem-Masters Corp.

- H. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G and containing not more than 0.1 percent chloride ions.

Available Products: Subject to compliance with requirements, products, which may be incorporated in the work, include, but are not limited to, the following:

"WRDA 19" or "Duracem"; W.R. Grace.

"Sikament"; Sika Chemical Corp.

"Eucon 37"; Euclid Chemical Co.

"Rheobuild"; Master Builders.

- I. Water Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E, and containing not more than 0.1 percent chloride ions.

Available Products: Subject to compliance with requirements, products, which may be incorporated in the work, include, but are not limited to, the following:

"Accelguard 80"; Euclid Chemical Co.

"Pozzolith High Early"; Master Builders.

- J. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and contain not more than 0.1 percent chloride ions.

Available Products: Subject to compliance with requirements, products, which may be incorporated in the work, include, but are not limited to, the following:

"Pozzolith 300-R"; Master Builders.

"Eucon Retarder 75"; Euclid Chemical Co.

"Daratard"; W.R. Grace.

"Plastiment"; Sika Chemical Co.

Prohibited Admixtures: Calcium chloride thycyanates or admixtures containing more than 0.1 percent chloride ions are not permitted.

2.4 RELATED MATERIALS

A. Non-Shrink Grout, Non-Metallic: CRD-C 621, factory pre-mixed grout.

Available Products: Subject to compliance with requirements, products, which may be incorporated in the work include, but are not limited to, the following:

"Type D, Masterflow 713"; Master Builders

"SonogROUT"; Sonneborn-Rexnord.

"Euco-NS"; Euclid Chemical Co.

"Five Star Grout"; U.S. Grout Corp.

B. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.

2. Polyethylene film.

3. Polyethylene-coated burlap.

C. Liquid Membrane-Forming Curing Compound: Liquid type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.

Available Products: Subject to compliance with requirements products, which may be incorporated in the work, include, but are not limited to, the following:

"Masterseal"; Master Builders.

"Clear Seal"; W.R. Grace

"Sealkure"; Toch Div. - Carboline.

"Kure-N-Seal"; Sonneborn-Rexnord.

"L & M Cure"; L & M Construction Chemicals.

D. Bonding Agent:

Available Product: Subject to compliance with requirements, a product, which may be incorporated in the work, is the following:

"Sikastix 300 Series"; Sika Chemical Corporation

E. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements.

Available Products: Subject to compliance with requirements, products, which may be incorporated in the work, include, but are not limited to, to the following:

"Thiopoxy"; W.R. Grace.

"Sikadur Hi-Mod"; Sika Chemical Corp.

"Euco Epoxy 452 or 620"; Euclid Chemical Co.

F. Preformed Joint Filler: Non-extruding, resilient, non-bituminous type conforming to ASTM Designation D-1752, Type II.

G. Elastomeric Joint Sealant: See SECTION 07 90 00 JOINT SEALANTS. Color shall closely match the color of the adjacent exposed surface of the concrete. Keep same color throughout project. Joint back-up material: Polyethylene foam, 60% closed cell.

2.5 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to the Owner for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.

1. Limit use of fly ash to not exceed 20 percent of cement content by weight.

B. Submit written reports to the Owner of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by the Owner.

C. Design mixes to provide normal weight concrete with the properties as shown on Concrete Quality Table on page 7, as indicated on drawings and schedules:

1. CONCRETE QUALITY TABLE

IDENT- IFICA- TION SYMBOL OR	CLASS OF CONC.	SPECIFIED COMPRES- SIVE CONST. OF CONC. (F'C) @ 28 DAYS (PSI)	REQ. AVE. DESIGN COMPRES- STRENGTH OF CONC. (f'cr) (PSI)	MINIMUM NO. OF SACKS OF SIVE PER CU. YD. OF CONC.	MAXIMUM AGGRE- GATE CEMENT (INCHES)	REQUIRED SLUMP (INCHES) SIZE PLUS MINUS ONE INCH
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A-1	Slabs on Grade:	3000	4200	5	3/4	3-1/2 " ±1"
A-2	Footings:	4000	5200	6	1 1/2	3 1/2" ±1"
A-3	Walls, Box culverts, junction boxes	4000	5200	6	1 1/2	4-1/2 " ±1"
A-4	Slope Lining:	4000	5200	6	1 1/2	4-1/2 " ±1"
B-1	Non-Structural Sidewalks, Curbs and Exterior Slabs on Grade:	3000	4200	5	3/4	3 1/2
B-2	Lean Concrete:	----	----	3	1 1/2	3 1/2

D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by the Owner. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Owner before using in work.

2.6 ADMIXTURES

- A. Use water reducing admixture or high range water-reducing admixture (super plasticizer) in concrete as required for placement and workability.
- B. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
- C. Use high-range water reducing admixture in pumped concrete, concrete for exposed open deck slabs, concrete required to be watertight, and concrete with water/cement ratios below 0.50.
- D. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-or- minus 1-1/2 percent within following limits:
 - 1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or subjected to hydraulic pressure:
 - a. 4.5 percent (moderate exposure); 1" max. aggregate.
 - b. 3.0 percent for slabs on grade
 - 2. Other Concrete: (not exposed to freezing, thawing, or hydraulic pressure): 2 percent to 4 percent air. Do not exceed 3% where Hard Aggregate Floor Surface Materials are scheduled.
- E. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
- F. Water Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:
 - 1. All other concrete; not more than W/C 0.45.
- G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as shown in the Concrete Quality Table of this section of the specifications.

2.7 CONCRETE MIXING.

- A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.
- B. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required by the Owner at his discretion.

PART 3 - EXECUTION**3.1 GENERAL**

- A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

3.2 FORMS

- A. Design, erect, support, brace and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation and position. Maintain formwork construction tolerances complying with ACI 347.
- B. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.
- C. Construct forms to sizes shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures.
 - 1. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.
- E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- G. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.
- H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive

concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retightening forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

- I. Temporary Shoring: Temporary shoring may be required, and where required, the Contractor shall be responsible for the design and installation in accordance with the applicable ACI code and temporary shoring shall be left in place until the slab attains 85% of its specified compressive strength. The Contractor shall provide temporary shoring between permanent structural supports at all locations recommended by the composite steel deck manufacturer, and it shall be the responsibility of the Contractor to determine whether temporary intermediate shoring under the permanent metal composite deck is required.

3.3 PLACING REINFORCEMENT

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials, which reduce or destroy bond with concrete.
- C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.
- D. Place reinforcement to obtain at least minimum coverage's for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.4 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated, or if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to the Engineer.
- B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.

- D. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals, foundation walls, grade beams and elsewhere as indicated.
 - 1. Joint filler and sealant materials are specified in Division-7 sections of these specifications.
- E. Contraction (Control) Joints in Slabs-on-Ground: Construct contraction joints in slabs-on-ground to form panels of patterns as shown. Use saw cuts 1/8" x 1/3 slab depth or plastic inserts as shown on drawings to achieve weakened plane.
- F. Form contraction joints by inserting pre-molded plastic, into fresh concrete until top surface of insert is flush with slab surface. Tool slab edges round at joints occurring at exposed concrete only.
 - 1. Contraction joints in unexposed floor slabs may also be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
 - 2. If joint pattern not shown, provide joints not exceeding 15' in either direction and location to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
 - 3. Joint sealant material is specified in Division-7 sections of these specifications.

3.5 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.6 PREPARATION OF FORM SURFACES

- A. Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.
- B. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- C. Thin form-coating compounds only with thinning agent of type, and amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place

concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.7 CONCRETE PLACEMENT

- A. Placement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used. Do not place concrete until after reviewed by the Owner.
- B. General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as herein specified.
- C. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
- E. Use pea gravel when mixing concrete for use in sections less than 3 inches thick and where concrete fill is required.
- F. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
- G. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into proceeding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
- H. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- I. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

- J. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- K. Maintain reinforcing in proper position during concrete placement operations.
- L. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C), and not more than 80 deg F (27deg C) at point of placement.
- M. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
- N. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
- O. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
- P. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F (32 deg C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
- Q. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
 - 1. Fog spray forms, reinforcing steel and subgrade just before concrete is placed.
- R. Use water-reducing-retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.8 FINISH OF FORMED SURFACES

- A. Rough Form Finish: For formed concrete surfaces not exposed to view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

- B. Smooth Form Finish: For formed concrete surfaces exposed to view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp proofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. Smooth Rubbed Finish: Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal.

Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

- D. Exposed surfaces shall be "Smooth Rubbed Finish" in accordance with ACI 301-72 Specifications for Structural Concrete and as described in C. above. The "Smooth Rubbed Finish" on the newly hardened concrete shall be applied not later than 18 hours after placing of the concrete.
 - 1. Surfaces shall be wetted and rubbed with carborundum brick or other approved abrasive until uniform color and texture are produced. **No cement grout shall be used** other than the cement past drawn from the concrete itself by the rubbing process and excessive rubbing shall be avoided. Where the smooth rubbed finish does not result in the desired surface, defects shall be repaired per the requirements of paragraph 3.14 **Concrete Surface Repairs**.
- E. Related Uniformed Surfaces: At finish tops of walls, horizontal offsets and similar uniformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent uniformed surfaces, unless otherwise indicated.
 - 1. At tops of walls, which will become a construction joint for placement of a slab or wall, strike-off to proper elevation, consolidate and leave a surface with a 1/4" profile.

3.9 SCREEDING

- A. Screed all floors and slabs-on-fill level, using fixed screed points with steel screed guides on fixed supports (stakes, pins, etc.). Use of concrete for screed control will not be permitted.

Owner's testing agency shall verify all concrete flatness. All slabs outside maximum flatness shall be repaired or shall be replaced at no cost to the Owner.

3.10 MONOLITHIC SLAB FINISHES

- A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, or sand-bed terrazzo, and as otherwise indicated. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units.
 - 1. Check and level surface plane to tolerances of FF 18 - FL 20. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

- B. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, except as described below, and slab surfaces to be covered with resilient flooring, carpet, ceramic tile, paint, or other thin film finish coating system.
 - 1. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand- troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances FF 20-FL 25. Grind smooth surface defects, which would telegraph through applied floor covering system.

- C. Broom Finish: Apply Broom finish to exposed floor slab surfaces scheduled to receive Broom finish. Broom finish shall consist of a finish applied immediately after the application of a trowel finish by lightly drawing a broom across the surface of the concrete slab while imprint is still possible, as directed by the Engineer.

- D. Chemical Hardener Finish: Apply chemical-hardener finish to interior concrete floors where indicated. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water (parts of hardener/water as follows), and apply in 3 coats; first coat, 1/3-strength; second coat, 1/2-strength; third coat, 2/3-strength. Evenly apply each coat, and allow 24 hours for drying between coats.
 - 1. Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.
 - 2. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

3.11 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Keep continuously moist for not less than 7 days.

Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

- B. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.
- C. Provide moisture curing by following methods.
 - 1. Keep concrete surface continuously wet by covering with water and containing at edges.
 - 2. Continuous water-fog spray.
 - 3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
- D. Provide moisture cover curing as follows:
 - 1. Cover concrete surfaces with moisture- retaining cover and plywood for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape. Cure for 7 days.
- E. Provide curing and sealing compound slabs as follows:
 - 1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply one application uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period. Apply a second coat at right angles to the first within 2 weeks prior to inspection for substantial completion.
 - 2. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, damp proofing, membrane roofing, flooring (such as ceramic or tile, glue-down carpet), painting, and other coatings finish materials or surface floor hardening materials, unless otherwise acceptable to the Engineer.

- F. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- G. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.
 - 1. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

3.12 REMOVAL OF FORMS

- A. Removal of forms: All forming material below the ground surface must be entirely removed.
- B. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- C. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.
- E. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength of 80% of their specified 28-day compressive strength based on field cured test cylinders. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

3.13 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to the Owner.

3.14 MISCELLANEOUS CONCRETE ITEMS

- A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place.

Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

- B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- C. Reinforced Masonry: Provide concrete grout as described in the Concrete Quality Table herein, for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

3.15 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to the Owner.

Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

- B. For exposed concrete surfaces blend white portland cement and structural portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of the Engineer. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.
- D. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- E. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.
- F. Repair finished unformed surfaces that contain defects, which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections

regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

- G. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- H. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to the Owner.
- I. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
- J. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
- K. Perform structural repairs with prior approval of the Owner for method and procedure, using specified epoxy adhesive and mortar.
- L. Repair methods not specified above may be used, subject to acceptance of the Engineer.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. The Contractor will employ a Testing and Inspection Laboratory to perform tests and to submit test reports.
- B. Sampling and testing for quality control during placement of concrete shall include the following, as directed by the Owner.
- C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - 1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.

2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
 3. Concrete Temperature: Test hourly when air temperature is 40 deg F (4 deg C) and below, and when 80-deg F (27 deg C) and above; and each time a set of compression test specimens made.
- D. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
- E. Compressive Strength Tests: ASTM C 39; one set of four (4) cylinders for each 50 cu. yds. or fraction thereof, or each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 2 specimens tested at 28 days, and one specimen retained in reserve for testing if required.
1. When frequency of testing will provide less than 4 strength tests for a given class of concrete, conduct testing from at least 4 randomly selected batches or from each batch if fewer than four are used.
 2. When total quantity of a given class of concrete is less than 50 cu. yds., strength test may be waived by the Owner if, in his judgment, adequate evidence of satisfactory strength is provided.
 3. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 4. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
- F. Test results will be reported in writing to the Owner, the Engineer, the Structural Engineer and the Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- G. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the basis for acceptance or rejection but only as a method of comparison with other concrete, subject solely to the interpretations and approval of the Engineer.

- H. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Owner. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

END OF SECTION 03 30 00

PART 1 – GENERAL**1. SUMMARY**

1.1 Reference Standards:

A. American Concrete Institute (ACI):

1. Specifications for Structural Concrete for Buildings (ACI 301).
2. Recommended Practice for Cold Weather Concrete (ACI 306).
3. Building Code Requirements for Reinforced Concrete (ACI318).
4. Recommended Practice for Hot Weather Concrete (ACI 318).
5. Consolidation of Concrete (ACI COMM. 609).
6. Curing Concrete (ACI COMM. 612)
7. Recommended Practice for Measuring, Mixing and Placing Concrete (ACI 614).
8. Manual of Concrete Inspection (SP-2).
9. Guide to Joint Sealants for Concrete Structures (ACI 504R).

B. American Society for Testing Materials (ASTM):

1. Standard Specification for Sheet Materials for Curing Concrete (ASTM C 171).
2. Standard Specifications for Liquid Membrane-Forming Compounds for Curing Concrete (ASTM C 309).
3. Specifications for Cotton Mats for Curing Concrete (ASTM C 440).

C. Portland Cement Association (PCA):

1. Design and Control of Concrete Mixtures.
2. Maintenance of Joints and Cracks in Concrete Pavements.
3. Patching Concrete Pavements.

D. United States Department of Commerce: Commercial Standard for Polyethylene Sheeting Construction, Industrial and Agricultural Applications) (CS 238).

E. U.S. Army Corps of Engineers: Pigmented Membrane-Forming Compounds for Curing Concrete (CRD C 300).

F. Latest edition of each of above Governing Standards shall apply. Except as modified in this section or the other related sections. ACI 301 shall generally apply to all concrete work in this project.

2.1 Submittals:

A. Manufacturer's literature for membrane-forming compounds for curing and for liquid floor hardeners shall be submitted for review by the Engineer prior to their use on the project.

B. Manufacturer's literature, specifications and technical support data on foundation waterproofing.

- 3. Coordination of Work: During placing and finishing of concrete (including patching concrete pavement and/or the repair and replacement of spalled areas in existing concrete slabs), coordinate all work and trades to insure that the requirements of the Contract Documents are complied with.

II - PRODUCTS

1.1 Membrane-Forming Compounds for Curing:

- A. Membrane-forming compounds shall conform to the requirements of CRD-C300 except as to pigment and shall include a fugitive dye which shall become inconspicuous as required by ASTM C 309.
- B. The membrane-forming compound used shall not be detrimental to the bonding of any finish required on any concrete surface, horizontal or vertical.

2.1 Liquid Floor Hardeners: Liquid floor hardeners shall be 081028 Penetrex Silicate Cure Seal Hardener as manufactured by Chemrex Corporation, or equal. The manufacturer must recommend the product sealing, hardening and dustproofing concrete floors under heavy traffic.

3.1 Concrete Bonding Agent: Shall conform to MMM-G-650B Type 1 Grade A requirements, as Chemrex Corp.

4.1 Epoxy Grout:

- A. Epoxy materials shall be in accordance with ASTM C 881, Types I, II, IV and V Class B & C.
 - 1. Packaging, Labeling and Storage. The components shall be packaged in suitable, well- sealed containers clearly labeled as to the type material and the ratio of the components to be mixed by volume. Any special instructions regarding mixing shall be included. The label shall show resin or hardener component, the brand name, of manufacturer, lot or batch number, date of packaging and the quantity contained therein. Caution warnings regarding contact of the epoxy with skin and eyes must be included on the labels.

The epoxy components must be stored at temperatures between 60 F and 100 F. Any material which shows evidence of crystallization, lumps, skinning, extreme thickening, or settling of pigments which cannot be readily re-dispersed with normal agitation shall not be used.
 - 2. Mixing. Prior to use, each component shall be stirred to re-disperse any settling or separation of the fillers and liquid portions. The components shall then be placed immediately in the proper reservoir when used in automatic mixing and dispensing equipment. For application by other means, the components must be properly proportioned and mixed until a uniform color and appearance are obtained. Unless otherwise indicated, no addition of solvents is allowed.
 - 3. Application and Surface Preparation. Requirements on application and preparation of the surface upon which the epoxy is to be placed shall be as directed in the applicable specification item.
- B. Epoxy Grout System.

1. Concrete Adhesives System. This system consists of three types of epoxy adhesive with different viscosities designed to bond fresh Portland cement concrete to existing Portland cement concrete, hardened concrete to hardened concrete and steel to fresh or hardened concrete.

Standard (Medium viscosity) for applying to horizontal and vertical surfaces. This material is suitable for surface sealing of fine cracks in concrete.

Low viscosity for application with spray equipment to horizontal surfaces.

Paste consistency for overhead application and where a high build-up is required. This material is suitable for surface sealing of cracks in concrete which are veed out prior to sealing and for grouting of dowel bars where clearance is 1/16 inches or less.

Any specific coloring or resin and hardener components shall be as directed by the Engineer.

2. Epoxy Binder System. This system is intended for mixing with selected aggregates to produce an epoxy mortar or concrete for grouting dowel bars or repairing spalls and other defects in existing Portland cement concrete.
3. Crack Injection System. This system is a low viscosity epoxy material designed for pressure injection into cracks in existing concrete to restore the structural integrity. The system shall be capable of bonding to damp surfaces. This system is designated as Type IX epoxy.

III - EXECUTION

1.1 Review by the Engineer before Concrete Placement and Replacement:

- A. Review by the Engineer is required of all foundations, forms, reinforcing steel, pipes, conduits, sleeves, inserts and other work required to be built into the concrete before the concrete is placed. Review by the Engineer does not relieve the Contractor from complying with the requirements of the Contract Drawings and Specifications.
- B. The Engineering Department must be notified at least twenty-four (24) hours prior to the placing of any concrete, and the placing of concrete before such notice is given and/or before review by the Engineer, is a valid reason for rejecting the concrete so placed.
- C. The date of placing of concrete for the different members of the structure shall be marked in ink on a set of drawings that are to be kept on file at the job site until completion of the structure. These drawings shall be turned over to the Engineer at completion of all concrete placing.

2. Setting of Base or Bearing Plates:

- A. The top of concrete or other bearing surfaces shall be finished to the elevations indicated on the drawings. Embedded items shall be set to the dimensions shown.
- B. Base and bearing plates shall then be set and anchored to the proper line and elevation using-steel wedges, shims, and/or setting nuts for leveling and plumbing the structural members.

- C. Wedges or shims shall not be removed, but where protruding shall be cut flush with the edge of the base or bearing plate.
3. Placing Concrete:
- A. Placing of concrete shall be in accordance with the recommended practice of ACI 614 and PCA "Design and Control of Concrete Mixtures" and "Patching Concrete Pavement".
 - B. No Concrete shall be placed during rain, sleet or snow. Rain water shall not be allowed to increase the mixing water or to damage finished surfaces.
 - C. Before any concrete is placed, mixing and conveying equipment shall be well cleaned, formwork completed, the forms of space to be filled with concrete thoroughly cleaned; forms, if not oiled, shall be wet; all reinforcement secured and cleaned; and expansion joint material, water stops, anchors and other embedded items positioned.
 - D. Bottom of footings shall be sprinkled sufficiently to eliminate drawing of water from the fresh concrete. The hardened concrete of joints between footings and walls or columns, between walls or columns and beams or floors they support, and other similar joints shall be dampened (But not saturated) immediately prior to placing fresh concrete.
 - E. Excess form oil if used shall be wiped off and no oil shall be allowed to coat reinforcing steel to the slightest degree. Any oil used shall be of such quality that later surface treatments specified for concrete will not be injured or prevented from application.
 - F. Concrete shall be handled as rapidly as practicable from the mixer to the place of final deposit by methods which prevent the separation or loss of ingredients. It shall be deposited as nearly as practicable in its final position to avoid re-handling or flowing.
 - G. All vertical members shall be filled at least two (2) hours ahead of horizontal members in order to allow the concrete in the vertical members to take its initial settlement. Vertical members shall be filled in one continuous operation, using drop chutes of rubber or metal, if necessary. The concrete shall not be allowed to drop freely more than four (4) feet.
 - H. Place concrete only when the ambient temperature is at least 40o F. and rising, and will remain above 40°F for a period of at least 12 hours. Ambient temperature reading will be those recorded from the local National Weather Service Bureau.
 - J. Concrete shall be carefully worked around reinforcing, waterstops and other embedded items along surfaces and into the corners of forms eliminating all air or stone pockets.
 - K. Place concrete for slabs to required thickness and strike off at designed elevations and contours. After screeding, the concrete surface shall be tamped to force coarse aggregate away from the surface.
 - L. Place concrete for footings, stem walls and retaining walls considering material and strength as specified in Plan Sheet S-100 for this project.

- M. Concrete shall be consolidated by the use of vibrators in accordance with ACI 609. Vibration must be by direct action in the concrete and not against forms or reinforcements.

Concrete shall be vibrated until the water shows indications of rising, but not until the water has risen. Vibrators shall not be used to transport concrete laterally within the forms or footings. Vibrators shall have a minimum frequency of 8000 revolutions per minute. Size of vibrator diameter shall be as required by space available between forms and reinforcing, embedded items, etc., and suitable for the mass thickness of concrete being placed. A spare vibrator shall be kept at the project site during all concrete placement operations.

4.1 Protection and Curing of Concrete:

- A. All concrete placed shall be protected such that the temperature at the surface shall be prevented from going below 55° F. for 72 hours after placing and prevented from going below freezing for 3 days thereafter.
- B. The Contractor shall submit, for review by the Engineer, the methods proposed for protecting the concrete against low or high temperatures. The Contractor shall adhere to the recommendations for cold or hot weather concreting of ACI 306 and 605, respectively, as to temperature of fresh concrete, heating or cooling of concrete materials, use of accelerators and other admixtures, methods of protection, temperature records, etc.
- C. Prevention of loss of moisture from surface of concrete shall be accomplished by keeping surface or forms continuously wet for as long as conditions require. Wet curing shall extend for not less than seven (7) days.
- D. Slabs on grade be cured either by using liquid membrane-forming compounds conforming to the requirements of CRD-C 300 and ASTM C 309, by using water-proof paper conforming to the requirements of ASTM C 171, or be using a wet covering kept continuously wet, such as cotton mats conforming to the requirements of ASTM 440, or burlap.
- E. Whatever curing method is used, it shall be applied immediately after final troweling, floating, or after forms are removed. The curing method used shall be coordinated with the method of protection.
- F. Membrane-forming compounds shall be applied as soon as possible after finishing operations. Apply compound in two (2) coats, the second at right angles to the first.
- G. After concrete placement protect concrete during other construction activities as necessary to prevent damage from equipment and personnel movements and from excessive stresses resulting from construction loads.
- H. Sand floated finish shall be as follows: the forms shall be removed before the surface has fully hardened. The surface then shall be wet and rubbed with a wood float by a uniform circular motion, with fine sand being rubbed into the surface until the resulting finish is even and uniform in color and texture. This finish shall be used for all wall exposed concrete surfaces.

- I. An as-cast finish shall be used for all unexposed concrete surfaces. The Contractor shall erect and maintain barricades and approved devices from newly placed pavement for a period of five (5) days. Any location necessitating crossing shall be protected by use of adequate bridging or other protection approved by the Engineer.
 - J. When required by the Engineer, a broom finish shall be provided on top of slab. Broom finish shall consist of a course and scoured texture as directed by the engineer by drawing a stiff broom across the concrete surface. This operation shall follow immediately after floating. Tolerances shall be within 1/8 inch to promote the intended drainage.
- 5.1 Repair of Surface Defects:
- A. After forms are removed, joint marks, fins, honeycombed areas, bulges, depressions, etc., on all concrete surfaces shall be removed and/or filled, leaving a smooth, dense and true surface.
 - B. All tie holes and all repairable defective areas shall be patched immediately using non-staining, non-shrink grout with a minimum compressive strength of 6000 p.s.i. The color of the patching grout shall match that of adjacent concrete.
 - C. Honey combed areas and other defective concrete shall be removed down to sound concrete as directed by the Engineer before patching. All honeycombed areas shall be shown to the Engineer.
 - D. All areas to be patched shall be thoroughly cleaned and dampened before patching is begun.
- 6.1 Finishing of Formed Surfaces:
- A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
 - B. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed.
 - C. Grout Cleaned Finish: Provide grout cleaned finish to scheduled concrete surfaces which have received smooth form finish treatment.

Combine one part Portland cement to 1-1/2 parts fine sand by volume, and mix with water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard Portland cement and white Portland cement, amounts determined by trial patches, so that final color of dry grout will match adjacent surfaces.

Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes.

Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

7.1 Sawing Green Concrete:

- A. The sawing contractor shall provide sawing equipment adequate in units and power to complete the sawing operation as per plans and specifications. The sawing contractor shall supply, except on very small jobs, at least one stand-by saw in good working condition. An adequate supply of diamond saw blades shall be maintained on job site.
- B. Sawing method- the sawing method shall consist of cutting a groove in the pavement with a power driven concrete saw.
- C. Sawed grooves for longitudinal and transverse weakened plane joints shall be cut to a minimum depth of (1/4 - thickness of slab divided by 4) and to minimum width of 1/8 inch but in no case shall the width exceed 1/4 inch.
- D. The exact time of sawing longitudinal and transverse weakened plane joints shall be the sawing contractor's responsibility. Sawing transverse weakened plane joints shall be completed within 24 hours following paving. Sawing of longitudinal weakened plane joints shall be completed within 48 hours.
- E. The sequence of sawing may vary due to climatic conditions. The contractor shall exert all possible effort to prevent volunteer cracking.
- F. Transverse contraction and longitudinal contraction joints shall be sawed as shown on the plans. The saw kerf shall be straight and true to the required depth and width. Reference points will be supplied by owner or contracting agency where joints are to be saved. Joints should be flushed immediately after sawing to remove concrete laitance.
- G. All joints shall be sawed true to line, with their faces perpendicular to the surface of the pavement. Joints shall not vary more than 1/4" from the true line. Transverse joints in succeeding lines shall be sawed in line matching abutting joints in first lane.

8.1 Repair and Sealing of Cracks:

- A. Volunteer cracks are all cracks and portions of cracks that are not coincident with constructed joints.
- B. All volunteer cracks that occur during the 10 calendar days following placement of concrete shall be repaired by injecting the entire length of crack with epoxy under pressure. Volunteer cracks not requiring epoxy injection shall be limited to single, continuous, volunteer cracks without branch or connecting cracks that conform to either conditions described in section 1) or 2) below.

- 1) Begin or end at a longitudinal joint or edge of pavement which are not within 5

feet at any point along length of crack of a transverse joint or another volunteer crack that has not been injected with epoxy.

- 2) Do not begin or end at a longitudinal joint or edge of pavement and are not: (A) within 5 feet, at any point along length of crack of any transverse joint-edge or other volunteer crack that has been injected with epoxy.
- C. Epoxy injection shall be completed within 90 days after pavement is placed. Any accumulations of epoxy in saw cuts shall be removed by re-sawing to the specific depth prior to opening pavement to traffic.
- D. Equipment used in sawing operations must meet all OSHA standards and specifications. Gas and air equipment may only be used on outside work areas due to noise and fume pollution, unless vented to the outside.

9.1 Full Depth Patching:

Full depth patching shall be rectangular in shape and conform to the dimensions and typical sections shown on the plans. Patches shall be sawed full depth and replaced on a prepared subgrade to the same thickness as the existing pavement.

Provide steel reinforcement similar to that of whole slab replacement as noted on the drawings. Provide load transfer dowels drilled, grouted and coated as specified.

Texture patched surfaces similar to that of surrounding pavement.

10.1 Repair of Spalls at Slabs and at Joints:

Spalls shall be repaired by shallow saw cutting in a waffle pattern within the damaged area or 6 inches from the joint or edge of spall, whichever is larger. All unsound concrete should be removed, spall cleaned and patched with specified material and finished to match surface texture of adjacent pavement.

11.1 Monolithic Slab Finishes:

- A. Float Finish: Apply float finish to monolithic slabs surfaces to receive trowel finish and other finishes as hereinafter specified and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-red terrazzo, and as otherwise indicated.

After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane so that depressions between high spots do not exceed 5/16" under a 10' straightedge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

- B. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint or other thin film finish coating system.

After floating, begin first trowel finish operation using a power-driven trowel. Begin first troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a level surface plane so that depressions between high spots do not exceed 1/8" under a 10' straightedge.

- C. Non-Slip Broom finish: Apply non-slip broom finish to sidewalks, exterior concrete platforms, steps and ramps, and elsewhere as indicated. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

- D. Finished Surface of Slabs and Joints: Faulted joints (longitudinal and transversal) shall be grinded on the high side of the faulted area. A self-propelled diamond bladed grinder shall skim the entire

Area to provide a uniform appearance and texture at a continuous motion. A vacuum system shall be used for cleanup.

Full depth repair and spall repair shall be completed before grinding operation. Joint sealing shall follow thereafter.

END OF SECTION

DIVISION 7

**THERMAL AND MOISTURE
PROTECTION**

PART 1 - GENERAL

1.1 SUMMARY

This item shall govern the material requirements for joint sealants, backing materials and joint fillers.

PART 2 - PRODUCTS

The material for this item shall conform to the following:

a). Joint Sealant Materials

Joint Sealant material shall be the class indicated on the plans or in the governing specifications. The various classes of sealant described herein shall be in accordance with Departmental Material Specification D-9-6310. Copies of specifications D-96310 are available from the Texas Department of Transportation, Director of Materials and tests, 125 E. 11th Street Austin, TX 78701 2483.

b). Storage

Class 1 and 2 sealants shall be stored at temperatures between 40 F and 100 F. Class 4 and 5 sealants shall be stored in sealed containers at a temperature of 100 F or below and the material must be used within two (2) months of receipt on the project.

c.) Classes of Joint Sealant

Class 1. Two Component, Synthetic Polymer, Non-sag. The components shall be proportioned and mixed in accordance with the manufacturer’s recommendations.

Class 2. Two Components, Synthetic Polymer, Self leveling. The components shall be proportioned and mixed in accordance with the manufacturer’s recommendations.

Class 3. Hot Poured Rubber. This sealant shall be a rubber asphalt compound which when heated shall melt to the proper consistency for pouring and shall solidify on cooling to ambient temperatures.

Class 4. Non-sag Low Modulus Silicone. The material shall be a single component formulation not requiring addition of a catalyst.

Class 5. Self-leveling Low Modulus Silicone. The material shall be as single component formulation not requiring addition of a catalyst.

Class 6. Preformed Joint Sealant (PJS). The preformed joint sealant shall be an extruded elastomeric material having a multi-channeled shape.

Class 7. Self –leveling, Rapid Curing, Low Modulus Silicone. The material shall be a two component, rapid curing, self-leveling, low modulus formulation. The components shall be proportioned and mixed in accordance with the manufacturer’s recommendations.

The size shown on the plans shall be the nominal width of the sealant. The uncompressed depth of the seal shall be equal to or greater than the width.

All preformed joint sealants installed by the Contractor shall have been prequalified for compliance with the requirements. Each size and configuration of seal produced by a manufacturer must be approved by the Engineer prior to use on Department projects. For a sealant manufacturer to prequalify and obtain approval of a sealant, detailed dimensions and configuration of each size of sealant and certified test results indicating compliance with Departmental Material Specification D-9-6310 and any requirements shown on the plans and specifications shall be submitted to the Engineer.

Submission shall be done sufficiently in advance of work to allow for testing and evaluation of the material.

The Engineer will confirm by visual inspection that the sealant proposed for installation is the same size, configuration and manufacture as shown on plans. The Engineer will examine the sealant for any undue distortions, such as dissymmetry, warping, thick webs or uneven width which are likely to impair the performance of the joint. If the magnitude of the distortions are sufficient to create doubt as to the performance of the sealant, the Engineer may direct that the sealant be replaced or that samples representing the worst of the lot be subjected to further testing to verify their performance.

d). Backer Rods and Backing Materials.

These materials shall be capable of holding the fluid sealant in open joints in place. In all cases, these materials shall be of such a type that will not bond to the sealant. The backing materials shall meet the requirements of the sealant manufacturer. They shall be compressible type materials, such as closed-cell, resilient foam or sponge rubber stock of vinyl, butyl or neoprene, or expanded polyethylene or polyurethane.

The diameter of the backer rod shall be at least 25 percent larger than the joint reservoir width.

e). Joint Fillers. Joint fillers shall be of the size, shape and type indicated on the plans and shall conform to the following requirements:

1. Timber Boards. Timber shall be obtained from redwood, cypress, gum, southern yellow pine or Douglas fir timber. They shall be sound heartwood and shall be free from sapwood, knots, clustered bird’s –eye, checks and splits. Occasional sound or hollow birds- eye, when not in clusters, will be permitted provided the board is free from any other defects that will impair its usefulness as a joint filler. All boards, except redwood and cypress, shall have a creosote or pentachlorophenol treatment conforming to Item 492, “Timber Preservative and Treatment”, Table 1. When oven dried at 230 F to a constant weight, the weight of the board per cubic foot (minus treatment) shall not be less than 20 pounds nor more than 35 pounds.

2. Asphalt Boards. Asphalt boards shall consist of two (2) suitable asphalt-impregnated liners filled with a mastic mixture of asphalt and vegetable fiber and/or mineral fiber. Asphalt boards shall be smooth, flat and sufficiently rigid to permit installation. When tested in accordance with Test Method Tex-524-C, the horizontal deflection shall not be more than one (1) inch in 3 ½ inches.

3. Preformed Fiber Material.

- a.** Preformed Bituminous Fiber Material. Preformed bituminous fiber material shall meet the requirements of ASTM D175.
- b.** Preformed Nonbituminous Fiber Material. Preformed nonbituminous fiber material shall meet the requirements of ASTM D1751, except that the requirements pertaining to bitumen content, density and water absorption shall be voided.
- c.** Rebonded Neoprene Filler. Rebonded neoprene filler shall consist of ground closed-cell neoprene particles, rebounded and molded into sheets of uniform thickness of the dimensions shown on the plans, meeting the requirements of ASTM D1752, Type I. Certification that the material meets these requirements shall be furnished to the Engineer.

END OF SECTION

PART 1: GENERAL

1. DESCRIPTION

This item shall govern for the materials, testing, fabrication and placement of elastomeric materials, except as otherwise covered in other specifications or on the plans.

PART 2: PRODUCTS

2. MATERIALS

A. When specified on the plans, structural members shall be seated on elastomeric bearings.

These bearings may be either "plain" (consisting of elastomer only) or "laminated" (consisting of alternating individual layers of elastomer and non-elastic laminates) as shown on the plans. Elastomeric bearings shall be specified on the plans by hardness (durometer), size and configuration and in the case of laminated bearings, by the thickness of the individual layers of elastomer and the size and position of special connection members, if any, required to be vulcanized with the bearing.

1. General. Unless otherwise shown on the plans, the elastomer for bearings shall be formulated from previously unvulcanized 100 percent virgin polychloroprene or 100 percent virgin polyisoprene rubber polymers. Rubber like polymers employed in the elastomer formulation shall be exclusively of the polychloroprene or natural polyisoprene type. Bearings will not be acceptable if the elastomer employed contains previously vulcanized rubber (natural or synthetic) or other synthetic rubber like polymers.

Non-elastic laminates shall be one-sixteenth of an inch (-0 inch, + 1/16 inch) thick steel strip or sheet. Metal for special connections including sole plates and bearing plates, shall conform to ASTM Designation: A 36, unless otherwise shown on the plans.

2. Physical Properties of the Elastomer. Elastomer formulated from polychloroprene shall meet the requirements shown on Table A. Elastomer formulated from polyisoprene shall meet the requirements of Table B. Material tests shall be made in accordance with the test methods stipulated except that all tests shall be made on the finished product and standard laboratory test slabs will not be utilized for this purpose. The values shown in Tables A and B pertain to tests performed on samples taken from the finished product. The apparatus employed in preparing test specimens from the finished product shall be in accordance with ASTM Designation: D 15, as pertains to "Sample Preparation for Physical Testing of Rubber Products". Compression set test specimens shall be taken from the finished product. In bearing thicknesses exceeding one half of an inch or elastomer layers in laminated bearings exceeding one half of an inch, the full thickness of the bearing or elastomer layer shall be utilized. The 25 percent compression shall be employed and obtained through the utilization of appropriate thickness of spacer bars and/or shims. Beveled or wedge shaped bearings of elastomer layers in laminated bearings shall have the compression set specimens selected from sections of the bearings or layers which have been properly cut or ground so that the top and bottom surfaces of the circular compression set specimens will have essentially parallel surfaces. The maximum permissible thickness of such bearings or layers, after rendering the upper and lower surfaces parallel, will be used as a source for the cutting of the cylindrical test specimens employed in the compression set test in accordance with ASTM Designation

D 395, as modified herein.

The thickness of such bearings or layers, after rendering the upper and lower surfaces parallel, will be used as a source for the cutting of the cylindrical test specimens employed in the compression set test in accordance with ASTM Designation: D 395, as modified herein.

- 3. Formulation Pre-Qualification and Certification. All bearings furnished by the Contractor shall be produced by a bearing manufacturer who has previously submitted the required pre-qualification test samples and certifications and whose elastomer formulation has been initially approved for use by the Engineer. Each elastomer formulation produced by a manufacturer must be approved by the Engineer prior to its first use on Department projects. To pre-qualify and obtain initial approval of a particular formulation, the bearing manufacturer shall submit to the Engineer, well in advance of anticipated use of his product, certified test results showing actual test values obtained when the physical properties of the elastomer to be furnished were tested for compliance with the pertinent specifications.

In addition, the manufacturer shall forward pre-qualification test samples, freight prepaid, to the Materials and Tests Engineer, 38th and Jackson Streets, Austin, Texas 78703, for testing and evaluation of compliance with pre-qualification requirements. These pre-qualification samples shall consist of at least two finished bearings typical of the formulation and workmanship intended for use on Departmental projects. When both laminated and plain bearings are required, two samples of each type shall be submitted. Plain sample bearings shall measure 9 inches x 9 inches by 1 inch, 70 Durometer; laminated sample bearings shall be 9 inches x 14 inches x 1 1/2 inches 60 Durometer, with two steel laminates of commercial grade steel 1/8 inch thickness. Only elastomers of the type or types to be supplied shall be submitted, (polychloroprene, polyisoprene).

The bearing manufacturer shall certify that all of the samples submitted are the same basic elastomer formulation and of equivalent cure to that used in the finished products to be furnished on Department projects.

- 4. Manufacturing Requirements. All components of a "laminated" bearing shall be molded together to form an integral unit free of voids or separations in the elastomer or between the elastomer and the non-elastic laminates or special connections unless specifically required or permitted by the plans or these specifications. The elastomer between the laminates or special connections and on the outer surfaces of the bearing shall be well-vulcanized, uniform and integral such that it is incapable of being separated by any mechanical means into separate, definite, well-defined elastomeric layers. Evidence of this layered construction, either at the outer surfaces or within the bearing, shall be cause for rejection of such laminated bearing shipments.

All edges of non-elastic laminates shall be covered by a minimum of one-eighth of an inch of elastomer except that exposure of the laminates will be permitted at approved laminate restraining devices and around holes that will be entirely enclosed in the finished structure. Unless otherwise shown on the plans, all laminates shall be parallel with the bottom surface of the bearing, subject to the tolerances that follow.

All edges of non-elastic laminates shall be covered by a minimum of one-eighth of an inch of elastomer except that exposure of the laminates will be permitted at approved laminate restraining devices and around holes that will be entirely

enclosed in the finished structure. Unless otherwise shown on the plans, all laminates shall be parallel with the bottom surface of the bearing, subject to the tolerances that follow.

Plain bearings may be molded individually, cut from previously molded strips or slabs molded to the full thickness of the finished bearings, or extruded and cut to length. The finished bearings shall have no voids or separations detectable either at the bearing surfaces or within the bearing unless specifically required or permitted by the plans or this specification. Plain elastomeric bearings shall be well-vulcanized, uniform and integral units of such construction that the bearing is incapable of being separated by any mechanical means into separate, definite and well-defined elastomeric layers. Evidence of layered construction either at the outer surfaces or within the bearing shall be cause for rejection of such bearing shipments.

SEE TABLE A & B

The finish of cut surfaces shall be ANSI Number 250, or smoother. The batch or lot number and the dimensions or piece mark shall be marked on each bearing and they shall remain legible until placement in the structure.

5. Appearance and Dimensions. Flash tolerances, finish and appearance shall meet the requirements of the latest edition of the Rubber Handbook as published by the Rubber Manufacturers' Association, Inc.; RMA-F3-T.063 for molded bearings and RMA-F2 for extruded bearings.

For both plain and laminated bearings the permissible variation from the dimensions and configuration required by the plans and these specifications shall be as follows:

- (a) Overall Vertical Dimensions
 - Average Total Thickness 1 1/4" or less.....-0,+1/8"
 - Average Total Thickness Over 1 1/4".....-0,+1/4"
- (b) Overall Horizontal Dimensions.....-0,+1/4"
- (c) Thickness of Individual Layers of Elastomer Laminated Bearings Only).....+/- 1/8"
- (d) Variation from a Plane Parallel to the Theoretical Surface.....1/8"
 - Sides.....1/4"
 - Individual Non-Elastic Laminates.....1/8"
 - (As determined by measurements at the edges of the bearings)
- (e) Position of Exposed Connection Members.....1/8"
- (f) Edge Cover of Embedded Laminates or.....-0,+1/8"
 - Connection Members
- (g) Size of Holes, Slots or Inserts.....-0,+1/8"
- (h) Position of Holes, Slots or Inserts.....-0,+1/8"
- (i) Thickness of Non-Elastic Laminates.....-0,+1/16"

- 6. Routine Inspection, Sampling and Testing. After pre-qualification approval, the inspection, sampling and testing of actual bearing production will be as outlined below:

Plain Bearings. A minimum of one plain bearing will be taken by a representative of the Materials and Test Division from each project or from each batch or lot in case the same batch or lot is used for more than one project. Routine tests for compliance with the requirements of Table A or Table B, whichever is applicable, will be performed by the Materials and Tests Division. Samples will not be returned.

Laminated Bearings. Each laminated bearing shall be subjected, by the manufacturer, to an average compression of 1,000 psi or to lower average compression if so indicated in the plans or approved by the Engineer. This compression test will be performed in the presence of a representative of the Materials and Tests Division who will perform visual inspection and accept or reject the bearings at the time. The performance of each bearing will be considered satisfactory provided there is no visible evidence of bond failure or other damage to the bearing because of this loading and provided the finished bearing meets all other pertinent portions of this specification. Samples of laminated bearings may be taken if the quality of the plant production becomes questionable. If samples are taken, they shall be taken and tested as outlined for plain bearings.

The manufacturer shall furnish certified laboratory test results on the elastomer properties of each batch or lot of compound used in the manufacture of bearings, both plain and laminated.

From either natural (plain) or synthetic rubber or from polyvinyl chloride (PVC) as specified below:

(a) Materials

- (1) Natural (plain) rubber waterstops shall be manufactured from a stock compound of a high-grade compound made exclusively from new plantation rubber, reinforcing carbon black, zinc oxide, accelerators, anti-oxidants and softeners. This compound shall contain not less than 72 percent by volume of new plantation rubber.
- (2) Synthetic rubber waterstops shall be manufactured from a compound made exclusively from neoprene or GRS, reinforcing carbon black, zinc oxide, polymerization agent and softeners. This compound shall contain not less than 70 percent by volume of neoprene or GRS.
- (3) Physical properties of natural or synthetic rubbers for waterstops shall be as shown in Table C at end of section:
- (4) Polyvinyl Chloride (PVC). Unless otherwise specified on the plans, the material shall conform to the Corps of Engineers Specification Number, CRD-C-572-60.

- (b) Manufacturer's Certification. The manufacturer shall furnish certified test results, indicating compliance with this specification, for each batch or lot of waterstop furnished under this contract. In case of doubt of the

quality furnished, the burden of proof shall be on the manufacturer, and the decision of the Engineer shall be final.

(c) Manufacturing Requirements.

- (1) Rubber Waterstops. Waterstops shall be manufactured with an integral cross section which shall be uniform within plus or minus one-eighth of an inch in width, and the web thickness or bulb diameter, within plus one-sixteenth and minus one-thirty-second of an inch. No splices will be permitted in straight strips. Strips and special connection pieces shall be well cured so that any cross sections shall be dense, homogeneous and free from all porosity. All junctions in the special connection pieces shall be full-molded. During the vulcanizing period the joint shall be securely held by suitable damps.
- (2) PVC Waterstops. Requirements shall be as in 1. above for rubber waterstops except that splicing of PVC shall be done by heat sealing the adjacent surfaces in accordance with the manufacturer's recommendations. A thermostatically controlled electric source of heat shall be used to make all splices. The heat shall be sufficient to melt but not to char the plastic.
- (3) Elastomeric Pads. When so specified on the plans, rail posts, rail members, metal shoes or minor structural members shall be insulated, leveled, shimmed or otherwise protected by elastomeric pads, sheets or washers.

Such bearings may be any elastomeric material, plain, fibered or laminated, having a hardness (durometer) between 70 and 100 as certified by the manufacturer to the Engineer. Acceptance testing will not be required.

- (4) Other Elastomeric Products. Other elastomeric products shall be in accordance with the requirements on the plans.

PART 3: EXECUTION

3. CONSTRUCTION METHODS

- A. Elastomeric Bearings. Unless otherwise shown on the plans, concrete bearing seats shall be float finished to the required elevation. Variation from a level plane shall not exceed one-sixteenth of an inch within the limits of the bearing.

After erection of members on steel structures only, the horizontal distortion of the bearings shall be measured, corrected for temperature and adjusted, if necessary, so that the horizontal displacement between top and bottom of bearing at 70 F does not exceed 15 percent of the elastomer thickness. Welding in the vicinity of the bearings shall be done with care to avoid injury to the elastomer.

- B. Waterstops. Field splices shall be either vulcanized; mechanical, using stainless steel parts; or made with a rubber splicing union of the same stock as the waterstop, at the option of the Contractor. All finished splices shall have a tensile strength not less than 50 percent of the unspliced material.

END OF SECTION

DIVISION 31

EARTHWORK

PART 1 - GENERAL**1.1 DESCRIPTION OF WORK:**

- A. This section specifies the requirements for furnishing all equipment, materials, labor, tools, and techniques for earthwork including, but not limited to, the following:
1. Site preparation.
 2. Excavation.
 3. Filling and backfilling.
 4. Grading.
 5. Soil Disposal.
 6. Clean Up.

1.2 DEFINITIONS:

- A. Unsuitable Materials:
1. Fills: Topsoil; construction materials and materials subject to decomposition; clods of clay, clay balls and stones larger than 75 mm (3 inches); organic material, including silts, which are unstable; and inorganic materials, including silts, too wet to be stable and any material with a liquid limit and plasticity index exceeding 40 and 12 respectively. Unsatisfactory soils also include satisfactory soils not maintained within 0 to +3 percent of optimum moisture content at time of compaction, as defined by ASTM/ D 698, D-1557, AASHTO- T 99, T 180.
 2. Existing Subgrade: Same materials as 1.2.A.1, that are not capable of direct support of slabs, pavement, and similar items with possible exception of improvement by compaction, proof rolling, or similar methods.
- C. Trench Earthwork: Trenchwork required for utility and drainage pipelines.
- D. Site Earthwork: Earthwork operations required in area outside of a line located 5 feet outside of structure perimeter and within new construction area with exceptions noted above.
- E. Degree of compaction: Degree of compaction is expressed as a percentage of maximum dry density obtained by laboratory test procedures ASTM D-1557 or D-698. Compaction tests shall be in accordance with ASTM D-6938.
- F. Fill: Satisfactory soil materials used to raise existing grades. In the Construction Documents, the term "fill" means Select fill or Select backfill as appropriate.
- G. Backfill: Soil materials or controlled low strength material used to fill an excavation.

- H. Unauthorized excavation: Removal of materials beyond indicated sub-grade elevations or indicated lines and dimensions without written authorization by the Engineer and El Paso Water Inspector. No payment will be made for unauthorized excavation or remedial work required to correct unauthorized excavation.
- I. Authorized additional excavation: Removal of additional material authorized by the Engineer and EP Water Inspector based on the determination by the EP Water soils testing agency that unsuitable bearing materials are encountered at required sub-grade elevations. Removal of unsuitable material and its replacement as directed will be paid on basis of Conditions of the Contract relative to changes in work.
- J. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular sub- base, drainage fill, or topsoil materials.
- K. Structure: walls, slabs, pavement sections, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- L. Borrow: Satisfactory soil imported from off-site for use as Select fill or Select backfill.
- M. Drainage course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.
- N. Bedding course: Layer placed over the excavated sub-grade in a trench before laying pipe. Bedding course shall extend up to the springline of the pipe.
- O. Sub-base Course: Layer placed between the sub-grade and base course for asphalt paving or layer placed between the sub-grade and a concrete pavement or walk.
- P. Utilities include on-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.
- Q. Debris: Debris includes all materials located within the designated work area not covered in the other definitions and shall include but not be limited to items like vehicles, equipment, appliances, building materials or remains thereof, tires, any solid or liquid chemicals or products stored or found in containers or spilled on the ground.
- R. Contaminated soils: Soil that contains contaminants as defined and determined by the EP Water Inspector or the EP Water testing agency.

1.3 CLASSIFICATION OF EXCAVATION:

- A. Unclassified Excavation: Removal and disposal of pavements and other man-made obstructions visible on surface; utilities, and other items including underground structures indicated to be

demolished and removed; together with any type of materials regardless of character of material and obstructions encountered.

- B. Classified Excavation: Removal and disposal of all material except that material not defined as Rock.

1.4 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

- B. American Association of State Highway and Transportation Officials (AASHTO):
 - T99-01(2004)Moisture-Density Relations of Soils Using a 2.5 kg (5.5 lb) Rammer and a 12-inch (305 mm) Drop
 - T180-01(2004)Moisture-Density Relations of Soils using a 10 lb. (4.54 kg) Rammer and an 18-inch 457 mm (457 mm) Drop

- C. American Society for Testing and Materials (ASTM):
 - D448-03aStandard Classification for Sizes of Aggregate for Road and Bridge Construction
 - D698-00ae1.....Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort 12,400 ft. lbf/ft³ D1556-00Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
 - D1557-02e1Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) D2167-94 (2001).....Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
 - D2487-06Standard Classification of Soil for Engineering Purposes (Unified Soil Classification System)
 - D2922-05Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
 - D2940-03Standard Specifications for Graded Aggregate Material for Bases or Subbases for Highways or Airports
 - D6938..... Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. General: Provide borrow soil material when sufficient satisfactory soil materials are not available from excavations.

- B. Fills: Material in compliance with ASTM D2487 Soil Classification Groups GW, GP, GM, SW, SP, SM, and SC or any combination of these groups; free of rock or gravel larger than 3 inches, in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. Material approved from on site or off-site sources having a minimum dry density of 120 pcf, a maximum Plasticity Index of 12, and a maximum Liquid Limit of 35. The gradation requirements below:

Sieve Size (square opening)	% Passing by Weight
3-inch	100
3/4-inch	75 – 100
No. 4	45 – 100
No. 200	5 – 45

- C. Engineered Fill: Naturally or artificially graded mixture of compliance with ASTM D2487 Soil Classification Groups GW, GP, GM, SW, SP, SM, and SC or any combination of these groups, or as approved by the Engineer or material with at least 90 percent passing a 1- 1/2-inch sieve and not more than 12 percent passing a No. 200 sieve, per ASTM D2940; Engineered Fill shall also meet the requirements of TXDOT Type A, Grade 3 Flexible Base Course Material with a minimum optimum dry density of 140 pcf as determined per ASTM D1557.
- D. Bedding Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- E. Infiltration System Fill Material: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 56 or 57; with 100 percent passing a 1- 1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.
- F. Granular Fill:
 - 1. Under concrete slab, crushed stone or gravel graded from 1 inch to No. 4, per ASTM D 2940.
 - 2. Bedding for drainage pipe, crushed stone or gravel graded from 1/2 inch to No 4, per ASTM D 2940.

- G. Pavement Gravel Bed: Crushed gravel $\frac{3}{4}$ in. size minimum, with 90 to 100 percent passing a 1 $\frac{1}{2}$ in. sieve and 20 to 55 % passing the $\frac{1}{2}$ in. sieve.
- H. Geofabric Material: Filter fabric that meets the physical requirements of a DMS-6200-Type 2 or equivalent such as Tencate Mirafi N-Series product (1100N or 1160N).

PART 3 - EXECUTION**3.1 SITE PREPARATION:**

- A. Clearing: Clear within limits of earthwork operations as shown. Work includes removal of trees, shrubs, fences, foundations, incidental structures, paving, debris, trash, and other obstructions.
- B. Grubbing: Remove stumps and roots 3 inch and larger diameter. Undisturbed, sound stumps with roots up to 3-inch diameter, and nonperishable solid objects a minimum of 3 feet below subgrade or finished embankment may be left, if approved by the Engineer and City of El Paso Inspector.
- C. Stripping Topsoil: Strip topsoil from within limits of earthwork operations as specified. Topsoil shall be a fertile, friable, natural topsoil of loamy character and characteristic of locality. Topsoil shall be capable of growing healthy horticultural crops of grasses. Stockpile topsoil and protect as directed by Project Engineer. Eliminate foreign materials, such as weeds, roots, stones, subsoil, frozen clods, and similar foreign materials larger than 1/2 cubic foot in volume, from soil as it is stockpiled. Retain topsoil on station. Remove foreign materials larger than 2 inches in any dimension from topsoil used in final grading. Topsoil work, such as stripping, stockpiling, and similar topsoil work shall not, under any circumstances, be carried out when soil is wet so that the composition of the soil will be destroyed.
- D. Concrete Slabs and Paving: Score deeply or saw cut to insure a neat, straight cut, sections of existing concrete slabs and paving to be removed where excavation or trenching occurs. Extend pavement section to be removed a minimum of 12 inches on each side of widest part of trench excavation and insure final score lines are approximately parallel unless otherwise indicated.
- E. Lines and Grades: Registered Professional Land Surveyor or Registered Civil Engineer shall establish lines and grades.
 - 1. Grades shall conform to elevations indicated on plans within the tolerances herein specified. Generally, grades shall be established to provide a smooth surface, free from irregular surface changes. Grading shall comply with compaction requirements and grade cross sections, lines, and elevations indicated. Where spot grades are indicated the grade shall be established based on interpolation of the elevations between the spot grades while maintaining appropriate transition at structures and paving and uninterrupted drainage flow

- into inlets.
2. Locations of existing and proposed elevations indicated on plans, except spot elevations, shall have been surveyed for generated topography. Proposed spot elevations and contour lines have been developed utilizing the existing conditions survey and developed contour lines and may be approximate. Contractor is responsible to notify the Project Engineer of any differences between existing elevations shown on plans and those encountered on site by Surveyor/Engineer described above. Notify the Project Engineer of any differences between existing or constructed grades, as compared to those shown on the plans.
 3. After establishment of lines and grades, Contractor will be responsible for any additional cut and/or fill required to ensure that site is graded to conform to elevations indicated on plans.
- F. Disposal: All materials removed from the property shall be disposed of at a legally approved site, for the specific materials, and all removals shall be in accordance with all applicable Federal, State and local regulations. No burning of materials is permitted onsite.

3.2 EXCAVATION:

- A. Shoring, Sheet piling and Bracing: Shore, brace, or slope, its angle of repose or to an angle considered acceptable by the Project Engineer, banks of excavations to protect workmen, banks, adjacent paving, structures, and utilities.
1. Design of the temporary support of excavation system is the responsibility of the Contractor.
 2. Construction of the support of excavation system shall not interfere with the permanent structure and may begin only after a review by the Project Engineer.
 3. Extend shoring and bracing to a minimum of 5 feet below the bottom of excavation. Shore excavations that are carried below elevations of adjacent structures.
 4. Shoring and trench safety protection shields and/or boxes labor and material costs required to perform excavation of on-site soils and/or backfill material shall be subsidiary to achieve the specified wall construction.
 5. Contractor shall be responsible for developing an earthwork and existing structures shoring plan to perform construction of walls and other specified structures on this project.
- B. Excavation Drainage: Operate pumping equipment, and/or provide other materials, means and equipment as required to keep excavation free of water and subgrade dry, firm, and undisturbed until approval of permanent work has been received from Project Engineer. Approval by the Project Engineer is also required before placement of the permanent work on all subgrades.

C. Subgrade Protection: Protect subgrades from softening, undermining, washout, or damage by rain or water accumulation. Reroute surface water runoff from excavated areas and not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches. When subgrade for foundations has been disturbed by water, remove disturbed material to firm undisturbed material after water is brought under control. Replace disturbed subgrade in trenches with concrete or material approved by the Project Engineer.

D. Proof Rolling:

1. After rough grade has been established in cut areas and prior to placement of fill in fill areas under building and pavements, proof-roll exposed subgrade with a fully loaded dump truck to check for pockets of soft material.
2. Proof rolling shall consist of at least two complete passes with one pass being in a direction perpendicular to preceding one. Remove any areas that deflect, rut, or pump excessively during proof rolling, or that fail to consolidate after successive passes to suitable soils and replaced with compacted fill. Maintain subgrade until succeeding operation has been accomplished.
3. Weak or soft compressible soil zones identified during earthwork operations should be removed and replaced with properly compacted Select Fill to a minimum depth of 12 inches or as required to appropriately bridge over these soils, whichever is deeper. Cohesive clayey sandy subgrade soils (i.e., soils with a PI greater than 18) should be compacted within 0 to +3 percentage points of optimum. Alternatively, soft spots may be bridged by over-excavating and replacing non-suitable soils with rock material or geogrids as indicated in the geotechnical report prepared for this project. Additional excavation and soil treatment shall be paid based on approved unit prices, if approved by the Engineer and EP Water Inspector.

E. Trench Earthwork:

1. Utility trenches (except sanitary and storm sewer):
 - a. Excavate to a width as necessary for sheeting and bracing and proper performance of the work.
 - b. Grade bottom of trenches with bell holes scooped out to provide a uniform bearing.
 - c. Support piping on undisturbed earth unless a mechanical support is shown.
 - d. Length of open trench in advance of piping laying shall not be greater than is authorized by Resident Engineer.
2. Sanitary and storm sewer trenches:
 - a. Trench width below a point 6 inches above top of pipe shall be 24 inches maximum for

pipe up to and including 12 inches diameter, and four-thirds diameter of pipe plus 8 inches for pipe larger than 12 inches. Width of trench above that level shall be as necessary for sheeting and bracing and proper performance of the work.

- b. Bed bottom quadrant of pipe on undisturbed soil or granular fill.
 - 1) Undisturbed: Bell holes shall be no larger than necessary for jointing. Backfill up to a point 12 inches above top of pipe shall be clean earth placed and tamped by hand.
 - 2) Granular Fill: Depth of fill shall be a minimum of 3 inches plus one sixth of pipe diameter below pipe to 12 inches above top of pipe. Place and tamp fill material by hand.
- c. Place and compact as specified remainder of backfill using acceptable excavated materials. Do not use unsuitable materials.

F. Site Earthwork: Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation. Excavation shall be accomplished as required by drawings and specifications. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, complying with OSHA requirements, and for inspections. Prepare and compact soil material below the specified flexible base course materials as indicted in the geotechnical soils evaluation report prepared for this project. Remove subgrade materials that are determined by Geotechnical Engineer as unsuitable, and replace with acceptable Select Fill material or treated as required to achieve the specified compaction. If there is a question as to whether material is unsuitable or not, the contractor shall obtain samples of the material, under the direction of the Geotechnical Engineer, and the materials shall be examined by an approved testing laboratory for soil classification to determine whether it is unsuitable or not. When additional unsuitable material is encountered and removed, contract price and time will be adjusted in accordance with Articles, DIFFERING SITE CONDITIONS, CHANGES and CHANGES-SUPPLEMENT of the GENERAL CONDITIONS as applicable. Adjustments to be based on volume in cut section only.

- 1. Site Grading:
 - a. Provide a smooth transition between adjacent existing grades and new grades.
 - b. Cut out soft spots, fill low spots, and trim high spots to comply with required surface

tolerances.

- c. Slope grades to direct water away from buildings and to prevent ponds from forming where not designed. Finish subgrades to required elevations within the following tolerances:
 - 1) Walks: Plus or minus 1 inch.
 - 2) Pavements: Plus or minus 1 inch.
2. For underpinning pits, underpin existing wall foundations by excavating 1200 mm (4 feet) wide pits to depth shown on drawings skipping 3 sections at any one time to maintain support for wall at all times.

3.3 FILLING AND BACKFILLING:

- A. General: Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation. For Select fill and Select backfill, use approved soil materials and borrow meeting the criteria specified herein, as applicable. Borrow will be supplied at no additional cost to the EP Water. Do not use unsuitable excavated materials. Do not backfill until foundation walls have been completed above grade and adequately braced, waterproofing or damp-proofing applied, foundation drainage, and pipes coming in contact with backfill have been installed and work inspected and approved by EP Water Inspector.
- B. Placing: Place materials in horizontal layers not exceeding 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 and then compacted. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure. Place no material on surfaces that are muddy, frozen, or contain frost.
- C. Compaction: Compact with approved tamping rollers, sheepfoot rollers, pneumatic tired rollers, steel wheeled rollers, vibrator compactors, or other approved equipment (hand or mechanized) well suited to soil being compacted.

Compaction Requirements. **All specified and approved Select backfill for excavations, embankments, fills, slopes** shall be compacted to 95% of maximum dry density as per ASTM D1557 (unless otherwise approved by Engineer). The subgrade under areas to be paved shall be compacted and/or treated to a minimum depth as specified in the geotechnical report prepared for this project. The in-place field density shall be determined in accordance with ASTM D6938. Stones or rock fragments larger than 3 inches in their greatest dimension will not be permitted in the top 12 inches of the subgrade or as required by the geotechnical engineer. The finished grading operations, conforming to the typical cross section, shall be completed and maintained

at least 1,000 feet (305 m) ahead of the paving operations or as directed by the Engineer.

Do not operate mechanized vibratory compaction equipment within the EP Water without prior approval of Engineer. Moisten or aerate material as necessary to provide moisture content that will readily facilitate obtaining specified compaction with equipment used. Compact soil to not less than the following percentages of maximum dry density, according to ASTM D698 or ASTM D1557 as specified below or as required by the geotechnical report prepared for this project or moist stringent requirement:

1. Cuts, Fills, Embankments, and Backfill
 - a. Under proposed structures and paved areas, scarify and recompact top (12 inches) of existing subgrade and each layer of backfill or fill material in accordance with ASTM D- 1557 and compact to a minimum of 95% of maximum dry density or as specified by geotechnical engineer.
 - b. Curbs, curbs and gutters, ASTM D698// D1557. Compact to a minimum of 95% of maximum dry density or as specified by geotechnical engineer.
 - c. Under Sidewalks, scarify and recompact top 150 mm (6 inches) below subgrade and compact each layer of backfill or fill material in accordance with ASTM D698// D1557. Compact to a minimum of 95% of maximum dry density or as specified by geotechnical engineer. Landscaped areas, top 16 inches, ASTM D698// D1557. Compact to a minimum of 90% of maximum dry density or as required by EP Water Inspector.
 - e. Landscaped areas, below 400 mm (16 inches) of finished grade ASTM D698// D1557. Compact to a minimum of 90% of maximum dry density or as required by EP Water Inspector.

3.4 GRADING:

- A. General: Uniformly grade the areas within the limits of this section, including adjacent transition areas. Smooth the finished surface within specified tolerance. Provide uniform levels or slopes between points where elevations are indicated, or between such points and existing finished grades. Provide a smooth transition between abrupt changes in slope.
- B. Cut rough or sloping rock to level beds for foundations. In pipe spaces or other unfinished areas, fill low spots and level off with coarse sand or fine gravel.
- C. Finish grade earth floors in pipe basements as shown to a level, uniform slope and leave clean.
- D. Finished grade shall be at least 6 inches below bottom line of window or other building wall openings unless greater depth is shown.
- E. Place crushed stone or gravel fill under concrete slabs on grade, tamped, and leveled. Thickness

of fill shall be 6 inches unless otherwise shown.

- F. Finish subgrade in a condition acceptable to Project Engineer at least one day in advance of paving operations. Maintain finished subgrade in a smooth and compacted condition until succeeding operation has been accomplished. Scarify, compact, and grade subgrade prior to further construction when approved compacted subgrade is disturbed by Contractor's subsequent operations or adverse weather.
- G. Grading for Paved Areas: Provide final grades for both subgrade and base course to +/- 0.25 inches of indicated grades.
- H. Grading requirements shall be in conformance with Geotechnical Engineers specifications. Geotechnical Soils Investigation report specifications shall supersede Engineer's specifications if not covered in plans and specifications.

3.5 DISPOSAL OF UNSUITABLE AND EXCESS EXCAVATED MATERIAL:

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off property.
- B. Disposal: Transport surplus satisfactory soil to designated storage areas on as specified. Stockpile or spread soil as directed by Engineer.
 - 1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off site.
- C. Place excess excavated materials suitable for fill and/or backfill on site where directed.
- D. Remove from site and dispose of any excess excavated materials after all fill and backfill operations have been completed.
- E. Segregate all excavated contaminated soil designated by the Engineer from all other excavated soils, and stockpile on site on two 0.15 mm (6 mil) polyethylene sheets with a polyethylene cover. A designated area shall be selected for this purpose. Dispose of excavated contaminated material in accordance with State and Local requirements.

3.7 CLEAN UP:

Upon completion of earthwork operations, clean areas within contract limits, remove tools, and equipment. Provide site clear, clean, free of debris, and suitable for subsequent construction operations. Remove all debris, rubbish, and excess material from the site Property .

END OF SECTION

PART 1 - GENERAL**1.1 SECTION INCLUDES**

- A. Sub grade preparation.
- B. Final Grading.

1.2 RELATED SECTIONS

- A. General Conditions.

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 proper position, when acceptable to Engineer.
 - 2. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of 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 on grade, inlets, manholes, curbs, sidewalks, flumes, channel linings, 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 applicable requirements of authorities having jurisdiction.

Testing and Inspection Service: Contractor will employ and pay for a qualified independent geotechnical testing and inspection laboratory to perform soil testing and inspection service during earthwork operations.

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 of warranties of accuracy or continuity between soil borings. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor. The subsurface investigation reports are not part of the Contract Documents.
 - 1. Additional test borings and other exploratory operations may be performed by 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 Owner and utility companies in keeping respective services and facilities in operation. Damaged utilities shall be repaired to satisfaction of utility owner at no additional expense to 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 minimum of 48-hour notice to Owner, and receive written notice to proceed before interrupting any utility.
- C. Use of Explosives: 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. Structural Fill: Structural fill materials are defined as those materials listed in paragraph 2.1, A and meeting the following additional requirements; shall be free of organic or other deleterious materials, have a maximum particle size less than 3-inches, have a liquid limit less than 40 and a plasticity index less than 18.
- D. Granular Fill: Granular fill for placement behind retaining walls shall be gravel meeting the requirements for “fine aggregate” in ASTM C33. Contractor shall submit sample of Granular Fill for testing prior to start of Work.
- E. Granular Fill for Foundation Drains: Granular fill for use in foundation drains and weep drainage system behind retaining walls shall be uniformly graded, washed ¾-inch gravel.
- F. Flowable Fill: Flowable fill shall consist of cement conforming to ASTM C150 C595, graded limestone aggregate screenings with a maximum size of 3/8-inch, Class C or F fly ash, water and an air entraining admixture. The flowable fill mixture shall meet the following requirements:
 - 1. Flowable fill mixture shall contain not more than 75 lbs. Nor less than 50 lbs of cement per cubic yard of flowable fill.
 - 2. Twenty-eight day compressive strength of neither less than 75 psi nor more than 125-psi using standard test measures and sampling techniques.
 - 3. PH shall be greater than 8.
 - 4. Stable air content of 20 to 35 percent. Air entrainment admixture shall be designed specifically for flowable fill.
 - 5. Slump shall be 8-inches.
 - 6. Water cement ratio not to exceed 4.5
 - 7. Flowable fill shall be of such consistency during placement that mix is highly flowable with no signs of segregation.
 - 8. Flowable fill shall be allowed to cure sufficiently prior to continuing backfill operations to prevent displacement during subsequent placement of backfill.
 - 9. Fully cured flowable fill shall be of such consistency that it can be excavated with standard excavation equipment, powered or hand operated. Test excavations shall be made as directed by the Engineer to confirm that the cured material can be excavated using the equipment described above. Material that cannot be excavated as described shall be removed and replaced with acceptable material at no cost to the Owner.
 - 10. Fly ash may not be used in the flowable fill mix if a colored pigment is to be used to create a colored flowable fill.

2.2 SUBDRAINAGE MATERIALS

- A. Geotextile Filtration Material – Geotextile filter material shall be a nonwoven pervious sheet of polymeric material, which is chemically resistant to the conditions it will be exposed to. Fibers used in the manufacture of the geotextile shall consist of long-chain synthetic polymers composed of at least 85 percent by weight polyolefins, polyesters, or polyamides. Stabilizers and/or inhibitors shall be added to the base polymer if necessary to make the filaments resistant to deterioration by ultraviolet light, oxidation, and heat exposure. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the selvages. Acceptance of geotextile shall be in accordance with ASTM D 4759.

1. Grab tensile Strength: 115 pounds, minimum, ASTM D4632.
2. Grab Tensile Elongation: 55 percent, minimum, ASTM D1682.
3. Mullen Burst Strength: 200 PSI, minimum.
4. Water Flow Rate: 120 GPM/SF, minimum, ASTM D4491.
5. Washed Equivalent Opening Size: 80-120
6. Acceptable Products: Subject to compliance with requirements, products, which may be incorporated in the work, include, but are not limited to, the following:

TXDOT DMS-6200-Type 2 or equivalent such as Tencate Mirafi N-Series product (1100N or 1160N) Tencate Mirafi N-Series product (1100N or 1160N).

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of 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 safe condition until completion of backfilling.

3.3 DEWATERING

- A. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area.
- B. Bidding general contractors shall consider that dewatering shall be required during the installation of the specified water seepage collection/diversion system and retaining wall construction. The water seepage collection system and retaining walls are detailed in the plans and include excavation, temporary shoring, installation of gravel material bedding, non-permeable geofabric lining of excavation walls, installation of perforated pipe, specified gravel and Select Fill and backfill and the installation of two (2) subsurface infiltration well systems. Water seepage was encountered during the soils evaluation for this project and information presented in the geotechnical engineering report shall be reviewed.
- C. Temporary water seepage monitoring wells are installed within the project site for the contractor's consideration. Contractor shall be responsible for collecting additional water seepage data to establish dewatering requirements, associated costs and means and methods to complete the construction of the specified work.
- D. Do not allow water to accumulate in excavations. Remove water to prevent softening of

foundation bottoms, undercutting footings, and soil changes detrimental to 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.

3.4 STORAGE OF EXCAVATED MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill where directed by Owner. Place, grade, and shape stockpiles for proper drainage.
- B. Locate and retain soil materials away from 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 form work, installation of services, and other construction and for inspection.
- B. Excavations for footings and foundations: Do not disturb bottom of 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.

3.7 TRENCH EXCAVATION FOR PIPES, CONDUIT AND CONCRETE BOXES

- A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 24-inches of clearance on both sides of pipe, conduit or concrete box. Provide a Trench Safety System for trench depth greater than 5 feet, as required in section 31 23 17.
- B. Excavate trenches to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe, conduit or concrete box on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- C. Where rock is encountered, carry excavation 12-inches below required elevation and backfill with a 12-inch layer of flowable fill as specified in this Section.
- D. For pipes or conduit less than 6 inches in nominal size, and for 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 bottom of trench to fit bottom of 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 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 atmospheric temperature is less than 35 degrees F.

3.9 BACKFILL AND FILL

- A. Existing pavements, concrete, rock and mortar rip rap, topsoil, vegetation, roots, and any soft soils in the construction areas shall be stripped from the site and removed from the site.
- B. A minimum sub-excavation of one (1) foot with replacement by structural fill or flowable fill topped with granular fill as shown on the drawings along the length of the channel and at each culvert.
- C. Where rock cobbles are encountered the cobbles shall be removed and replaced with structural fill or flowable fill to the levels required for construction of the retaining wall footings, pipe culverts, headwalls and the granular fill layers shown on the drawings.
- D. After subgrade preparation and observation have been completed, fill placement may begin. The first layer of fill shall be placed in a relatively uniform horizontal lift and be adequately keyed into the stripped and scarified subgrade soils. Fill materials under structures shall be structural fill or flowable fill at the Contractor's option. Fill material behind concrete retaining wall shall be granular fill as defined in paragraph 2.1D above.

3.10 PLACEMENT AND COMPACTION

- A. The subgrade soils FOR ALL STRUCTURES shall be scarified and compacted to at least 95 percent of the modified Proctor maximum dry density ASTM D 1557 for a depth of at least 6-inches below the surface.
- B. Structural fill shall be compacted to at least 95-percent of modified proctor maximum dry density as determined by ASTM Designation D1557.
- C. Fill shall be placed in maximum lifts of 8-inches of loose material and shall be compacted within the range of 2 percentage points below to 2 percentage points above the optimum moisture content value. If water must be added, it shall be uniformly applied and thoroughly mixed into the soil by disking or scarifying. Each lift of compacted engineered fill shall be tested by a representative of the Geotechnical Engineer prior to placement of subsequent lifts.

3.11 GRADING

- A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. 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: Landscaped Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.
- C. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 foot above or below required subgrade elevation.
- D. Pavements: Shape surface of areas under pavement to line, grade, and cross-section, with finish surface not more than ½ inch above or below required subgrade elevation.
- E. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of ½ inch when tested with a 10-foot straightedge.
- F. 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. At least one moisture-density (Proctor) test, Atterberg limits test and percent finer than #200 sieve tests shall be performed per soils type for subgrade, backfill, fill and base materials.
- C. In structural footing and pavement areas, at least 1 density and moisture content test per 2,500 square feet of surface area shall be performed on the subgrade soils for each compacted 6-inch thickness of fill. Testing of backfilled trenches shall be at least 1 density and moisture content test per 100 linear feet of trench per 8-inch compacted fill thickness.
- D. At least 3 densities and moisture content tests shall be performed in the building area on the subgrade soils, and at least 3 densities and moisture content tests shall be performed per 6-inch compacted thickness of fill in the building area. Testing of backfilled trenches shall be at least 1 density and moisture content test per 100 linear feet of trench per 8-inch compacted fill thickness.
- E. For all structural slabs on grade (except for buildings), at least 1 density and moisture content test per 1000 square feet of surface area shall be performed on the subgrade soils for each compacted lift.
- F. If in 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 specified density is obtained. The contractor or subcontractor is required to pay for failed tests and additional tests due to failed tests.

3.13 EROSION CONTROL

- A. Provide erosion control methods in accordance with the Storm Water Pollution Prevention Plan and 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 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 surface or finish to match adjacent work, and eliminate evidence of restoration to 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 Owner's property.

END SECTION

PART 1: GENERAL

1.1 DESCRIPTION

The work specified under this section requires the Contractor to provide for the safety of the workmen in strict compliance with 29 CFR Part 1926 1993 (Revised as July 1, 1996 of latest Edition or Revision to) Excavation and Application Subparts. The submission of a “TRENCH SAFETY PLAN” which shall fully satisfy the requirements of this specification is required prior to a notice to proceed to start the project. **See 29CFR Part 1926 following this section.**

Trenching that requires shoring and/or bracing will be design by a Professional Engineer Registered in the State of Texas.

1.2 MATERIALS

A. Material

1. Timber

Trench sheeting materials shall be full size, a minimum of 2 inches in thickness, solid and sound, free from weakening defects such as loose knots and splits.

2. Sheet Piling

Steel sheet piling shall conform to one or more of ASTM A328/328M, ASTM A572/ A572M / ASTM A690/A690M material requirements.

3. Structural Steel

Steel for stringers (wales) and cross braces shall conform to ASTM A588.

4. Trench Boxes

Steel trench Boxes to be constructed of steel conforming to ASTM A36/A36M. Connecting bolts used to conform to ASTM A307. Welds shall conform to the requirements of AWS D1.1.

5. Miscellaneous

Miscellaneous material to be utilized shall conform to applicable ASTM standards.

B. Referenced Specifications

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only.

American Society of Testing and Materials (ASTM)

ASTM A36/A36M 1997 Standard Specification for Carbon Structural Steel

ASTM A307 1997 Revision A-Standard Specification for Carbon Steel Bolts and

Studs, 60,000 psi Tensile length

ASTM A328/A328M 1996 (REV) Standard Specification for Steel Sheet Piling

ASTM A572/A572M 1997 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality

1.3 SUBMITTALS

A. Certificates

Submit Manufacturer’s “Certificate of Compliance,” stating that the devices (trench boxes, speed shoring etc.) to be used for trench safety comply with the requirements of this specifications. The certificate should show the design assumptions and limitations of the device and should be sealed by an engineer registered and licensed to practice in the state of Texas.

B. Trench Safety Plan

Submit a detailed TRENCH SAFETY PLAN for all work areas. Calculations shall be provided for any areas beyond the capacity of the trench box or speed shoring and sealed by an engineer registered and licensed to practice in the state of Texas. This plan shall include evacuation routes for personnel.

1.4 CONSTRUCTION METHODS

A. General:

The trench safety system shall be constructed, installed and maintained in accordance with the Trench Safety Plan as outlined in 1.1. Bed and backfill pipe to a point at least one (1) foot above top of pipe or other embedded items prior to removal of any portion of trench safety system. Bedding and backfill shall be in accordance to other applicable Specification Sections. Back filling and removal of trench supports shall be in accordance with Contractor’s Trench Safety Plan. Removal of trench safety system to be accomplished in such a manner to cause no damage to pipe or other embedded items. Remove no braces or trench supports until all personnel have evacuated the trench. The trench shall be backfilled to within 5 feet of natural ground prior to removal of entire trench safety system.

B. Supervision:

Provide competent supervisory personnel at each trench while work is in progress to ensure Contractor’s methods, procedures, equipment and materials pertaining to the safety systems in this Section are sufficient to meet requirements of OSHA Standards.

C. Inspection:

The CONTRACTOR shall make daily inspection of trench safety system to ensure that the system meets OSHA requirements. Daily inspection shall be made by competent personnel. If evidence of possible cave-ins or slides is apparent, all work in the trench is to cease until necessary precautions have been taken to safeguard personnel entering trench. The CONTRACTOR shall maintain permanent record of daily inspections.

D. Timber Sheeting

Timber sheeting and size of uprights, stringers (wales,) and cross bracing to be installed in accordance with the TRENCH SAFETY PLAN. Place cross braces in true horizontal position, spaced vertically, and secure to prevent sliding, falling or kick outs. Cross braces to be placed at each end of stringers (wales) in addition to other locations required. Cross braces and stringers (wales) to be placed at splices of uprights, in addition to other locations required.

E. Steel Sheet Piling

Steel sheet piling of equal or greater strength may be used in lieu of timber trench shoring shown in the OSHA tables (proposed standards). Drive steel sheet piling to a least minimum depth below trench bottom as recommended by CONTRACTOR’s Registered Licensed Professional Engineer providing design. Place cross braces in true horizontal position and spaced vertically. Secure to prevent sliding, falling, or kick outs. Cross braces to be placed at each end of stringers (wales), in addition to other locations required.

F. Maintenance of Safety System

The safety system to be maintained in the condition as shown on the Trench Excavation and Shoring Safety Plan as design by the CONTRACTOR’s Registered Licensed Professional ENGINEER. The CONTRACTOR shall take all necessary precaution to ensure the safety systems are not damaged during their use. If at any time during its use a safety system is damaged, personnel to be immediately removed from the trench excavation area and the safety system repaired. The CONTRACTOR is to take all necessary precautions to ensure no loads, except those provided for in the plan, are imposed upon the trench safety system.

END SECTION

• OSHA REGULATIONS •

• REGARDING TRENCH SAFETY (FROM FEDERAL REGISTER)

(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 breaching 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 sufficiently 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. De-*

signs 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 re-

moved from service, and shall be evaluated and approved by a registered professional engineer before being returned to service.

(e) *Installation and removal of support—*(1) *General.* (i) Members of support systems shall be securely connected together to prevent sliding, falling, kickouts, or other predictable failure.

(ii) Support systems shall be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.

(iii) Individual members of support systems shall not be subjected to loads exceeding those which those members were designed to withstand.

(iv) Before temporary removal of individual members begins, additional precautions shall be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system.

(v) Removal shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation.

(vi) Backfilling shall progress together with the removal of support systems from excavations.

(2) *Additional requirements for support systems for trench excavations.* (i) Excavation of material to a level no greater than 2 feet (.61 m) below the bottom of the members of a support system shall be permitted, but only if the system is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

(ii) Installation of a support system shall be closely coordinated with the excavation of trenches.

(f) *Sloping and benching systems.* Employees shall not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from

the hazard of falling, rolling, or sliding material or equipment.

(g) *Shield systems*—(1) *General.* (i) Shield systems shall not be subjected to loads exceeding those which the system was designed to withstand.

(ii) Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.

(iii) Employees shall be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.

(iv) Employees shall not be allowed in shields when shields are being installed, removed, or moved vertically.

(2) *Additional requirement for shield systems used in trench excavations.* Excavations of earth material to a level not greater than 2 feet (.61 m) below the bottom of a shield shall be permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

APPENDIX A TO SUBPART P—SOIL CLASSIFICATION

(a) *Scope and application*—(1) *Scope.* This appendix describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. The appendix contains definitions, sets forth requirements, and describes acceptable visual and manual tests for use in classifying soils.

(2) *Application.* This appendix applies when a sloping or benching system is designed in accordance with the requirements set forth in §1926.652(b)(2) as a method of protection for employees from cave-ins. This appendix also applies when timber shoring for excavations is designed as a method of protection from cave-ins in accordance with appendix C to subpart P of part 1926, and when aluminum hydraulic shoring is designed in accordance with appendix D. This Appendix also applies if other protective systems are designed and selected for use from data prepared in accordance with the requirements set forth in §1926.652(c), and the use of the data is predicated on the use of the soil classification system set forth in this appendix.

(b) *Definitions.* The definitions and examples given below are based on, in whole or in part, the following: American Society for Testing Materials (ASTM) Standards D653-85 and D2488: The Unified Soils Classification

System, The U.S. Department of Agriculture (USDA) Textural Classification Scheme; and The National Bureau of Standards Report BSS-121.

Cemented soil means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

Cohesive soil means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

Dry soil means soil that does not exhibit visible signs of moisture content.

Fissured means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

Granular soil means gravel, sand, or silt, (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

Layered system means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

Moist soil means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

Plastic means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

Saturated soil means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or shear 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 under-water 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 on 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 cohe-

sive 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 American 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 1/8-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 1/8-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 minimum the effects of exposure to drying influences. If the exca-

vation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.

(iv) *Other strength tests.* Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shearvane.

(v) *Drying test.* The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.54 cm) and six inches (15.24 cm) in diameter until it is thoroughly dry:

(A) If the sample develops cracks as it dries, significant fissures are indicated.

(B) Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as a unfissured cohesive material and the unconfined compressive strength should be determined.

(C) If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

APPENDIX B TO SUBPART P—SLOPING AND BENCHING

(a) *Scope and application.* This appendix contains specifications for sloping and benching when used as methods of protecting employees working in excavations from cave-ins. The requirements of this appendix apply when the design of sloping and benching protective systems is to be performed in accordance with the requirements set forth in § 1926.652(b)(2).

(b) *Definitions.*

Actual slope means the slope to which an excavation face is excavated.

Distress means that the soil is in a condition where a cave-in is imminent or is likely to occur. Distress is evidenced by such phenomena as the development of fissures in the face of or adjacent to an open excavation; the subsidence of the edge of an excavation; the slumping of material from the face or the bulging or heaving of material from the bottom of an excavation; the spalling of material from the face of an excavation; and raveling, 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 $\frac{1}{2}$ horizontal to one vertical ($\frac{1}{2}$ H: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°) 1 1/2:1 (34°)

NOTES:

- Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
- 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°).
- Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

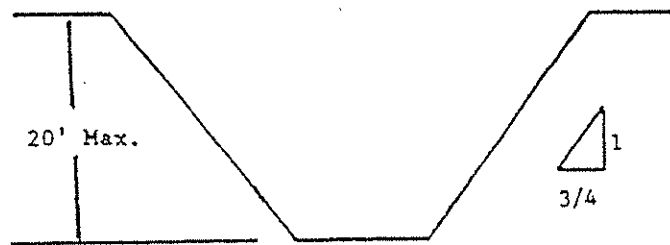
Figure B-1

Slope Configurations

(All slopes stated below are in the horizontal to vertical ratio)

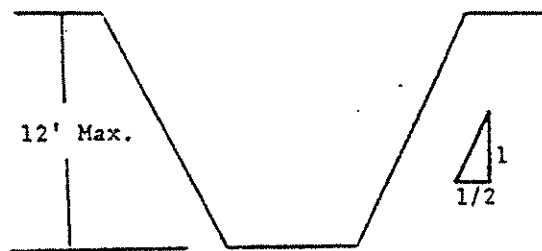
B-1.1 Excavations made in Type A soil.

- All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of $\frac{1}{2}$:1.



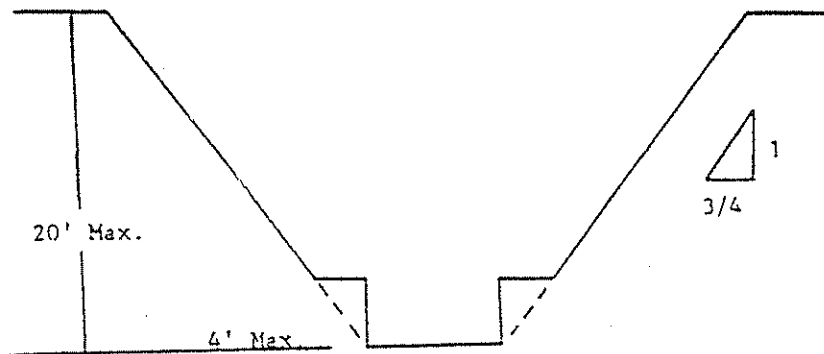
SIMPLE SLOPE—GENERAL

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 1/2:1.

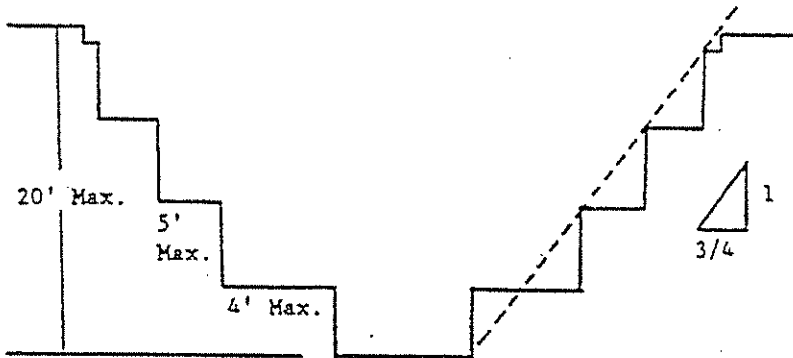


SIMPLE SLOPE—SHORT TERM

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4 to 1 and maximum bench dimensions as follows:

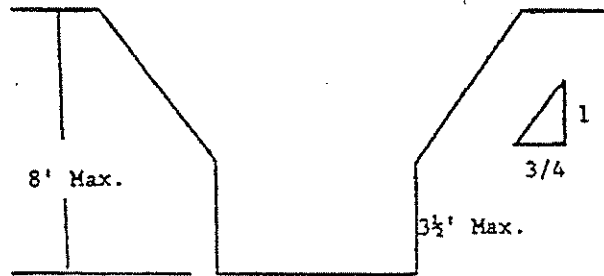


SIMPLE BENCH



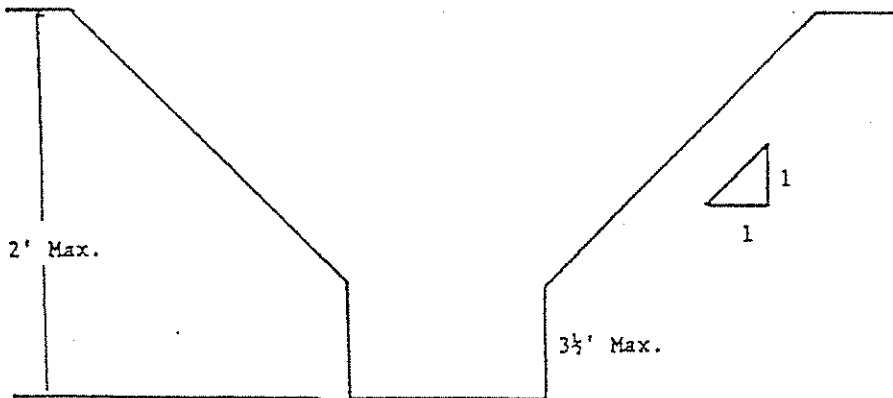
MULTIPLE BENCH

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.



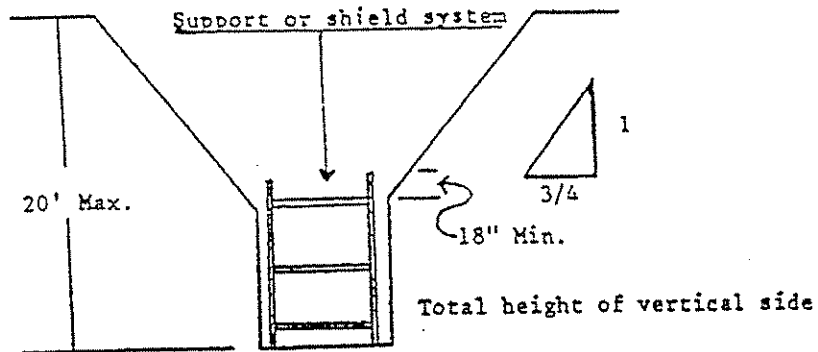
UNSUPPORTED VERTICALLY SIDED LOWER PORTION—MAXIMUM 8 FEET IN DEPTH

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

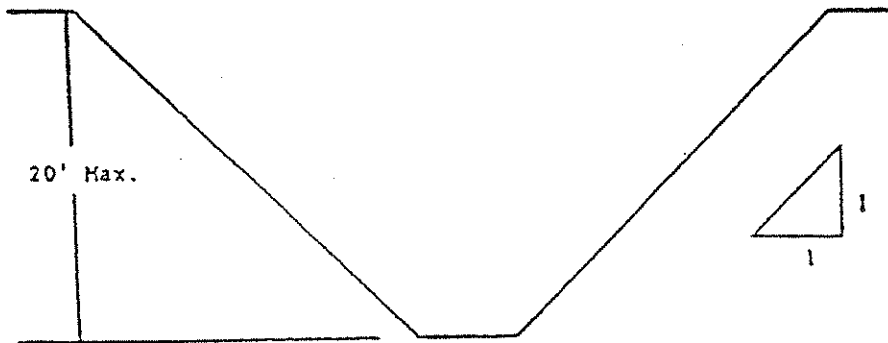
All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of $\frac{3}{4}$:1. The support or shield system must extend at least 18 inches above the top of the vertical side.

**SUPPORTED OR SHIELDED VERTICALLY SIDED LOWER PORTION**

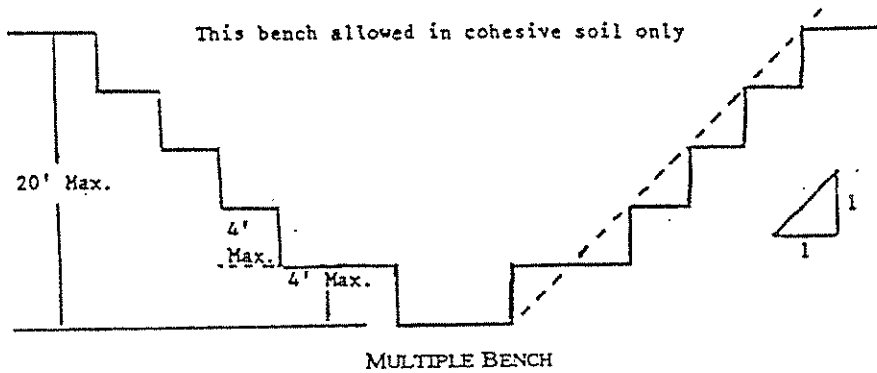
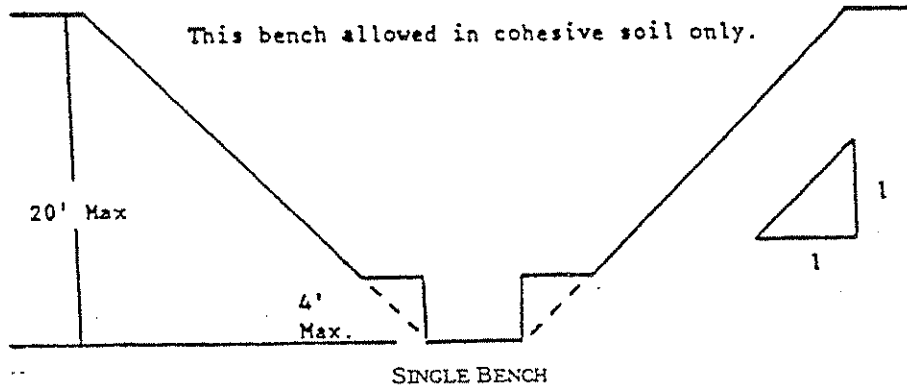
4. All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other options permitted under §1926.652(b).

B-1.2 Excavations Made in Type B Soil

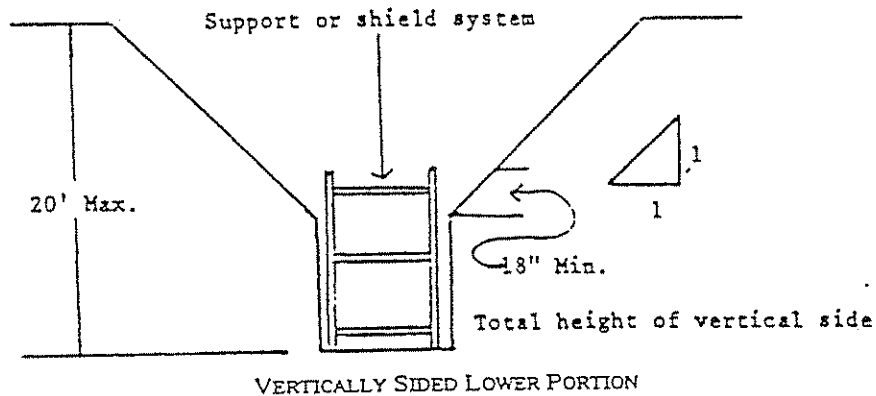
1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

**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:



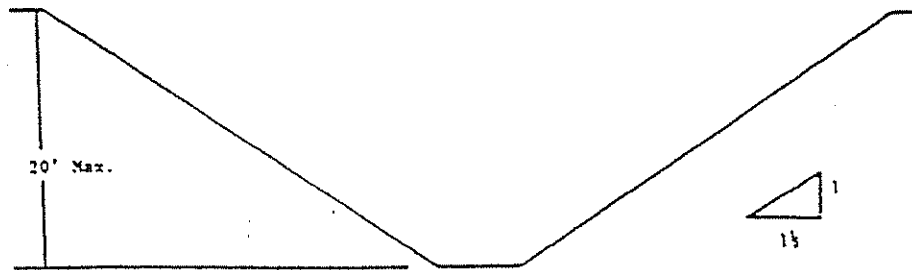
3. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.



4. All other sloped excavations shall be in accordance with the other options permitted in §1926.652(b).

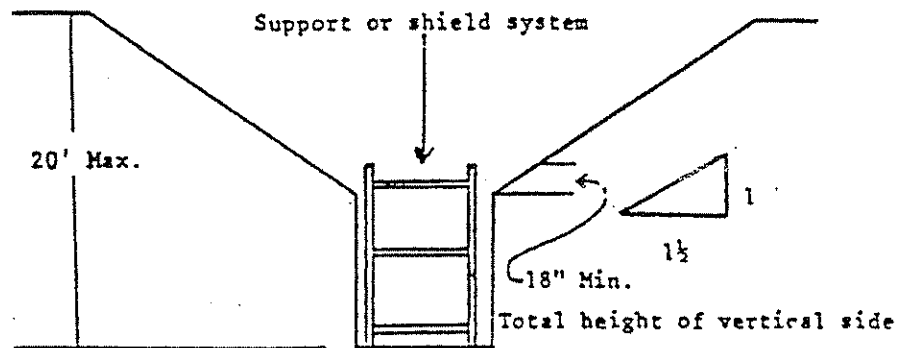
B-1.3 Excavations Made in Type C Soil

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 $1\frac{1}{2}$:1.

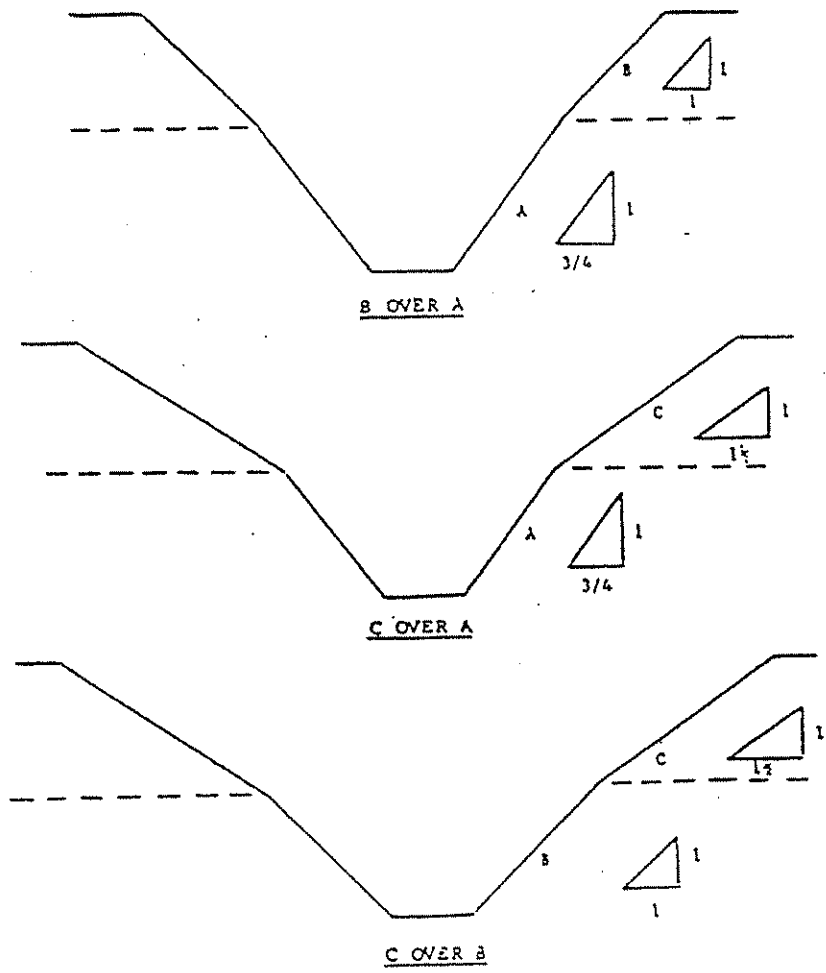


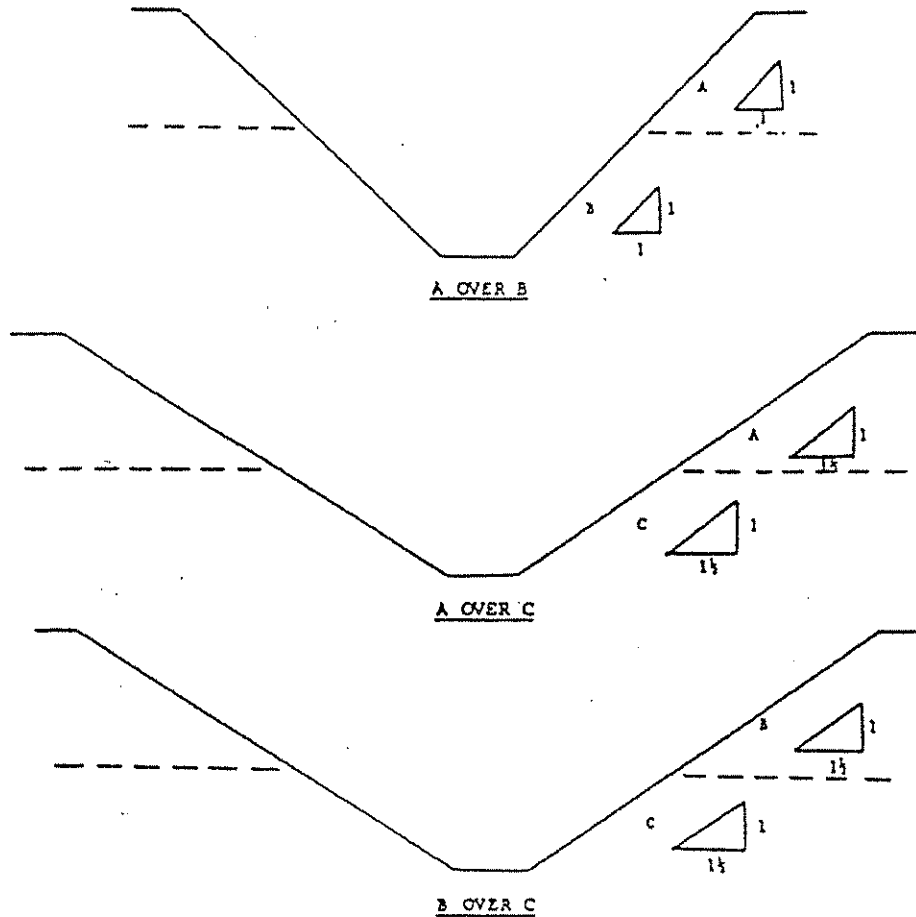
VERTICAL SIDED LOWER PORTION

3. All other sloped excavations shall be in accordance with the other options permitted in 51926.652(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.





2. All other sloped excavations shall be in accordance with the other options permitted in §1926.652(b).

APPENDIX C TO SUBPART P—TIMBER SHORING FOR TRENCHES

(a) *Scope.* This appendix contains information that can be used timber shoring is provided as a method of protection from 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.*—(i) *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.*

(i) *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 #1

Space 4x4 crossbraces at six feet horizontally and four feet vertically.

Wales are not required.

Space 3x8 uprights at six feet horizontally. This arrangement is commonly called "skip shoring."

Arrangement #2

Space 4x6 crossbraces at eight feet horizontally and four feet vertically.

Space 8x8 wales at four feet vertically.
Space 2x6 uprights at four feet horizontally.

Arrangement #3

Space 6x6 crossbraces at 10 feet horizontally and four feet vertically.
Space 8x10 wales at four feet vertically.
Space 2x6 uprights at five feet horizontally.

Arrangement #4

Space 6x6 crossbraces at 12 feet horizontally and four feet vertically.
Space 10x10 wales at four feet vertically.
Spaces 3x8 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 #1

Space 6x6 crossbraces at six feet horizontally and five feet vertically.
Space 8x8 wales at five feet vertically.
Space 2x6 uprights at two feet horizontally.

Arrangement #2

Space 6x8 crossbraces at eight feet horizontally and five feet vertically.
Space 10x10 wales at five feet vertically.
Space 2x6 uprights at two feet horizontally.

Arrangement #3

Space 8x8 crossbraces at 10 feet horizontally and five feet vertically.
Space 10x12 wales at five feet vertically.
Space 2x6 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 #1

Space 8x8 crossbraces at six feet horizontally and five feet vertically.
Space 10x12 wales at five feet vertically.
Position 2x6 uprights as closely together as possible.

If water must be retained use special tongue and groove uprights to form tight sheeting.

Arrangement #2

Space 8x10 crossbraces at eight feet horizontally and five feet vertically.

Space 12x12 wales at five feet vertically.

Position 2x6 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 8x10 crossbraces at six feet horizontally and five feet vertically.

Space 12x12 wales at five feet vertically.

Use 3x6 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. Mudills are wales that are installed at the toe of the trench side.

6. Trench jacks may be used in lieu of or in combination with timber crossbraces.

7. Placement of crossbraces. When the vertical spacing of crossbraces is four feet, place the top crossbrace no more than two feet below the top of the trench. When the vertical spacing of crossbraces is five feet, place the top crossbrace no more than 2.5 feet below the top of the trench.

TABLE C-1.1
 TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *
 SOIL TYPE A $P_a = 25 \text{ X H} + 72 \text{ psf}$ (2 ft Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (ACTUAL) AND SPACING OF MEMBERS **												UPRIGHTS									
	CROSS BRACES						RAILS						MAXIMUM ALLOWABLE HORIZONTAL SPACING									
	HORIZ. SPACING (FEET)		WIDTH OF TRENCH (FEET)		VERT. SPACING (FEET)		UP TO		UP TO		UP TO		VERT. SPACING (FEET)		CLOSE		4		5		6	
5	UP TO 6	4X4	4X4	4X6	6X6	4	6X6	6X6	4	Not Req'd	---	---	---	---	---	---	---	---	---	---	---	---
	UP TO 8	4X4	4X4	4X6	6X6	4	6X6	6X6	4	Not Req'd	---	---	---	---	---	---	---	---	---	---	---	2X8
10	UP TO 10	4X6	4X6	4X6	6X6	4	6X6	6X6	4	8X8	4	---	---	---	---	---	---	---	---	---	---	---
	UP TO 12	4X6	4X6	4X6	6X6	4	6X6	6X6	4	8X8	4	---	---	---	---	---	---	---	---	---	---	2X6
15	UP TO 6	4X4	4X4	4X6	6X6	4	6X6	6X6	4	Not Req'd	---	---	---	---	---	---	---	---	---	---	---	---
	UP TO 8	4X6	4X6	4X6	6X6	4	6X6	6X6	4	8X8	4	---	---	---	---	---	---	---	---	---	---	2X6
20	UP TO 10	6X6	6X6	6X6	6X8	4	6X8	6X8	4	8X10	4	---	---	---	---	---	---	---	---	---	---	---
	UP TO 12	6X6	6X6	6X6	6X8	4	6X8	6X8	4	10X10	4	---	---	---	---	---	---	---	---	---	---	3X8
OVER 20	UP TO 6	6X6	6X6	6X6	6X8	4	6X8	6X8	4	6X8	4	---	---	---	---	---	---	---	---	---	---	---
	UP TO 8	6X6	6X6	6X6	6X8	4	6X8	6X8	4	8X8	4	---	---	---	---	---	---	---	---	---	---	---
OVER 20	UP TO 10	8X8	8X8	8X8	8X10	4	8X10	8X10	4	8X10	4	---	---	---	---	---	---	---	---	---	---	---
	UP TO 12	8X8	8X8	8X8	8X10	4	8X10	8X10	4	10X10	4	---	---	---	---	---	---	---	---	---	---	---

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-1.2

TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *
 SOIL TYPE B P = 45 X H + 72 psf (2 ft. Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (ACTUAL) AND SPACING OF MEMBERS**										
	CROSS BRACES				WALKES			UPRIGHS			
	HORIZ. SPACING (FEET)	WIDTH OF TRENCH (FEET)			VERT. SPACING (FEET)			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 6	4X6	4X6	6X6	6X6	6X6	5	6X8	5			2X6
6 TO 8	6X6	6X6	6X6	6X8	6X8	5	8X10	5			2X6
8 TO 10	6X6	6X6	6X6	6X8	6X8	5	10X10	5			2X6
10 TO 15	See Note 1										
15 TO 18	6X6	6X6	6X6	6X8	6X8	5	8X8	5			2X6
18 TO 20	6X8	6X8	6X8	8X8	8X8	5	10X10	5			2X6
20 TO 25	8X8	8X8	8X8	8X8	8X10	5	10X12	5			2X6
25 TO 30	See Note 1										
30 TO 35	6X8	6X8	6X8	8X8	8X8	5	8X10	5			3X6
35 TO 40	8X8	8X8	8X8	8X8	8X10	5	10X12	5			3X6
40 TO 45	8X10	8X10	8X10	8X10	10X10	5	12X12	5			3X6
OVER 45	See Note 1										

* Mixed oak or equivalent with a bending strength not less than 850 psf.
 ** Manufactured members of equivalent strength may be substituted for wood.

TABLE C-1.3
 TIMBER TRENCH SHORING -- MINIMUM TIMBER REQUIREMENTS *
 SOIL TYPE C P = 80 X H + 72 psf (2 ft. Surcharge)

DEPTH OF TRENCH (FEET)	GROSS 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												
	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 pcf (2 ft. Surcharge)

DEPTH OF TRENCH (FEET)	CROSS BRACES										SIZE (S&S) AND SPACING OF MEMBERS **			UPRIGHS			
	HORIZ. SPACING (FEET)		WIDTH OF TRENCH (FEET)		VERT. SPACING (FEET)		SIZE (IN.)		VERT. SPACING (FEET)		MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET)		VERT. SPACING (FEET)		MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET)		
	UP TO	TO	UP TO	UP TO	UP TO	UP TO	UP TO	UP TO	UP TO	UP TO	CLOSE	4	5	6	8		
5	UP TO	TO	4	4X4	4X4	4X4	4X4	4X6	4	Not Req'd				4X6			
	UP TO	TO	4X4	4X4	4X4	4X4	4X6	4	Not Req'd						4X8		
	UP TO	TO	4X6	4X6	4X6	4X6	6X6	4	4			4X6					
10	UP TO	TO	4X6	4X6	4X6	4X6	6X6	4	4					4X6			
	UP TO	TO	4X4	4X4	4X4	4X4	6X6	4	Not Req'd					4X10			
	UP TO	TO	4X6	4X6	4X6	4X6	6X6	4	4			4X6					
15	UP TO	TO	6X6	6X6	6X6	6X6	6X6	4	4					4X8			
	UP TO	TO	6X6	6X6	6X6	6X6	6X6	4	4								
	UP TO	TO	6X6	6X6	6X6	6X6	6X6	4	4			4X6		4X10			
20	UP TO	TO	6X6	6X6	6X6	6X6	6X6	4	4								
	UP TO	TO	6X6	6X6	6X6	6X6	6X6	4	4			3X6					
	UP TO	TO	6X6	6X6	6X6	6X6	6X6	4	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 = 45 X N * 72 psf (2 ft. Surcharge)

DEPTH OF TRENCH (FEET)	SIZE (S4S) AND SPACING OF MEMBERS **										UPRIGHTS			
	CROSS BRACES					HALES					MAXIMUM ALLOWABLE HORIZONTAL SPACING			
	HORIZ. SPACING (FEET)	W/QUIL OF TRENCH (FEET)		VERT. SPACING (FEET)		VERT. SPACING (FEET)	SIZE (IN)	VERT. SPACING (FEET)	CLOSE	2	3	4	6	
5 TO 10	UP TO 6	4X6	4X6	4X6	6X6	5	6X8	5						
	UP TO 8	4X6	4X6	6X6	6X6	5	8X8	5		3X8			4X8	
	UP TO 10	4X6	4X6	6X6	6X8	5	8X10	5			4X8			
10 TO 15	UP TO 6	6X6	6X6	6X6	6X8	5	8X8	5						
	UP TO 8	6X8	6X8	6X8	8X8	5	10X10	5		3X6				
	UP TO 10	6X8	6X8	8X8	8X8	5	10X12	5		3X6				
15 TO 20	UP TO 6	6X8	6X8	6X8	8X8	5	8X10	5						
	UP TO 8	6X8	6X8	6X8	8X8	5	10X12	5		4X6				
	UP TO 10	8X8	8X8	8X8	8X8	5	12X12	5		4X6				
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 **										UPRIGHTS			
	CROSS BRACES					HALFS					VERT. SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING		
	HORIZ. SPACING (FEET)		WIDTH OF TRENCH (FEET)			VERT. SPACING (FEET)		SIZE (IN)				CLOSE	FEET	
UP TO	TO	UP TO	UP TO	UP TO	UP TO	15	5	5	8X8	10X10	10X12	5	3X6	
5	6	6X6	6X6	6X6	6X6	8X8	5	5	8X8	5			3X6	
TO	8	6X6	6X6	6X6	6X6	8X8	5	5	10X10	5			3X6	
10	10	6X6	6X6	6X6	6X6	8X8	5	5	10X12	5			3X6	
		See Note 1												
10	6	6X8	6X8	6X8	6X8	8X8	5	5	10X10	5			4X6	
TO	8	6X8	6X8	6X8	6X8	8X8	5	5	12X12	5			4X6	
15		See Note 1												
		See Note 1												
15	6	8X8	8X8	8X8	8X10	8X10	5	5	10X12	5			4X6	
TO		See Note 1												
20		See Note 1												
OVER 20		See Note 1												

* Douglas fir or equivalent with a bending strength not less than 1500 psi.
 ** Manufactured members of equivalent strength may be substituted for wood.

APPENDIX D TO SUBPART P—ALUMINUM
HYDRAULIC SHORING FOR TRENCHES

(a) *Scope.* This appendix contains information that can be used when aluminum hydraulic shoring is provided as a method of protection against cave-ins in trenches that do not exceed 20 feet (6.1m) in depth. This appendix must be used when design of the aluminum hydraulic protective system cannot be performed in accordance with § 1926.652(c)(2).

(b) *Soil Classification.* In order to use data presented in this appendix, the soil type or types in which the excavation is made must first be determined using the soil classification method set forth in appendix A of subpart P of part 1926.

(c) *Presentation of Information.* Information is presented in several forms as follows:

(1) Information is presented in tabular form in Tables D-1.1, D-1.2, D-1.3 and E-1.4. Each table presents the maximum vertical and horizontal spacings that may be used with various aluminum member sizes and various hydraulic cylinder sizes. Each table contains data only for the particular soil type in which the excavation or portion of the excavation is made. Tables D-1.1 and D-1.2 are for vertical shores in Types A and B soil. Tables D-1.3 and D-1.4 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 manufacturer.

(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 #2) spaced 5.5 feet o.c. horizontally and 4 feet o.c. vertically, plywood (per footnote (g) (7) to the D-1 Table) should be used behind the shores. (See Figures 2 & 3 for typical installations.)

(4) Example 4: A trench is dug in previously disturbed Type B soil, with characteristics of a Type C soil, and will require sheeting. The trench is 18 feet deep and 12 feet wide. 8 foot horizontal spacing between cylinders is desired for working space. From Table D-1.3: Find horizontal wale with a section modulus of 14.0 spaced at 4 feet o.c. vertically and 3 inch diameter cylinder spaced at 9 feet maximum o.c. horizontally. 3x12 timber sheeting is required at close spacing vertically. (See Figure 4 for typical installation.)

(5) Example 5: A trench is dug in Type C soil, 9 feet deep and 4 feet wide. Horizontal cylinder spacing in excess of 6 feet is desired for working space. From Table D-1.4: Find horizontal wale with a section modulus of 7.0 and 2 inch diameter cylinders spaced at 6.5 feet o.c. horizontally. Or, find horizontal wale with a 14.0 section modulus and 3 inch diameter cylinder spaced at 10 feet o.c. horizontally. Both wales are spaced 4 feet o.c. vertically. 3x12 timber sheeting is required

at close spacing vertically. (See Figure 4 for typical installation.)

(g) Footnotes, and general notes, for Tables D-1.1, D-1.2, D-1.3, and D-1.4.

(1) For applications other than those listed in the tables, refer to § 1926.652(c)(2) for use of manufacturer's tabulated data. For trench depths in excess of 20 feet, refer to § 1926.652(c)(2) and § 1926.652(c)(3).

(2) 2 inch diameter cylinders, at this width, shall have structural steel tube (3.5x3.5x0.1875) oversleeves, or structural oversleeves of manufacturer's specification, extending the full, collapsed length.

(3) Hydraulic cylinders capacities. (i) 2 inch cylinders shall be a minimum 2-inch inside diameter with a safe working capacity of not less than 18,000 pounds axial compressive load at maximum extension. Maximum extension is to include full range of cylinder extensions as recommended by product manufacturer.

(ii) 3-inch cylinders shall be a minimum 3-inch inside diameter with a safe work capacity of not less than 30,000 pounds axial compressive load at maximum extension. Maximum extension is to include full range of cylinder extensions as recommended by product manufacturer.

(4) All spacing indicated is measured center to center.

(5) Vertical shoring rails shall have a minimum section modulus of 0.40 inch.

(6) When vertical shores are used, there must be a minimum of three shores spaced equally, horizontally, in a group.

(7) Plywood shall be 1.125 in. thick softwood or 0.75 inch. thick, 14 ply, arctic white birch (Finland form). Please note that plywood is not intended as a structural member, but only for prevention of local raveling (sloughing of the trench face) between shores.

(8) See appendix C for timber specifications.

(9) Wales are calculated for simple span conditions.

(10) See appendix D, Item (d), for basis and limitations of the data.

ALUMINUM HYDRAULIC SHORING TYPICAL INSTALLATIONS

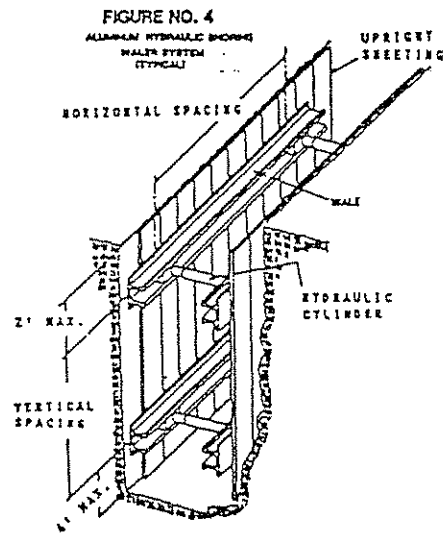
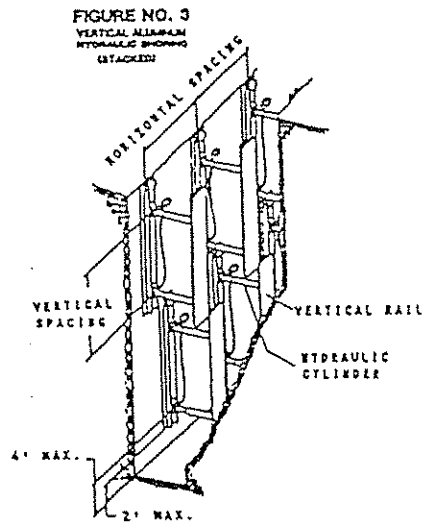
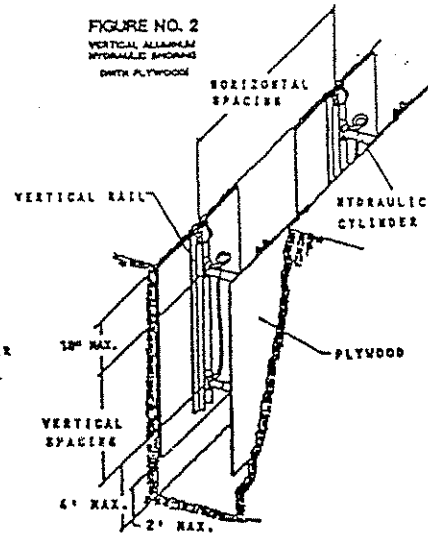
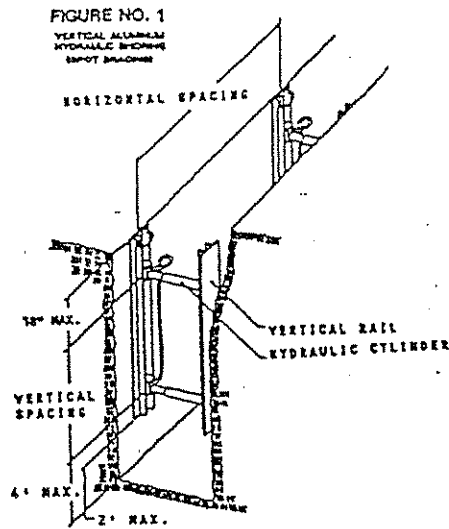


TABLE D - 1.1
ALUMINUM HYDRAULIC SHORING
VERTICAL SHORES
FOR SOIL TYPE A

DEPTH OF TRENCH (FEET)	HYDRAULIC CYLINDERS			MAXIMUM VERTICAL SPACING (FEET)	WIDTH OF TRENCH (FEET)		
	MAXIMUM HORIZONTAL SPACING (FEET)	UP TO 8	OVER 8 UP TO 12		OVER 12 UP TO 15		
OVER 5 UP TO 10	8			4			
OVER 10 UP TO 15	8			4	2 INCH DIAMETER	2 INCH DIAMETER NOTE (2)	3 INCH DIAMETER
OVER 15 UP TO 20	7			4			
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)

TABLED - 1.2.
ALUMINUM HYDRAULIC SHORING
VERTICAL SHOES
FOR SOIL TYPE B

HYDRAULIC CYLINDERS					
DEPTH OF TRENCH (FEET)	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 ⁴)	WIDTH OF TRENCH (FEET)								MAX. HORIZ. SPACING (ON CENTER)	3 FT.	
			UP TO 8		OVER 8 UP TO 12		OVER 12 UP TO 15		CYLINDER DIAMETER	SOLID SHEET			
OVER 5 UP TO 10	4	3.5	HORIZ. SPACING	8.0	HORIZ. SPACING	8.0	HORIZ. SPACING	8.0			CYLINDER DIAMETER	2 IN	CYLINDER DIAMETER
			CYLINDER DIAMETER	2 IN	CYLINDER DIAMETER	NOTE(2)	CYLINDER DIAMETER	NOTE(2)	CYLINDER DIAMETER	3 IN			
			HORIZ. SPACING	9.0	HORIZ. SPACING	9.0	HORIZ. SPACING	9.0	HORIZ. SPACING	9.0			
OVER 10 UP TO 15	4	7.0	HORIZ. SPACING	12.0	HORIZ. SPACING	12.0	HORIZ. SPACING	12.0	CYLINDER DIAMETER	3 IN	CYLINDER DIAMETER	3 IN	3x12
			CYLINDER DIAMETER	3 IN	CYLINDER DIAMETER	NOTE(2)	CYLINDER DIAMETER	NOTE(2)	CYLINDER DIAMETER	3 IN			
			HORIZ. SPACING	6.0	HORIZ. SPACING	6.0	HORIZ. SPACING	6.0	HORIZ. SPACING	6.0			
OVER 15 UP TO 20	4	14.0	HORIZ. SPACING	8.0	HORIZ. SPACING	8.0	HORIZ. SPACING	8.0	CYLINDER DIAMETER	3 IN	CYLINDER DIAMETER	3 IN	3x12
			CYLINDER DIAMETER	3 IN	CYLINDER DIAMETER	10.0	CYLINDER DIAMETER	3 IN	CYLINDER DIAMETER	3 IN			
			HORIZ. SPACING	10.0	HORIZ. SPACING	10.0	HORIZ. SPACING	10.0	HORIZ. SPACING	10.0			
OVER 20	4	3.5	HORIZ. SPACING	5.5	HORIZ. SPACING	5.5	HORIZ. SPACING	5.5	CYLINDER DIAMETER	2 IN	CYLINDER DIAMETER	3 IN	3x12
			CYLINDER DIAMETER	2 IN	CYLINDER DIAMETER	NOTE(2)	CYLINDER DIAMETER	NOTE(2)	CYLINDER DIAMETER	3 IN			
			HORIZ. SPACING	6.0	HORIZ. SPACING	6.0	HORIZ. SPACING	6.0	HORIZ. SPACING	6.0			
OVER 20			9.0		9.0		9.0		9.0				

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		
	VERTICAL SPACING (FEET)	SECTION MODULUS (IN ⁴)	WIDTH OF TRENCH (FEET)						MAX. HORIZ. SPACING (ON CENTER)	SOLID SHEET	3 FT.
			UP TO 8	OVER 8 UP TO 12	OVER 12 UP TO 15	OVER 12 UP TO 15	OVER 12 UP TO 15	OVER 12 UP TO 15			
			HORIZ. SPACING	CYLINDER DIAMETER	HORIZ. SPACING	CYLINDER DIAMETER	HORIZ. SPACING	CYLINDER DIAMETER	HORIZ. SPACING	CYLINDER DIAMETER	
OVER 5 UP TO 10	4	3.5	6.0	2 IN	2 IN	6.0	NOTE(2)	6.0	3 IN	3x12	3 FT.
		7.0	6.5	2 IN	2 IN	6.5	NOTE(2)	6.5	3 IN	3x12	3 FT.
		14.0	10.0	3 IN	3 IN	10.0	3 IN	10.0	3 IN	3x12	3 FT.
OVER 10 UP TO 15	4	3.5	4.0	2 IN	2 IN	4.0	NOTE(2)	4.0	3 IN	3x12	3 FT.
		7.0	5.5	3 IN	3 IN	5.5	3 IN	5.5	3 IN	3x12	3 FT.
		14.0	8.0	3 IN	3 IN	8.0	3 IN	8.0	3 IN	3x12	3 FT.
OVER 15 UP TO 20	4	3.5	3.5	2 IN	2 IN	3.5	NOTE(2)	3.5	3 IN	3x12	3 FT.
		7.0	5.0	3 IN	3 IN	5.0	3 IN	5.0	3 IN	3x12	3 FT.
		14.0	6.0	3 IN	3 IN	6.0	3 IN	6.0	3 IN	3x12	3 FT.
OVER 20			NOTE (1)								

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, Item (g)

Notes (1): See Appendix D, item (g) (1)

Notes (2): See Appendix D, item (g) (2)

♦ Consult product manufacturer and/or qualified engineer for Section Modulus of available wales.

APPENDIX E TO SUBPART P—ALTERNATIVES TO TIMBER SHORING

Figure 1. Aluminum Hydraulic Shoring

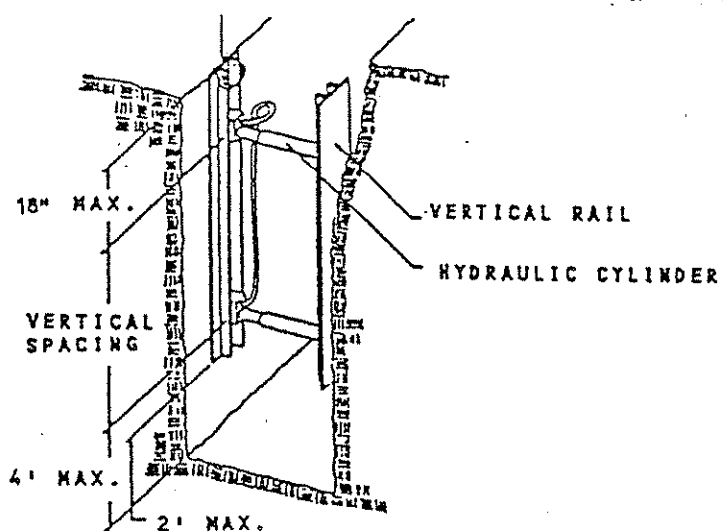


Figure 2. Pneumatic/hydraulic Shoring

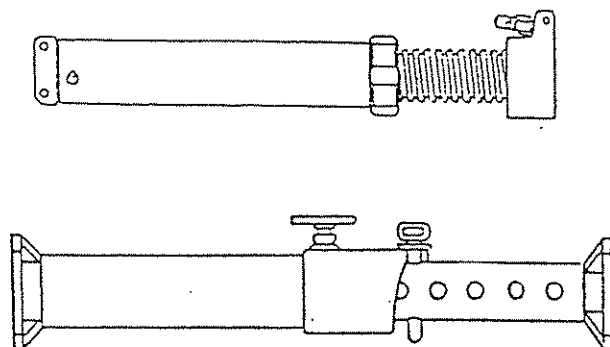


Figure 3. Trench Jacks (Screw Jacks)

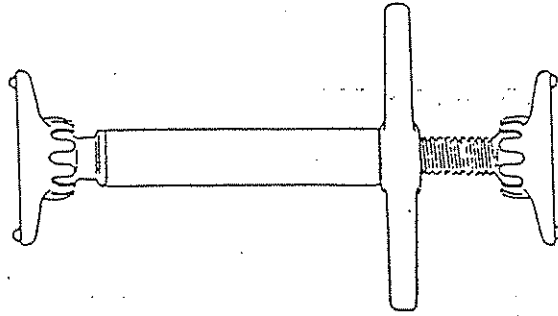
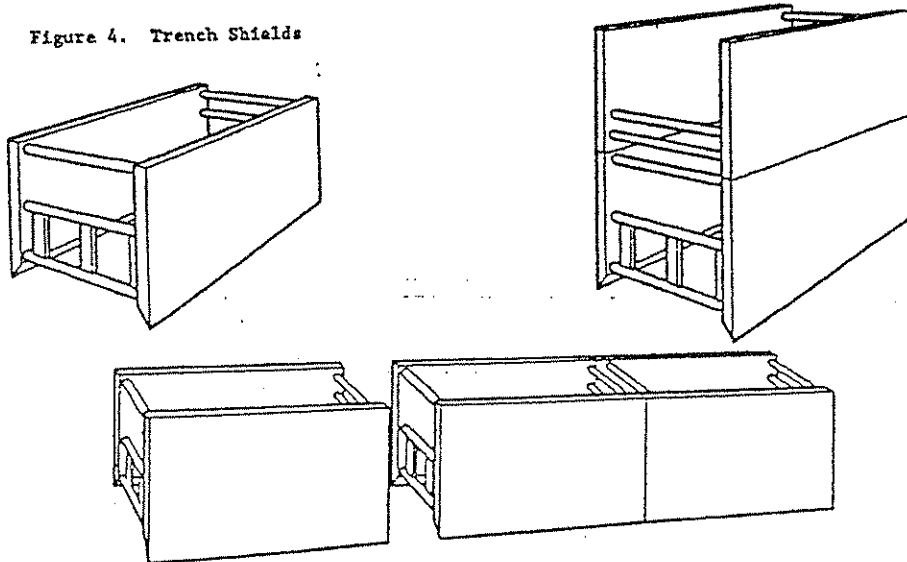


Figure 4. Trench Shields



APPENDIX F TO SUBPART P—SELECTION OF PROTECTIVE SYSTEMS

The following figures are a graphic summary of the requirements contained in subpart P for excavations 20 feet or less in depth. Protective systems for use in excavations more than 20 feet in depth must be designed by a registered professional engineer in accordance with §1926.652 (b) and (c).

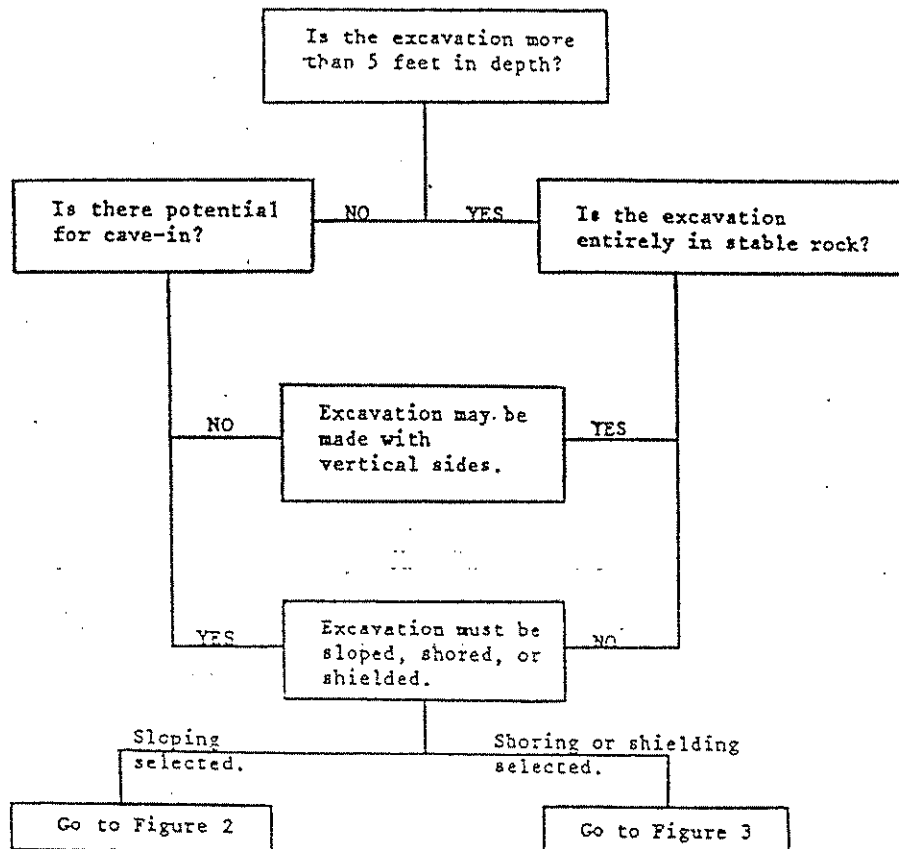


FIGURE 1 - PRELIMINARY DECISIONS

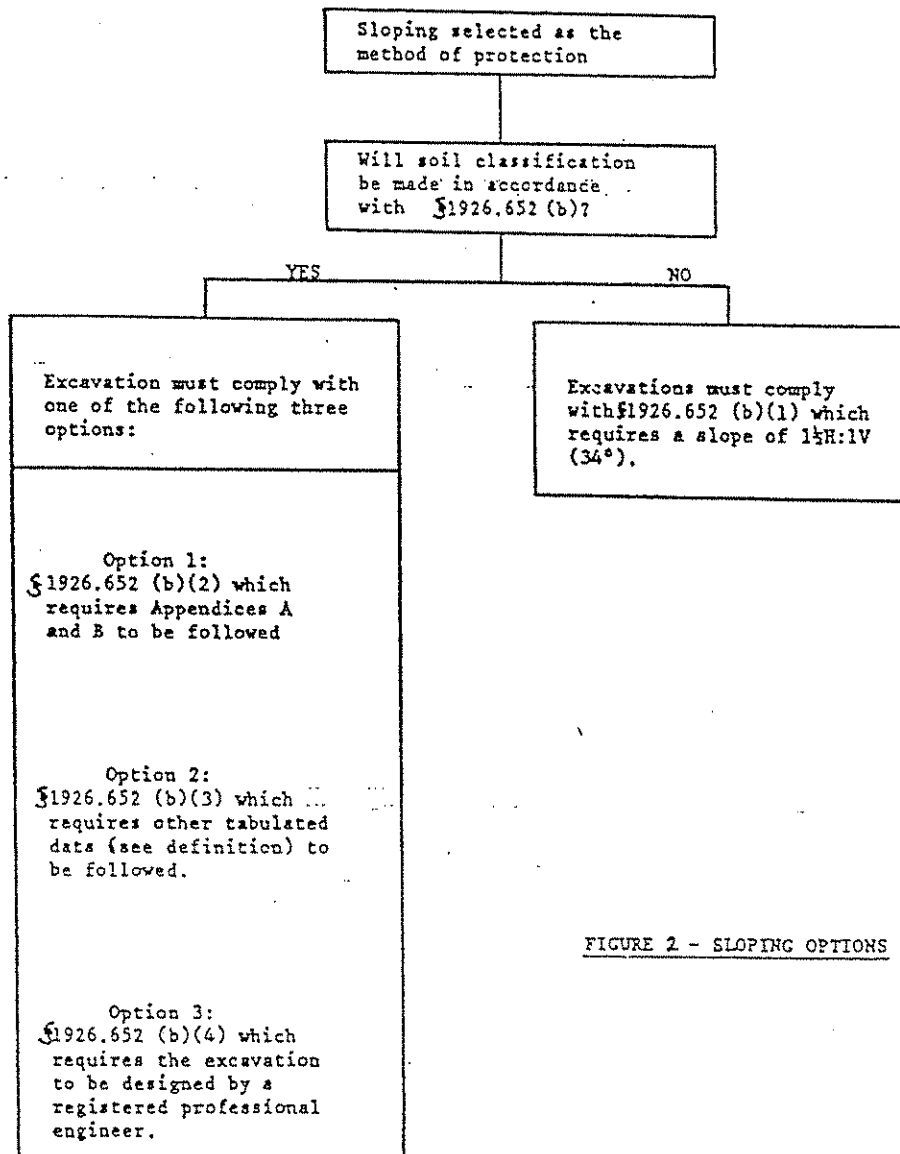


FIGURE 2 - SLOPING OPTIONS

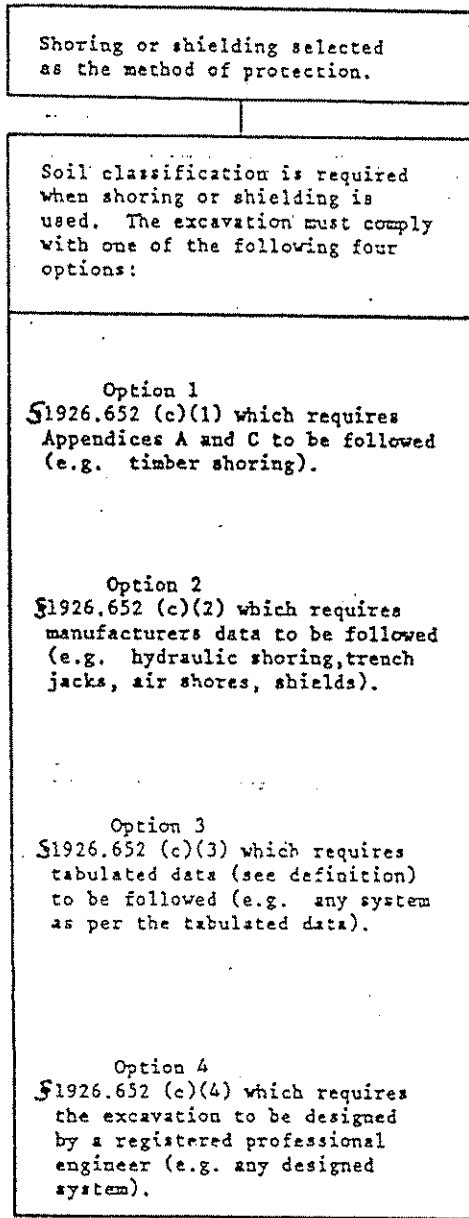


FIGURE 3 - SHORING AND SHIELDING OPTIONS

PART 1 - GENERAL

1. DESCRIPTION

Furnish and place quarry angular stone or special riprap.

PART 2 - MATERIALS

2.1 Furnish materials in accordance with the following Items.

Stone Riprap. Use durable natural stone with a bulk specific gravity of at least 2.50 as determined by Tex-403-A unless otherwise shown on the plans. Provide stone that, when tested in accordance with Tex-411-A, has weight loss of no more than 18% after 5 cycles of magnesium sulfate solution.

Perform a size verification test on the first 5,000 sq. yd. of riprap stone for all types of stone riprap at a location determined by the Engineer. Test the riprap stone in accordance with ASTM D551. Additional tests may be required. Do not place additional riprap until the initial 5,000 sq. yd. of finished riprap has been approved.

- 2.3.1. Type R. Use stones between 50 and 250 lb. with at least 50% of the stones heavier than 100lb.
- 2.3.2. Type F. Use stones between 50 and 250 lb. with at least 40% of the stones heavier than 100 lb. Use stones with at least 1 broad flat surface.
- 2.3.3. Common. Use stones between 50 and 250 lb. Use stones that are at least 3 in. in their least dimension. Use stones that are at least twice as wide as they are thick. When shown on the plans or approved, material may consist of broken concrete removed under the Contract or from other approved sources. Cut exposed reinforcement flush with all surfaces before placement of each broken piece of concrete.
- 2.3.4. Protection. Use boulders or quarried rock that meets the gradation requirements of Table 1. Both the width and the thickness of each piece of riprap must be at least 1/3 of the length. When shown on the plans or as approved, material may consist of broken concrete removed under the Contract or from other approved sources. Cut exposed reinforcement flush with all surfaces before placement of each piece of broken concrete. Determine gradation of the finished, in-place, riprap stone under the direct supervision of the Engineer in accordance with ASTM D5519.

Table 1
In-Place Protection Riprap Gradation Requirements

Size	Maximum Size	90% Size ¹ (lb.)	50% Size ² (lb.)	8% Size ³ Minimum (lb.)
12 in.	200	80—180	30—75	3
15 in.	320	170—300	60—165	20
18 in.	530	290—475	105—220	22
21 in.	800	460—720	175—300	25
24 in.	1,000	550—850	200—325	30
30 in.	2,600	1,150 - 2,250	400—900	40

- 1. Defined as that size such that 10% of the total riprap stone, by weight, is larger and 90% is smaller.
- 2. Defined as that size such that 50% of the total riprap stone, by weight, is larger and 50% is smaller.
- 3. Defined as that size such that 92% of the total riprap stone, by weight, is larger and 8% is smaller.

The engineer may require in-place verification of the stone size. Determine the in-place size of the riprap stone by taking linear transects along riprap and measuring the intermediate axis of the stone at select intervals. Place a tape measure along the riprap and determine the intermediate axis size of the stone at 2 ft. intervals. Measure a minimum of 100 stones, either in a single transect or in multiple transects, then follow ASTM D5519 Test Procedure Part B to determine the gradation. Table 2 is a guide for comparing the stone size in inches to the stone weight in Table 1.

Table 2
Protection Riprap Stone Size²

Size	Dmax (in.)	D90 (in.)	D50 (in.)	D8 (in.)
12 in.	13.76	10.14—13.29	7.31—9.92	3.39
15 in.	16.10	13.04—15.75	9.21—12.91	6.39
18 in.	19.04	15.58—18.36	11.10—14.21	6.59
21 in.	21.85	18.17—21.09	13.16—15.75	6.88
24 in.	23.53	19.28—22.29	13.76—16.18	7.31
30 in.	32.36	24.65—30.84	17.34—22.72	8.05

1. Based on a Specific Gravity of 2.5 an using the following equation for the intermediate axis diameter $D = \{(12*W)/(Gs*62.4*0.85)\}^{1/3}$

Where:

D = intermediate axis diameter in in.;

W = weight of stone in lbs.;

Gs = Specific Gravity of stone

Note—If the Specific Gravity of the stone is different than 2.5, then the above equation can be used to determine the appropriate size using the actual Specific Gravity.

If required, provide bedding stone that, in-place, meets the gradation requirements shown in Table 3 or as otherwise shown on the plans. Determine the size distribution in Table 3 in accordance with ASTM D6913.

Table 3
Protection Riprap Bedding Material Gradation Requirements

Sieve Size (Sq. Mesh)	% by Weight Passing
3"	100
1-1/2"	50-80
3/4"	20-60
#4	0-15
#10	0-5

- 2.4. **Cement-Stabilized Riprap.** Provide aggregate that meets Item 247, “Flexible Base,” for the type and grade shown on the plans. Use cement-stabilized riprap with 7% hydraulic cement by dry weight of the aggregate.
- 2.5. **Special Riprap.** Furnish materials for special riprap according to the plans.

PART 3 – EXECUTION CONSTRUCTION

Dress slopes and protected areas to the line and grade shown on the plans before the placement of riprap. Place riprap and toe walls according to details shown on the plans or as directed.

- 3.1. **Concrete Riprap.** Reinforce concrete riprap with 6 x 6 – W2.9 x W2.9 welded wire fabric or with No. 3 or No. 4 reinforcing bars spaced at a maximum of 18 in. in each direction unless otherwise shown. Alternative styles of welded wire fabric that provide at least 0.058 sq. in. of steel per foot in both directions may be used if approved. A combination of welded wire fabric and reinforcing bars may be provided when both are permitted. Provide a minimum 6-in. lap at all splices. Provide horizontal cover of at least 1 in. and no more than 3 in. at the edge of the riprap. Place the first parallel bar no more than 6 in. from the edge of the concrete. Use approved supports to hold the reinforcement approximately equidistant from the top and bottom surface of the slab. Adjust reinforcement concrete placement to maintain correct position.

Sprinkle or sprinkle and consolidate the subgrade before the concrete is placed as directed. All surfaces must be moist when concrete is placed.

Compact and shape the concrete once it has been placed to conform to the dimensions shown on the plans. Finish the surface with a wood float after it has set sufficiently to avoid slumping to secure a smooth surface or broom finish as approved.

Cure the riprap immediately after the finishing operation according to Item 420, “Concrete Substructures.”

- 3.2. **Stone Riprap.** Provide the following types of stone riprap when shown on the plans:

- **Dry Riprap.** Stone riprap with voids filled with only spalls or small stones.
- **Grouted Riprap.** Type R, F, Common stone riprap with voids grouted after all the stones are in place.
- **Mortared Riprap.** Type F stone riprap laid and mortared as each stone is placed.

Use spalls and small stones lighter than 25 lbs. to fill open joints and voids in stone riprap, and place to a tight fit.

Place mortar or grout only when the air temperature is above 35°F. Protect work from rapid drying for at least 3 days after placement.

Place filter fabric with the length running up and down the slope unless otherwise approved. Ensure fabric has a minimum overlap of 2 ft. Secure fabric with nails or pins. Use nails at least 2 in. long with washers or U-shaped pins with legs at least 9 in. long. Space nails or pins at a maximum of 10 ft. in each direction and 5 ft. along the seams. Alternative anchorage and spacing may be used and approved.

- 3.2.1. **Type R.** Construct riprap as shown in Figure 1 on the *Stone Riprap Standard* and as shown on the plans. Place stones in a single layer with close joints so most of their weight is carried by the earth and not the adjacent stones. Place the upright axis of the stones approximately at an angle of 90° to the embankment slope. Place each course from the bottom of the embankment upwards with the larger stones in the lower courses.

Fill open joints between stones with spalls. Place stones to create a uniform finished top surface. Do not exceed a 6-in. variation between the tops of the adjacent stones. Replace, embed deeper, or chip away stones that project more than the allowable amount above the finished surface.

Prevent earth, sand, or foreign material from filling the spaces between the stones when the plans require Type R stone riprap to be grouted. Wet the stones thoroughly after they are in place, fill the spaces between the stones with grout, and pack. Sweep the surface of riprap with a stiff broom after grouting.

3.2.2. Type F.

3.2.2.1. Dry Placement. Construct riprap as shown in Figure 2 of the *Stone Riprap Standard*. Set the flat surface on a prepared horizontal earth bed, and overlap the underlying course to secure a lapped surface. Place the large stones first, roughly arranged in close contact. Fill the spaces between the large stones with suitably sized stones placed to leave the surface evenly stepped and conforming to the contour required. Place stone to drain water down to the face of the slope.

3.2.2.2. Grouting. Construct Riprap as shown in Figure 3 on the *Stone Riprap Standard*. Size, shape, and lay large flat-surfaced stones to produce an even surface with minimal voids. Place stones with the flat surface facing upward parallel to the slope. Place the largest stones near the base of the slope. Fill spaces between the larger stones with stones of suitable size, leaving the surface smooth, tight, and conforming to the contour required. Place the stones to create a plane surface with a variation of no more than 6-in. in 10 ft. from true plane. Provide the same degree of accuracy for warped and curved surfaces. Prevent earth, sand, or foreign material from filling the spaces between the stones. Wet the stones thoroughly after they are in place, fill the spaces between them with grout, and pack. Sweep the surface with a stiff broom after grouting.

3.2.2.3. Mortaring. Construct riprap as shown in Figure 2 on the *Stone Riprap Standard*. Lap courses as described for dry placement. Wet the stones thoroughly before placing mortar. Bed the larger stones in fresh mortar as they are being placed and shove adjacent stones into contact with one another. Spread excess mortar forced out during placement of the stones uniformly over them to fill all voids completely. Point all joints roughly either with flush joints or shallow, smooth-raked joints as directed.

3.2.3. Common. Construct riprap as shown in Figure 4 on the *Stone Riprap Standard*. Place stones on a bed excavated for the base course. Bed the base course of stone well into the ground with the edges in contact. Bed and place each succeeding course even in contact with the preceding course. Use spalls and small stones to fill any open joints and voids in the riprap. Ensure the finished surface presents an even, tight surface, true to the line and grades of the typical sections.

Prevent earth, sand, or foreign material from filling the spaces between the stones when the plans require grouting common stone riprap. Wet the stones thoroughly after they are in place; fill the spaces between them with grout; and pack. Sweep the surface with a stiff broom after grouting.

3.2.4. Protection. Construct riprap as shown in figure 5 in the *Stone Riprap Standard*. Place riprap stone on the slopes with the limits shown on the plans. Place stone for riprap on the filter fabric to produce a reasonably well-graded mass of riprap with the minimum practicable percentage of voids. Construct the riprap to the lines and grades shown on the plans or staked in the field. A tolerance of +6 in. and -0 in. from the slope line and grades shown on the plans is allowed in the finished surface of the riprap. Place riprap to its full thickness in a single operation. Avoid displacing filter fabric. Ensure the entire mass of the stones in their final position is free from objectional pockets of small stones and clusters of larger stones. Do not place riprap in layers, and do not place it by dumping it into chutes, dumping it from the top of a slope, pushing it from the top of the slope, or any method likely to cause segregation of the various sizes. Obtain the desired

distribution of the various sizes of stones throughout the mass by selective loading of material at the quarry or other source or by other methods. Of placement that will produce the specified results. Rearrange individual stones by mechanical equipment or by hand if necessary to obtain a reasonably well-graded distribution of stone sizes. Use the bedding thickness shown and place stone for riprap on the bedding material to produce a reasonably well-graded mass of riprap with the minimum practicable percentage of voids if required on the plans.

- 3.3. **Pneumatically Placed Concrete Riprap, Class II.** Meet Item 431, “Pneumatically Placed Concrete.” Provide reinforcement following the details on the plans and Item 440, “Reinforcement for Concrete.” Support reinforcement with approved supports throughout placement of concrete.

Give the surface a wood-float finish or a gun finish as directed. Cure the riprap with membrane-curing compound immediately after the finishing operation in accordance with Item 420, “Concrete Substructures.”

- 3.4. **Cement-Stabilized Riprap.** Follow the requirements of the plans and the provisions for concrete riprap except for when reinforcement is not required. The Engineer will approve the design and mixing of the cement-stabilized riprap.
- 3.5. **Special Riprap.** Construct special riprap according to plans.

END OF SECTION

DIVISION 32

EXTERIOR IMPROVEMENTS

PART 1 GENERAL

1.1 DESCRIPTION

This item shall consist of a base course composed of crushed aggregates constructed on the prepared underlying course in accordance with these specifications and shall conform to the dimensions and typical cross section shown on the plans and with the lines and grades approved by the Engineer.

2.1 MATERIALS

- A. AGGREGATE. The aggregate shall be either crushed stone or crushed gravel. The fine aggregate shall be screenings obtained from crushed stone or gravel.

The crushed stone shall consist of hard, durable particles or fragments of stone, free from dirt or other objectionable matter, and shall contain not more than 8% of flat, elongated, soft, or disintegrated pieces.

The crushed gravel shall consist of hard durable stones, rocks, and boulders crushed to specified sizes and shall be free from excess flat, elongated, soft or disintegrated pieces, dirt, or other objectionable matter. The method used in production of crushed gravel shall be such that the finished product shall be as uniform as practicable. The crushing of the gravel shall result in a product, all of which will be retained on a No. 4 mesh sieve, and shall have at least 85% by weight of particles with at least two fractured faces and 95% by weight of particles with at least one fractured face. If necessary, the gravel shall be screened before crushing to meet this requirement or to eliminate an excess of fine particles. All stones, rocks, and boulders of inferior quality occurring in the pit shall be wasted.

The crushed aggregate shall have a percent of wear not more than 45 to 500 revolutions, as determined by AASHTO T 96 (Los Angles Rattler Test).

The crushed aggregate shall not show evidence of disintegration nor show a total loss greater than 12% when subjected to 5 cycles of the sodium sulfate accelerated soundness test using AASH T 104.

All material passing the No. 4 mesh sieve produced in the crushing operation of either the stone or gravel shall be incorporated in the base material unless there is an excessive amount which, if included, would not meet the gradation requirements.

The crushed aggregate shall meet the requirements of one of the gradations given in the following table when tested in accordance with AASHTO T11 and T 27.

TABLE 1. -- Requirements for Gradation of Aggregate Percentage by Weight Passing Sieves

Sieve Designation (square openings)	GRADE A	GRADE B
	2" Maximum Aggregate Size	1" Maximum Aggregate Size
2 inch.....	100	
1-1/2 inch.....	70-95	100
1 inch.....	55-85	70-95
3/4 inch.....	50-80	55-85
No. 4.....	30-60	30-60
No.40.....	10-25	10-25
No. 200.....	3-10	3-10

The gradations in the table represent the limits which shall determine suitability of aggregate for use from the sources of supply. The final gradations decided on within the limits designated in the table shall be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieves or vice versa.

The amount of the fraction of material passing the No. 200 mesh sieve shall not exceed one half the fraction passing the No. 40 mesh sieve.

The portion of the base aggregate, including any blended material, passing the No. 40 mesh sieve shall have a liquid limit of not more than 35 and a plasticity index of not more than 12 when tested in accordance with AASHTO T 89 and T 90.

The selection of any of the gradations shown in the table shall be such that the maximum size aggregate used in any course shall not be more than two thirds the thickness of the layer of course being constructed.

- B. TESTING FOR GRADATION OF AGGREGATE. Base material shall be tested for gradation at every 1000 tons or less, at source, with a minimum of one gradation test per project.

3.1 CONSTRUCTION METHODS

- A. OPERATION AT SOURCES OF SUPPLY. All work involved in clearing and stripping of quarries and pits, including the handling of unsuitable material, shall be performed by the Contractor at his own expense. The base material shall be obtained from approved sources. The material shall be handled in a manner that shall secure a uniform and satisfactory product.

- B. EQUIPMENT. All equipment necessary for the proper construction of this work shall be on the project, in first class working condition, and approved by the Engineer before construction is permitted to start.
- C. PREPARING UNDERLYING COURSE. The underlying course shall be tested and accepted by the Engineer before placing and spreading operations are started. Any ruts or soft, yielding places caused by improper drainage conditions, hauling, or any other cause, shall be corrected and rolled to the required compaction before the base course is placed thereon.

To protect the underlying course and to insure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

- D. PLANT MIX. The base material shall be uniformly blended during crushing operations or mixed in an approved plant. The type of plant may be either a central proportioning and mixing plant or a traveling plant. the plant shall blend and mix the materials to meet these specifications and to secure the proper moisture content for compaction.
- E. PLACING AND SPREADING

- 1). Central Plant. The crushed aggregate base material that has been proportioned in a crushing and screening plant, or proportioned and processed in a central mixing plant, shall be placed on the prepared underlying course and compacted in layers of the thickness shown on the plans. The depositing and spreading of the material shall commence where designated and shall progress without breaks. The material shall be deposited and spread in lanes in a uniform layer and without segregation of size to such loose depth that, when compacted, the layer shall have the required thickness. The base aggregate shall be spread by spreader boxes or other approved devices or methods that shall spread the aggregate in the required amount to avoid or minimize the need for rehandling the material and to prevent the rutting of the underlying course. The spreader boxes or other devices shall be equipped with strike-off templates or screeds that can be adjusted or controlled to secure the required thickness of the material. Dumping from vehicles in piles on the underlying course which will require rehandling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.
- 2). Traveling Plant. If a traveling plant is used for mixing, the base material shall be placed on the underlying course in such condition to provide a base mixture conforming to the specified gradation and moisture content, and in such quantity to develop the thickness of the layer of the base and the density after compaction. The material shall be shaped to a uniform section. The Engineer shall examine the mixture to determine that the mixing is complete and satisfactory and that the proper moisture content is maintained before compaction is started. No spreading shall be done except when authorized. Care shall be taken that no material from the underlying course is mixed with the base material.

If necessary, the base course shall be bladed until a smooth, uniform surface is obtained that is true to line, grade, and cross section and until the mix is in condition for compacting.

- 3). Method of Placing. The base course shall be constructed in a layer not less than 2-1/2 inches nor more than 4-1/2 inches of compacted thickness. The aggregate, as spread, shall be of uniform gradation with no segregation or pockets of fine or coarse materials. Unless otherwise permitted by the Engineer, the aggregate shall not be spread more than 2,000 square yards or 500 lin. ft. of street in advance of the rolling. Any necessary sprinkling shall be kept within these limits. No material shall be placed in snow or on a soft, muddy, or frozen underlying course.

When more than one layer is required, the construction procedure described herein shall apply similarly to each layer.

The Engineer shall make tests to determine the maximum density and the proper moisture content of the base material, and this information will be available to the Contractor. The base material shall have a satisfactory moisture content when rolling is started, and any minor variations prior to or during rolling shall be corrected by sprinkling or aeration, if necessary.

During the placing and spreading, sufficient caution shall be exercised to prevent the incorporation of subgrade, subbase, or shoulder material in the base course mixture.

- F. **FINISHING AND COMPACTING.** After spreading, the crushed aggregate shall be thoroughly compacted by rolling. The rolling shall progress gradually from the sides to the center of the lane under construction, or from one side toward previously placed material by lapping uniformly each preceding rear wheel track by one half the width of such track. Rolling shall continue until the entire area of the course has been rolled by the rear wheels. The rolling shall continue until the stone is thoroughly set, the interstices of the material reduced to a minimum, and until creeping of the stone ahead of the roller is no longer visible. Rolling shall continue until the base material has been compacted to not less than 100% density for non-cohesive subgrade and 95% density for cohesive subgrade, as specified. Density tests will be taken at every 500 square yards or at every 125 lin. ft. of street with a minimum of two (2) density tests take for each street. Blading and rolling shall be done alternately, as required or directed, to obtain smooth, even, and uniformly compacted base.

The course shall not be rolled when the underlying course is soft or yielding or when the rolling causes undulation in the base course. When the rolling develops irregularities that exceed 1/2 inch when tested with a 16 foot straightedge, the irregular surface shall be loosened, refilled with the kind of material as that used in constructing the course, and rolled again as required.

In areas inaccessible to rollers, the base course material shall be tamped thoroughly with mechanical tampers as approved by the Engineer.

The sprinkling during rolling, if necessary, shall be in the amount and by equipment approved by the Engineer.

- G. **SURFACE TEST.** After the course has been completely compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Surface tests will be taken every 500 square yards or at every 125 lin. ft. of street with a minimum of two (2) density tests taken for each street. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified, reshaped, recompacted, and otherwise manipulated as the Engineer may direct until the required smoothness and accuracy are obtained.

The finished surface shall not vary more than 1/2 inch from a 16 foot straightedge when applied to the surface parallel with, and at right angles to, the centerline.

- H. **THICKNESS.** The thickness of the base course shall be determined by depth tests or cores taken at every 500 square yards or at every 125 lin. ft. of street with a minimum of two (2) density tests taken for each street. When the base deficiency is more than 1/2 inch, the Contractor shall correct such areas by scarifying, adding satisfactory base mixture, rolling, sprinkling, reshaping, and finishing in accordance with these specifications. The Contractor shall replace, at his expense, the base material where borings have been taken for test purposes.

- I. PROTECTION. Work on the base course shall not be accomplished during freezing temperatures nor when the subgrade is wet. When the aggregates contain frozen materials or when the underlying course is frozen, the construction shall be stopped.

Hauling equipment may be routed over completed portions of the base course, provided no damage results and provided that such equipment is routed over the full width of the base course to avoid rutting or uneven compaction. However, the Engineer in charge shall have full and specific authority to stop all hauling over completed or partially completed base course when, in his opinion, such hauling is causing damage. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at his own expense.

- J. MAINTENANCE. Following the completion of the base course, the Contractor shall perform all maintenance work necessary to keep the base course in a condition satisfactory for priming. After priming, the surface shall be kept clean and free from foreign material. The base course shall be properly drained at all times. If cleaning is necessary, or if the prime coat becomes disturbed, any work or restitution necessary shall be performed at the expense of the Contractor.

END OF SECTION

PART 1 – GENERAL:

1. DESCRIPTION

This item shall consist of a surface course composed of mineral aggregate and bituminous material mixed in a central mixing plant and placed on a prepared course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross sections shown on the plans. The more stringent specifications shall govern if conflicts exist with the specified requirements of this specification and current TXDOT Item 300 and 340 Standard Construction Specifications.

Each course shall be constructed to the depth, typical section, or elevation required by the plans and shall be rolled, finished and approved before the placement of the next course.

PART 2 – PRODUCTS:

2. MATERIALS

A. AGGREGATE. Aggregates shall consist of crushed stone or crushed gravel with or without sand or other inert finely divided mineral aggregate. The portion of materials retained on the No. 8 sieve shall be known as coarse aggregate, the portion passing the No. 8 sieve and retained on the No. 200 sieve as fine aggregate, and the portion passing the No. 200 sieve a mineral filler.

1. Coarse Aggregate. Coarse aggregate shall consist of sound, tough, durable particles, free from adherent films of matter that would prevent thorough coating with the bituminous material. The percentage of wear shall not be greater than 40% percent when tested. (The sodium sulfate soundness loss shall not exceed [**9] percent, after five cycles, when tested in accordance with ASTM C88.)

Aggregate shall contain at least [**70] percent by weight of crushed pieces having two or more fractured faces and [**85] percent having at least one fractured face. The area of each face shall be equal to at least 75 percent of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces. Fractured faces shall be obtained by artificial crushing.

The aggregate shall not contain more than 8 percent, by weight, of flat or elongated pieces. A flat particle is one having a ratio of width to thickness greater than five; an elongated particle is one having a ratio of length to width greater than five.

2. Fine Aggregate. Fine aggregate shall consist of clean, sound, durable, angular particles produced by crushing stone or gravel that meets the requirements for wear and soundness specified for coarse aggregate. The aggregate particles shall be free from coatings of clay, silt, or other objectionable matter and shall contain no clay balls. The fine aggregate, including any blended filler, shall have a plasticity index of not more than six when tested in accordance with ASTM D424, and a liquid limit of not more than 25 when tested in accordance with ASTM D423 or shall have a sand equivalent value not less than 45 in accordance with ASTM D2419.

Natural sand may be used to obtain the gradation of the aggregate blend or to improve the workability of the mix. The amount of sand to be added will be adjusted to produce mixtures conforming to requirements of this specification.

- 3. 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.
- 4. 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 has a satisfactory service record in bituminous pavement construction for at least five years, samples shall be submitted [****14**] days prior to start of production. An inspection of the producer's operation will be made by the Engineer. When new sources are to be developed, the Contractor shall indicate the sources and shall submit a plan for operation [****30**] days in advance of starting production. Samples from test pits, borings, and other excavations shall be submitted at the same time. Approval of the source of aggregate does not relieve the Contractor in any way of the responsibility for delivery at the jobsite of aggregates that meet the requirements specified herein.
- 5. 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.

- B. FILLER. If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D242 or TXDOT Item 340.
- C. BITUMINOUS MATERIAL. Bituminous material shall conform to the following requirements: TXDOT Item 300 – PG76-22 material **UNLESS OTHERWISE SPECIFIED BY GEOTECHNICAL ENGINEER.**

The Engineer shall specify the type and grade of bituminous material, based on geographical location and climatic conditions, as well as the controlling specification.

The Contractor shall furnish vendor's certified test reports for each tankload of bitumen shipped to the project. The report shall be delivered to the Engineer before permission is granted for use of the material. The furnishing of the vendor's certified test report for the bituminous material shall be the basis for final acceptance.

3. 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 payment 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. Should a change in sources of materials be made, a new job mix formula must be established before the new material is used.

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 1 and 2. The temperature of the mix immediately prior to compaction shall be 250 degrees \ 5 degrees F (121 degrees \ 3 degrees C).

TABLE 1. MARSHALL DESIGN CRITERIA

	<u>Test Property</u>
Number of Blows	75
Stability, minimum pounds	1800
Flow, 0.01 in. (0.25mm)	8-16
Percent air voids	3 - 4½
Percent voids in mineral aggregate	See Table 2

TABLE 2. MINIMUM PERCENT VOIDS IN MINERAL AGGREGATE

<u>Maximum Particle Size:</u> <u>in.</u>	<u>Minimum Voids in</u> <u>mm</u>	<u>Mineral Aggregate</u> <u>Percent</u>
3/4	19.0	15
1	25.0	14
1 1/4	31.25	13

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory screens, will conform to the gradation of TXDOT Item 340 Type C. The percentage by weight for the bituminous material shall be within the limits specified.

The gradations in Table 3 represent the limits which shall determine the suitability of aggregate for use from the sources of supply. The aggregate, as finally selected, shall have a gradation within the limits designated in the master grading of TXDOT Item 340 Type C 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 3. JOB MIX FORMULA TOLERANCES
(Based on a Single Test)

Material	Tolerance
	Plus or Minus
Aggregate Passing No. 4 Sieve or larger	7 percent
Aggregate Passing Nos. 8 and 16 sieves	6 percent
Aggregate Passing Nos. 30 and 50 sieve	5 percent
Aggregate Passing Nos. 100 and 200 sieves	3 percent
Bitumen	0.45 percent
Temperature of Mix	20 deg.F (11 deg.

C)

The aggregate gradation may be adjusted as directed, without adjustments in the contract unit prices.

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.

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 degrees F \ 5 degrees F (121 degrees C \ 2 degrees 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 percent of the job mix formula value.

The Engineer or his representative may halt production if the Marshall test criteria are not met and not allow it to resume until the problem is corrected.

If the index of retained strength of the specimens of composite mixture, as determined by ASTM D1075, is less than 75, the aggregates shall be rejected or the asphalt shall be treated with an anti-stripping agent. The amount of anti-stripping agent added to the asphalt shall be sufficient to produce an index of retained strength of not less than 75.

- C. 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'] and [**12'] 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 is to be constructed shall be the same as the remainder of the course represented by the test section. The equipment used in construction of the test

section shall be the same type and weight to be used on the remainder of the course represented by the test section.

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. Full production shall not begin without the Engineer's approval. Test sections will be paid for in accordance with paragraph 6.1.

- D. 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 contractor QC laboratory meets these requirements shall be submitted to the Engineer.

PART 3 - EXECUTION:

E. CONSTRUCTION METHODS

- 1. 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 5.

TABLE 4. 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

- 2. BITUMINOUS MIXING PLANT. Plants used for the preparation of bituminous mixtures shall conform to the requirements of ASTM D995 with the following changes:

A. Requirements for All Plants.

- 1) 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.
- 2) 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.

- 3) Inspection of Plant. The Engineer, or his authorized representative, shall have access, at all times, to all parts of the plant for checking adequacy of equipment; inspecting operation of the plant; verifying weights, proportions, and character of materials; and checking the temperatures maintained in the preparation of the mixtures.

- 4) Storage Bins and Surge Bins. Paragraph 3.9 of ASTM D995 is deleted. Instead, the following applies. Use of surge bins or storage bins for temporary storage of hot bituminous mixtures will be permitted as follows:
 - a. The bituminous mixture may be stored in surge bins for period of time not to exceed 3 hours, provided all specifications, temperature and segregation requirements are fully met.
 - b. 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.

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.

- 3. HAULING EQUIPMENT. 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.

- 4. BITUMINOUS PAVERS. 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 shown on the plans.

The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed. The screed or strike off assembly shall effectively produce a finished surface of the required evenness and texture without rearing, shoving, or gouging the mixture.

The paver shall be capable of operating at forward speeds consistent with satisfactory laying of the mixture.

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.

The controls shall be capable of working in conjunction with any of the following attachments:

- a.) Ski type device of not less than 30 feet (9.14 m) in length or as directed by the Engineer.
- b.) Taut stringline (wire) set to grade.
- c.) Short ski or shoe.

5. ROLLERS. Rollers of the steel wheel, or pneumatic tired type may be used. Vibratory rollers may be used subject to 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 which causes excessive crushing of the aggregate will not be permitted.

6. PREPARATION OF BITUMINOUS MATERIAL. 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 degrees F (160 degrees C).

7. PREPARATION OF MINERAL AGGREGATE. 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.

8. PREPARATION OF BITUMINOUS MIXTURE. 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. 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 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 percent of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of the mix shall not exceed 1.0 percent.

9. TRANSPORTING, SPREADING, AND FINISHING. 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.

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. The mix shall be placed at a temperature of not less than 250 degrees F (107 degrees C) when asphalt cement is used, and not less than 150 degrees F (65 degrees C) when tar is used.

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 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 sectioned or on the high side of areas with a one way slope. On streets with inverted crown, no joint will be placed at invert of street.

The mixture shall be placed in consecutive adjacent strips having a minimum width of [**12'] except where edge lanes require less width to complete the area. In a two layer operation the longitudinal joint in one layer shall offset that in the layer immediately below by at least 1 foot (30cm); however, the joint in the top layer shall be at the centerline of the pavement. Except on streets with inverted crowns, where the invert is at the center line of the street. Transverse joints in one layer shall be offset by at least 2 feet (60cm) from transverse joints in the previous layer. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet (3m).

On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture may be spread, raked, and fluted by hand tools.

- 10. COMPACTION OF MIXTURE. 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. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor with approval from the Engineer. 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. Each lift of approved asphaltic-concrete paving material shall be compacted to at least 98% of the laboratory determined Marshal Value.

Sufficient rollers shall be furnished to handle to the output of the plant. Rolling shall continue until all roller marks are eliminated, the surface is of uniform texture and true to grade and cross section, and the required field density is obtained.

To prevent adhesion of the mixture to the roller, the wheels shall be kept properly moistened, but excessive water will not be permitted.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with hot hand tampers.

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.

- 11. JOINTS. 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.

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.

Longitudinal joints which are irregular, damaged, or otherwise defective shall be cut back to expose a clean, sound surface for the full depth of the course. All contact surfaces shall be given a tack coat of bituminous material prior to placing any fresh mixture against the joint.

- 12. 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.

- a) Lot sizes. The pavement will be accepted for density on a lot basis. A lot will consist of:

- 1) One day's production where it is not expected to exceed 500 tons. A minimum of three (3) density tests will be required.
- 2) A half day's production where a days production is expected to consist of between 500 and 1,000 tons. A minimum of three (3) density tests will be required per day.
- 3) Similar subdivisions for quantities greater than 1,000 tons.

- b) Laboratory Density. Bituminous mixture for laboratory compacted specimens shall be sampled as per paragraph 4.12.

The specimens shall be compacted in accordance with ASTM D1559, Section 3.5, except that the temperature immediately prior to compaction shall be 250 degrees F \ 5 degrees (120 degrees C \ 3 degrees). The sample of bituminous mixture can be placed in an oven for not more than 30 minutes to maintain the heat, but it shall not be reheated if it cools below 250 degrees F (120 degrees C) before use. The density of each specimen shall be determined in accordance with ASTM D2726 or D1188, whichever is applicable.

- c) Core Density. Cores for determining the density of the compacted pavement shall be taken as indicated in paragraph 4.12. The cores shall be taken in accordance with the requirements of paragraph 4.14. The density of each core shall be determined in accordance with ASTM D2726 or D1188, whichever is applicable.

- d) Pavement Density. The target density (percent compaction) of each lot of in-place pavement shall be 98 percent 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. Pavement density may also be determined based on the average results of sealed source gauge density tests performed in accordance with the requirements of ASTM D-2950, if approved by the Engineer and City of El Paso Inspector.

- e) Acceptance Criteria. Acceptance of each lot of bituminous [surface] [base] course shall be based on the percentage of material within specification limits (PWL). The PWL is determined using standard statistical techniques and involves the number of tests in each lot (n) and the Quality Index (Q). The Quality Index is calculated from the following formula:

$$Q = \frac{X - L}{R}$$

- where: Q = Quality Index
- X = average of pavement densities (percent compaction)
- L = lower specification limit (96.7 percent)
- R = range - difference between the highest and lowest pavement densities (percent compaction)

The PWL shall be determined from Table 6, using the number of tests (n) and the Quality Index (Q). Each lot of bituminous mix shall be accepted for density when the PWL equals or exceeds 90 percent PWL requirement will be accepted at an adjusted contract unit price in accordance with Table 6.

TABLE 5

TABLE FOR ESTIMATING PERCENT OF LOT WITHIN TOLERANCE LIMITS

Percent Within Limits	n=3	n=4	n=5	n=6
99	.5895	.6574	.6642	.6611
98	.5879	.6440	.6387	.6264
97	.5863	.6307	.6166	.5983
96	.5847	.6173	.5966	.5744
95	.5830	.6039	.5777	.5530
94	.5814	.5905	.5600	.5330
93	.5797	.5771	.5431	.5143
92	.5762	.5638	.5267	.4968
91	.5219	.5504	.5108	.4800
90	.5677	.5370	.4955	.4640
89	.5621	.5236	.4808	.4485
88	.5564	.5101	.4657	.4337
87	.5499	.4967	.4514	.4191
86	.5432	.4833	.4373	.4050
85	.5355	.4699	.4234	.3913
84	.5275	.4565	.4097	.3778
83	.5189	.4431	.3962	.3647
82	.5098	.4297	.3829	.3517
81	.5001	.4162	.3697	.3391
80	.4889	.4028	.3567	.3266
79	.4791	.3894	.3438	.3144
78	.4679	.3760	.3311	.3023
77	.4560	.3526	.3184	.2902
76	.4439	.3492	.3059	.2785
75	.4311	.3358	.2935	.2669
74	.4179	.3223	.2811	.2554
73	.4041	.3088	.2689	.2440
72	.3901	.2954	.2567	.2327
71	.3754	.2820	.2446	.2215
70	.3604	.2685	.2325	.2104
69	.3450	.2551	.2206	.1995
68	.3293	.2417	.2086	.1884
67	.3131	.2283	.1968	.1777
66	.2965	.2149	.1835	.1668
65	.2798	.2015	.1732	.1562
64	.2625	.1881	.1614	.1455
63	.2451	.1747	.1497	.139
62	.2274	.1611	.1382	.1243
61	.2093	.1477	.1265	.1139
60	.1911	.1343	.1149	.1034
55	.0970	.0672	.0573	.0515
50	.0000	.0000	.0000	.0000

All negative values of Q will result in a PWL below 65 percent.

TABLE 6. PRICE ADJUSTMENT SCHEDULE

Percentage of Material Above the Specification Limit (PWL):	Percent of Contract Unit Price to be Paid
90-100 :	100
80-90 :	0.5 PWL + 55.0
65-80 :	2.0 PWL - 65.0
Below 65 :	To be Removed and Replaced

13. **SURFACE 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 [****1/4"**] 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 Engineer; 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 Engineer. This shall be done at the Contractor's expense.

The finished surfaces of bituminous courses shall not vary from the gradeline, elevations, and cross sections shown on the contract drawings by more than 1/2 inch (12.70 mm). The Contractor shall correct pavement areas varying in excess of this amount by paving and replacing defective work. Skin patching will not be permitted.

14. **SAMPLING PAVEMENT.** Core samples for determination of the density of completed pavements shall be obtained by the Contractor at no extra cost. The size, number, and locations of the samples will be as directed by the Engineer. Samples shall be neatly cut with a saw, core drill, or other approved equipment. The Contractor shall furnish all tools, labor, and materials for cutting samples and replacing pavement.
15. **THICKNESS.** The thickness of the pavement course shall be determined by cores taken at every 500 square yards or at every 125 lin. ft. of street with a minimum of two (2) tests taken for each street.

All tests necessary to determine conformance with requirements specified in this item will be performed by the Engineer without cost to the Contractor.

END OF SECTION

DIVISION 33

UTILITIES

PART 1: GENERAL

- 1. **SCOPE:** Manholes shall be of the pre-cast concrete type or cast-in-place concrete manhole and shall be in conformity with ASTM designation C-478.
 - 1.1. Manholes for the various sized lines shall be Standard Type “A” (48” inside diameter), Type “B” (72” inside diameter), 120 inch inside diameter or Drop Manhole constructed at the locations designated, and in accordance with Utility Standard Details, and as otherwise indicated in the Project Drawings.

PART II: PRODUCTS

2. MATERIALS:

- 2.1 **FRAME AND COVER:** The frame and cover shall be either the El Paso Water Utilities Standard or an equivalent 34” heavy duty type. No holes shall be in the cover but edge notches for embedded rings shall be used for lifting. “Storm” or a suitable designation is to be on the cover. Weight shall be 335 pounds minimum. Mating surfaces shall be machined to assure a snug fit of the cover in the frame.
- 2.2 **CEMENT:** Cement shall be Portland Cement conforming to ASTM Specifications C-150, Type II.
- 2.3 **MANHOLE RINGS:** The manhole riser and conical section shall be designed for installations in the diameters specified or shown on the plans. All manhole sections shall have a 6-inch wall thickness with tongue and groove, unless otherwise specified. All manhole sections shall have a 6-inch wall thickness with tongue and groove, unless otherwise specified. Rings shall be available in various lengths from one foot to four feet. The conical sections shall be concentric and adapted to the ring at one end to standard cast iron frame at the other. The base ring shall have a flat bottom joint. Steps or rungs are not required. Manufacturing of manhole sections(s) shall comply with ASTM-C-478 and any additional specifications listed hereforth.
- 2.4 **CONCRETE AGGREGATES:** Concrete aggregates shall conform to ASTM Specifications C-33 except that the requirement for gradation shall not apply to concrete manhole conical and riser sections.
- 2.5 **STEEL REINFORCEMENT:** Billet-steel bars shall conform to ASTM Specifications A-15 and welded steel wire fabric shall conform to ASTM Specifications A-32 or to ASTM Specifications A-185.
- 2.6 **WATER:** Water shall be clean, clear free from oil, acid or organic matter and injurious amounts of alkali, salts or other chemicals or deleterious materials.
- 2.7 **WALLS:** Walls shall be pre-cast and a minimum of 5’ 6” or 8 inch dependant on size

- 2.8 **SUBGRADE:** Subgrade for manhole base placement shall be compacted to 95% maximum density as per ASTM D1557.

PART III: EXECUTION

3. PRE-CAST CONCRETE:

- 3.1 **GENERAL:** All manhole sections shall have a 5, 6 or 8-inch wall thickness (dependant on size) with tongue and groove joints. The base piece shall have a flat bottom joint. Manufacturing of manhole sections (s) shall comply with ASTM C-478-87 specifications, and any additional specifications listed below:

- 3.2 **CONCRETE:** Concrete to have a minimum 28 days compressive strength of 4000 PSI. Water cement ratio shall be 0.5 or less by weight or not more than 5.5 gallons per sack.
 - A. **AGGREGATES:** All aggregates fine and coarse other than lightweight aggregate shall conform to specifications outlined by ASTM C-33-64T. Aggregates shall be free of deleterious substances causing reactivity with oxidized hydrogen sulfide. Both types of aggregates shall be graded in order to produce a homogenous concrete mix. All materials are to be accurately weighed at a central batching facility for mixing.

 - B. **CEMENT:** All cement shall be Portland cement conforming to ASTM C150, Type V (sulfate resistant) for sewer applications. Cement content shall be sufficient to produce a minimum strength of 4,000 PSI, or other design strengths required.

 - C. **PLACING:** All concrete shall be handled from the mixer or transport vehicle to the place of final deposit in the continuous manner, as rapidly as practicable, and without segregation or loss of ingredients, until (the approved unit operation) is completed. Concrete shall be placed in layers not over two feet deep. Each layer shall be compacted by mechanical internal or external vibrating equipment. Duration of the vibration cycle shall be limited to the time necessary to produce satisfactory consolidation without causing objectionable segregation.

 - D. **CURING:** For purposes of early re-use of forms, the concrete may be heated in the mold after the initial set has taken place. The temperature shall not exceed 160 degrees and shall be raised from normal ambient temperature at a rate not to exceed 40 degrees per hour. The cured unit shall not be removed from forms until sufficient strength is obtained for the unit to withstand any structural strain that may be subjected during the form stripping operation. After the stripping of forms, further curing by means of water spraying or a membrane curing compound may be used and shall be of a clear or white type, conforming to ASTM C309-58.

- 3.3 **STEEL REINFORCMENT:** Reinforcing steel shall be as outlined in ASTM C-478 and any additional specifications herein. The minimum steel area of 0.12 square inches shall apply to both riser and cone sections and the maximum center to center spacing of 6 inches shall apply as well.

Placing of reinforcing steel for one-line circumferential reinforcement shall be on the tension side of the wall (the inner half part of the wall with a minimum 1-inch cover) for two lines circular reinforcement, refer to ASTM C-478. All reinforcing shall be sufficiently tied to withstand any displacement during the pouring operation.

- A. JOINT REINFORCEMENT: Both tongue and groove shall contain a #4 rebar.
 - B. LIFTERS: Lifters shall be designed to handle that imposed weighs, and shall be placed per manufacturer’s requirements.
- 3.4 JOINT MATERIAL: All joints to be sealed using Ram-Nek sealer. Joint sealer to be provided in sufficient quantities by the vendor as part of the manhole sections(s). Size shall be per manufacturer’s recommendations.
4. SUBMITTALS: Complete manufacturer’s shop drawings on the manhole section(s), to include the joints, shall be submitted for approval. If the shop drawings do not meet specifications and secure the El Paso Water Utility Engineer’s approval, the vendor shall revise their shop drawings do not meet specifications and receive the Engineer’s approval. Manufacturer’s specification data and recommendations shall be submitted on the lifters and joint material.

Compliance with ASTM C-478-87 and these specifications shall also be submitted. Failure to provide the detailed shop drawings, specifications data and recommendation on lifters and joint material, or the letter certifying that all material provided shall meet bid specifications shall be grounds for rejection of the material.

- 5. CAST-IN PLACE CONCRETE MANHOLES: Cast-in place concrete manholes may be used provided the wall thickness is not less than 5’, 6” or 8” dependant on size the concrete is of good quality and well vibrated, and the method of construction materials and type of forms to be used are approved by the Engineer.
- 6. MANHOLE CONNECTORS: At manholes, a water-tight resilient connection shall be made between the wall and the pipe. This shall be accomplished by use of an engineering approved manhole waterstop adaptor such as Indiana Seal Manhole Adaptor, Kor-N-Seal, or approved equal, meeting the requirements of ASTM C-923. The connector must be compatible to both the type of pipe wall and manhole wall, and shall be installed in strict accordance with the recommendation of the connector manufacturer.
- 7. INSTALLATION: The manholes shall be constructed at the location shown on the plans or as directed by the Engineer an in accordance with the details shown on the plans and as specified herein. After the excavation has been completed, the concrete base or bottom shall be poured. When the concrete has sufficiently set, the riser work may proceed. After the manhole rise has been completed, the invert shall be nearly formed in the bottom of the manhole with concrete. The invert shall have a true curve of as large a radius as the size of the manhole will permit and shall be given a smooth trowel finish.

The subgrade under pre-cast manhole bases shall be compacted to 95% density in accordance with ASTM D-1557. Compaction limits shall be one foot beyond the perimeter of the concrete base and shall be a minimum of one foot in depth.

Drop connection shall be constructed as shown on the drawings.

All manholes that are in ground water shall be externally coated with a bituminous coating such as Coal Tar Epoxy. Interior coating of manholes shall be required only when specified in the construction plans. The coating shall be an epoxy resin-type material such as Plascite 7122 or approved equal.

- 8. **CLEAN-UP:** After completing each section of water line, the Contractor shall remove all debris construction materials, and equipment from the site of the work; grade and smooth over the surface on both sides of the line and leave the entire right-of-way in a clean, neat and serviceable condition.

END OF SECTION

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals shown, specified, and required to furnish and install reinforced concrete pressure pipe and fittings.
 - 2. Extent of concrete pipe to be provided is shown and specified in piping schedules included in Section 31 23 16 Excavating for structures
- B. Coordination:
 - 1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before concrete pipe Work.
- C. Related Sections:
 - 1. Section 03 30 00 Concrete for Structures
 - 2. Section 03 37 00 Placing, Finishing and Curing Concrete

1.2 REFERENCES

- A. Standards referenced in this Section are:
 - 1. AASHTO, Policy on Geometric Design of Highways and Streets.
 - 2. ANSI/ASTM A36/A36M, Specification for Carbon Structural Steel.
 - 3. ANSI/ASTM A82, Specification for Steel Wire, Plain for Concrete Reinforcement.
 - 4. ANSI/ASTM A185, Specification for Steel Welded Wire Reinforcement, Plain for Concrete.
 - 5. ANSI/ASTM A496, Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 - 6. ANSI/ASTM A497/A497M, Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
 - 7. ANSI/ASTM C14, Specification for Concrete Sewer, Storm Drain and Culvert Pipe.
 - 8. ANSI/ASTM C33, Specification for Concrete Aggregates.
 - 9. ANSI/ASTM C76, Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
 - 10. ANSI/ASTM C118, Specification for Concrete Pipe for Irrigation or Drainage.
 - 11. ANSI/ASTM C150, Specification for Portland Cement.
 - 12. ANSI/ASTM C1433, Specification For Precast Reinforced Concrete Box Sections for Culverts, Storm Drains and Sewers.

1.3 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer:
 - a. Manufacturer shall have a minimum of five years of experience producing concrete pipe and fittings, and shall be able to document satisfactory service in at least five installations.
- B. Component Supply and Compatibility:

REINFORCED CONCRETE PIPE..... SECTION 33 05 20

1. Each type of concrete pipe and associated fittings shall be products of one manufacturer.
 2. Concrete pipe Supplier shall review, and approve, and prepare all Shop Drawings and submittals for all components furnished under this Section.
 3. Components shall be suitable for specified service conditions.
- C. Quality of materials, process of manufacturer, and finished pipe shall be subject to inspection by ENGINEER.

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
1. Shop Drawings:
 - a. Detailed drawings and data on piping and fittings, where applicable, and appurtenances.
 2. Product Data:
 - a. Detailed product data on pipe, fittings, gaskets, fastening hardware where applicable, and appurtenances.
- B. Informational Submittals: Submit the following:
1. Certifications: Submit certificate signed by manufacturer of each product certifying that products conform to applicable referenced standards.
 2. Supplier Instructions: Pipe manufacturer instructions for handling, storing, and installing products.

PART 2 – PRODUCTS

2.1 SYSTEM PERFORMANCE

- A. General:
1. Pipe shall be designed for an external live loading, including impact, equal to AASHTO H-20 loading with earth cover as shown.
- B. Service Conditions:
1. Liquid Service: Storm Water
 2. Pipe Inside Diameter: varies
 3. Type of Joint: O-ring
 4. Pipe Overburden and Trench Bedding Condition: As shown on Drawings.

2.2 MATERIALS, REINFORCED CONCRETE PIPE FOR CULVERTS, STORM DRAINS, AND SEWERS

- A. Pipe and fittings shall conform to requirements of ANSI/ASTM C76. Pipe shall be free of fractures and surface roughness. Ends of pipe shall be normal to the walls and center of pipe. Joints shall be designed so that, when sections are laid together, they make a continuous line of pipe with smooth interior free of irregularities in flow line.
- B. Pipe Materials:
1. Cement for concrete work shall be in accordance with, ANSI/ASTM C150 or ANSI/ASTM C595.

REINFORCED CONCRETE PIPE..... SECTION 33 05 20

- 2. Aggregates shall conform to ANSI/ASTM C33.
- 3. Steel wire bar reinforcement shall be in accordance with ANSI/ASTM A82 or ANSI/ASTM A496.
- 4. Steel wire fabric reinforcement shall be in accordance with ANSI/ASTM A185.
- C. Pipe shall be Class III, IV or V as specified on plans. Quality of materials, process of manufacture and finished pipe shall be subject to inspection and approval by ENGINEER.

2.3 WALL FITTINGS

- A. Connect to structures by casting a fabricated bell wall fitting into concrete. Fabricated bell wall fitting shall consist of a bell ring suitable for connecting to steel spigot, steel pipe section, and waterstop ring, all welded together to form a complete unit, with a laying length equal to width of wall in which it is installed.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. For buried piping installation, refer to Section 31 23 16 Excavating for structures.

END OF SECTION

PART 1

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Division 01 Specification Sections, apply to this Section.

PART 2 - GENERAL

2.1 SUMMARY

- A. This Section includes storm sewer piping and related components outside the building for storm building services and storm mains, including:
 - 1. Pipe and fittings.
 - 2. Channel drainage systems.
 - 3. Manholes.
 - 4. Stormwater Management structures.
- B. All materials, installation, and quality assurance for storm lines and appurtenances installed in the city/state right-of-way/public space shall be in accordance with the standards, specifications, and applicable permits of the City of El Paso Municipal Code and the Texas Department of Transportation rules and regulations.

2.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings:
 - 1. Manholes: Include plans, elevations, sections, details, frames, and covers.
 - 2. Catch basins and stormwater inlets: Include plans, elevations, sections, details, frames, covers, and grates.
 - 3. Stormwater Management Sand filter Structure: Include plans, elevations, sections, details, frames, covers, and grates.
- B. Field quality-control reports.

2.3 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes according to manufacturer's written rigging instructions.
- D. Handle catch basins and stormwater inlets according to manufacturer's written rigging

instructions.

2.4 PROJECT CONDITIONS

- A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
 - 1. Notify Owner, owners of affected occupied facilities, and the City/State no fewer than seven days in advance of proposed interruption of service.
 - 2. Do not proceed with interruption of storm water-distribution service without written permission of those parties mentioned above.

PART 3 - PRODUCTS

3.1 PVC PIPE AND FITTINGS – If used

- A. Schedule 40 PVC Drain Pipe:
 - 1. Schedule 40 Polyvinyl chloride (PVC) pipe shall meet requirements of ASTM D 2665.
Unless otherwise approved, 20-foot lengths of pipe shall be used wherever practicable and lengths of wye-branches shall not exceed three feet. Saddle wye-branches shall not be used. Pipe and fittings will be inspected upon delivery. Rejected pipe and fittings shall be removed by the Contractor.
 - 2. Pipe fittings and joints shall meet requirements of ASTM D 3311. Joints shall be solvent welded with solvent cement meeting requirements of ASTM D 2564.

3.2 CONCRETE PIPE AND FITTINGS

- A. General: To be used only for public storm main in the City/State right-of-way/public space or in City/State easements.
- B. Reinforced concrete pipe and fittings shall be per ASTM C76, Class III, Wall B, Class 4000 concrete, for the diameter specified in the Contract. Unless otherwise specified on plans.
- C. Concrete pipe shall be furnished with bell and spigot, rubber gasket joints per ASTM C443. Joints shall pass 13 psi hydrostatic test. The bevel or drop on bevel pipe shall not exceed the pipe wall thickness.

3.3 NONPRESSURE TRANSITION COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground non-pressure piping. Include ends of same sizes as piping to be

joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:

1. For Concrete Pipes: ASTM C 443, rubber.
2. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
3. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
4. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Unshielded, Flexible Couplings:

1. Description: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant metal tension band and tightening mechanism on each end.

D. Shielded, Flexible Couplings:

1. Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

E. Ring-Type, Flexible Couplings:

1. Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

3.4 CLEANOUTS

A. Manhole Frames and Covers:

1. Description: Ferrous; 33-inch ID by 7- to 9-inch riser, with 4-inch minimum-width flange and 31-inch diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "EPWU - STORM SEWER."
2. Material: ASTM A 48/A 48M, Class 35 gray iron unless otherwise indicated.

3.5 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R, and the following:

1. Cement: ASTM C 150, Type I.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

- C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.
 - 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - a. Invert Slope: 2 percent through manhole, 1.25% where indicated on the plans.
 - 2. Benches: Concrete, sloped to drain into channel.
 - a. Slope: 2" - 4"/foot.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.
 - 1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
 - 2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

POLYMER-CONCRETE, CHANNEL DRAINAGE SYSTEMS

PART 4-EXECUTION

4.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Division 31 Section "Excavation 31 23 16."

4.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions. Subgrade compaction to be a minimum of 95% as per ASTM D1557.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.
- F. Install gravity-flow, non-pressure drainage piping according to the following:
 - 1. Install piping pitched down in direction of flow.
 - 2. Install piping with 24-inch minimum cover.
 - 3. Install hub-and-spigot, cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
 - 4. Install ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.
 - 5. Install PE corrugated sewer piping according to ASTM D 2321.
 - 6. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
 - 7. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."
- G. Install corrosion-protection piping encasement over the following underground metal piping according to ASTM A 674 or AWWA C105:
 - 1. Hub-and-spigot, cast-iron soil pipe and fittings.
 - 2. Ductile-iron pipe and fittings.

4.3 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, non-pressure drainage piping according to the following:
 - 1. Join hub-and-spigot, cast-iron soil piping with gasketed joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
 - 2. Join ductile-iron culvert piping according to AWWA C600 for push-on joints.
 - 3. Join ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.
 - 4. Join corrugated PE piping according to ASTM D 3212 for push-on joints.
 - 5. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
 - 6. Join dissimilar pipe materials with non-pressure-type flexible couplings.

4.4 MANHOLE INSTALLATION

- A. General: Install manholes complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Form continuous concrete channels and benches between inlets and outlet.
- D. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Retain paragraph below only if specified in "Manholes" Article.
- E. Install manhole-cover inserts in frame and immediately below cover.

4.6 CATCH BASIN INSTALLATION

- A. Set frames and grates to elevations indicated.

4.7 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318.

4.8 CHANNEL DRAINAGE SYSTEM INSTALLATION

- A. Install with top surfaces of components, except piping, flush with finished surface.
- B. Assemble channel sections to form slope down toward drain outlets. Use sealants, adhesives, fasteners, and other materials recommended by system manufacturer.
- C. Embed channel sections and drainage specialties in 4-inch minimum concrete around bottom and sides.
- D. Fasten grates to channel sections if indicated.
- E. Assemble channel sections with flanged or interlocking joints.
- F. Embed channel sections in 4-inch minimum concrete around bottom and sides.

4.9 CONNECTIONS

- A. Make connections to existing piping and underground manholes.
 - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
 - 2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
 - 3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

- a. Use concrete that will attain a minimum 28-day compressive strength of 4000 psi unless otherwise indicated.
- b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
- 4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.
- B. Pipe couplings and expansion joints with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- 1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.
 - a. Flexible couplings for same or minor difference OD pipes.
 - b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
 - c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

4.10 IDENTIFICATION

- A. Materials and their installation are specified in Division 31 Section "Excavation." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
 - 1. Use detectable warning tape over piping and over edges of underground structures.

4.11 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate reports for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.

- 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
- 4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 - 1. Do not enclose, cover, or put into service before inspection and approval.
 - 2. Test completed piping systems according to requirements of authorities having jurisdiction.
 - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 - 4. Submit separate report for each test.
 - 5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
 - a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
 - b. Option: Test plastic piping according to ASTM F 1417.
 - c. Option: Test concrete piping according to ASTM C 924.
 - d. Option: Test concrete pipe for infiltration/exfiltration as per ASTM C969
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

4.12 CLEANING

- A. Clean interior of piping of dirt and superfluous materials. Flush with potable water.

END OF SECTION

PART I: GENERAL

1. DESCRIPTION

This item shall govern for the furnishing and installation of frames, gates, rings and covers for inlets, manholes and other structures in accordance with the plans and specifications.

PART II: PRODUCTS

2. MATERIALS

Welded steel grates and frames shall conform to the member size, dimensions and details shown on the plans and shall be welded into an assembly in accordance with those details. Steel shall conform to the requirements of ASTM Designation: A 36 or equal.

Castings, whether Carbon-Steel, Gray Cast Iron or Ductile Iron shall conform to the shape and dimensions shown on the plans and shall be clean substantial castings, free from sand or blow holes or other defects. Surfaces of the castings shall be free from burnt-on sand and shall be reasonably smooth. Runners, risers, fins, and other cast-on pieces shall be removed from the castings and such areas ground smooth. Bearing surfaces between manhole rings and covers or grates and frames shall be cast or machined with such precision that uniform bearing shall be provided throughout the perimeter area of contact. Pairs of machined castings shall be matchmarked to facilitate subsequent identification at installation.

Steel castings shall conform to the requirements of the specifications for "Mild to Medium Strength Carbon Steel Castings for General Application", ASTM Designation: A 27. Grade 70-36 shall be furnished unless otherwise specified.

Cast iron castings shall conform to the requirements of "Gray Iron Castings", ASTM Designation: A 48, Class 30.

Ductile iron castings shall conform to the requirements of "Ductile Iron Castings" ASTM Designation: A 536. Grade 60-40-18 shall be used unless otherwise specified.

Commercial type frames, rings risers and/or appurtenances may be used with prior approval of the Engineer.

PART III: EXECUTION

3. CONSTRUCTION METHODS

Frames, grates, rings and covers shall be constructed of the materials as specified and in accordance with the details shown on the plans and shall be placed carefully to the lines and grades indicated on the plans or as directed by the Engineer.

Frames, grates, rings and covers shall be given one coat of a commercial grade primer and two coats of commercial grade aluminum paint. Painting of gray iron castings will not be required, except when used in conjunction with structural steel shapes.

Commercial grade galvanized bolts and nuts shall be used. The zinc coating shall be uniform in thickness, smooth and continuous.

END OF SECTION

PART I: GENERAL

1.0 Description. Construct inlets and junctions boxes, complete in place or to the stage detailed, including furnishing and installing frames, grates, rings and covers.

PART II: PRODUCTS

2.0. Materials. Furnish materials in accordance with the following:

- Item 03 30 00, “Concrete Structures”
- Item 03 21 00, “Reinforcing Steel”
- Item 33 49 13, “Frames, Grates, Rings, and Covers.”

Precast Inlets, junction boxes, risers, and appurtenances are acceptable unless otherwise shown. Alternate designs for precast items must be acceptable to the Engineer and not deviate from the functional dimensions given. Alternate designs are to be designed and sealed by a licensed professional engineer.

A. Concrete. Furnish Class A concrete for cast-in-place inlets and boxes and unless otherwise shown on the plans. Furnish Class A concrete or concrete meeting ASTM C 478 for precast manholes and inlets. Air entrained concrete will not be required in precast concrete members.

B. Mortar. Furnish mortar composed of 1 part hydraulic cement and 2 parts clean sand. Hydrated lime or lime putty may be added to the mix to a maximum of 10% by weight of the total dry mix.

C. Concrete Blocks. Provide concrete blocks that meet ASTM C 139.

D. Cast Iron or Aluminum. Provide supports conforming to the shape and dimensions shown on the plans that meet the requirements of ASTM A 48, Class 35B, for gray iron castings or ASTM A 536, Grade 65-45-12, for ductile iron castings

E. Timber. Provide sound timber for temporary covers when used with Stage I construction (see Section 465.3, “Construction”) that is a minimum of 3 in. nominal thickness and reasonably free of knots and warps.

F. Other Materials. Commercial-type hardware of other materials may be used with prior approval.

PART III: EXECUTION**3.1 Construction.**

A. General. All types of junction boxes and inlets may be built either in 1 stage or in 2 stages, described as Stage I and Stage II. Build boxes and inlets designed to match the final roadway

surface in stages. Construct Stage II after the pavement structure is substantially complete unless otherwise approved by the Engineer.

Construct the Stage I portion of boxes and inlets as shown on the plans or as specified in this Item. Furnish and install a temporary cover as approved by the Engineer.

For Stage I construction of cast iron or steel inlet units, furnish and install the pipe and a temporary plug for the exposed end of the pipe from the storm sewer to a point below the top of curb indicated on the plans.

For Stage II, construct the remaining wall height and top of box or inlet and furnish and install any frames, grates, rings and covers, curb beams, or collecting basins required.

Construct precast junction boxes and inlets in accordance with Item 03 30 00 "Concrete Structures," or ASTM C 478. Construct cast-in-place boxes and inlets in accordance with Item 03 30 00. Forms will be required for all concrete walls.

B. Junction Boxes and Inlets for Precast Concrete Pipe storm sewers. Construct boxes and inlets for precast concrete pipe storm sewers as soon as is practicable after sewer lines into or through the manhole or inlet locations are completed. Neatly cut all sewers at the inside face of the walls of the manhole or inlet and point up with mortar.

C. Boxes and Inlets for Monolithic Pipe Sewers. Construct bases for boxes and inlets on monolithic pipe sewers either monolithically with the sewer or after the sewer is constructed.

D. Junction Box for storm sewers. Cast bases for box sewers as an integral part of the sewer. Construct boxes before backfilling, or cover the box opening temporarily and backfill the sewer as a whole.

E. Inverts. Shape and route floor inverts passing out or through the manhole or inlet as shown on the plans. Shape by adding and shaping mortar or concrete after the base is cast or by placing the required additional material with the base.

F. Finishing Complete Boxes and Inlets. Complete boxes and inlets in accordance with the plans. Backfill to original ground elevation in accordance with Item 31 23 16, "Earthwork for Structures."

G. Finishing Stage I Construction. Complete Stage I construction by constructing the walls to the elevations shown on the plans and backfilling to required elevations in accordance with Item 31 23 16 "Earthwork for Structures."

H. Stage II Construction. Construct subgrade and base course or concrete pavement construction over Stage I box or inlet construction, unless otherwise approved by the Engineer. Excavate to expose the top of Stage I construction and complete the manhole or inlet in

accordance with the plans and these Specifications, including backfill and cleaning of all debris from the bottom of the junction box or inlet.

END OF SECTION