



Bid #B001-24
DOWNTOWN WASTEWATER PROJECT 1

CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS

September 2023

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DOWNTOWN WASTEWATER PROJECT 1

CONTRACT DOCUMENTS

September 2023

Divisions 01, 02, 03, 04, 31, 32, 33, and 34

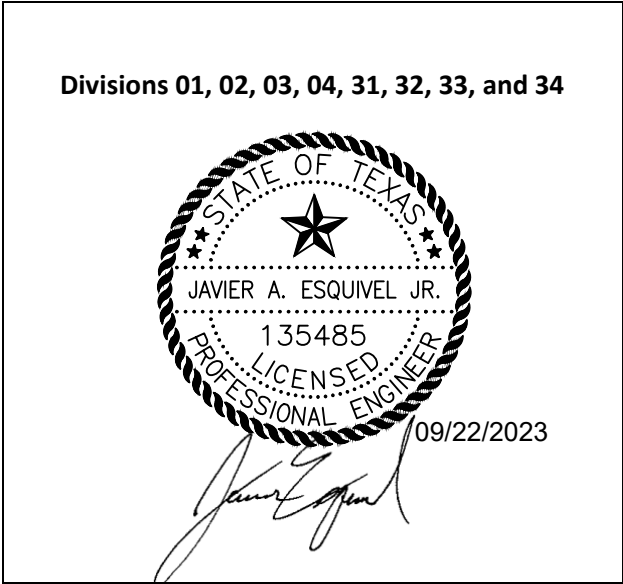


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**LEGAL NOTICE
AND
INVITATION TO BID
BID #B001-24**

Notice Date:

Sealed bids will be received by the PUBLIC UTILITIES BOARD of the City of Brownsville, Texas ("BPUB", "OWNER"), at the PUB Purchasing Department office; 1155 FM511, Olmito, TX 78575 **until 2:00 PM, local prevailing time, on October 18, 2023** for the Project described in the Contract Documents and Specifications entitled:

DOWNTOWN WASTEWATER PROJECT 1

Bids received after this time will not be considered.

Bids will be publicly opened and read aloud on October 18, 2023 at 2:15 PM. Bidders can request a copy of the bid tabulation by emailing dsolitaire@brownsville-pub.com. Vendors can call in at 2:15 AM, October 18, 2023 to (956) 214-6020 to listen to the bid opening.

The Work in general includes, but is not limited to:

- 1) Segment A:
 - a. Rehabilitation or reconstruction of approximately 2,300 LF of 10-inch wastewater gravity mains with 12-inch wastewater gravity mains and seven (7) manholes. Segment A runs within an alleyway located between E. Elizabeth St. and E. Levee St. from E. 7th St. to International Blvd.
- 2) Segment B:
 - a. Rehabilitation or reconstruction of approximately 1,050 LF of 8-inch wastewater gravity mains with 12-inch wastewater gravity mains and four (4) manholes. Segment B runs within an alleyway located between E. Levee St. and E. St. Charles St. from E. 7th St. to E. 10th St.
- 3) Segment C:
 - a. Rehabilitation or reconstruction of approximately 1,350 LF of 8-inch wastewater gravity mains with 12-inch wastewater gravity mains and five (5) manholes. Segment C runs within an alleyway located between E. St. Francis St. and E. St. Charles St. from E. 8th St. to E. 11th St., as well as a section that runs down E. 8th St.
- 4) Segment D:
 - a. Rehabilitation or reconstruction of approximately 300 LF of 8-inch wastewater gravity mains with 12-inch wastewater gravity mains and two (2) manholes. Segment D runs along E. 11th St. near E. St. Charles St.

Copies of the Contract Documents and Specifications may be obtained at the following website https://www.brownsville-pub.com/rfp_status/open/. A non-mandatory pre-bid conference shall be held at the BPUB Purchasing Department via conference call (956-214-6020) at 10:00 AM, local prevailing time, on October 10, 2023.

Each bid, with 1 signed original, and 1 copy shall be enclosed in a sealed envelope and shall be plainly marked on the outside of the envelope: **“BID B001-24 Downtown Wastewater Project 1, October 18, 2023, 2:00 PM”**. This envelope shall be addressed to Diane Solitaire; Brownsville Public Utilities Board; Purchasing Department; 1155 FM 511, Olmito, Texas 78575. Bids may be delivered by mail, in person or special delivery. If forwarded by mail, the sealed envelope containing the bid itself must be enclosed in another mailing envelope addressed as specified in the bid form.

Each bid shall constitute an offer to the Board, as outlined therein, and shall be irrevocable for at least ninety (90) calendar days after the time announced for the opening thereof.

Each bid shall be accompanied by a Certified or Cashier's check payable to the order of the Brownsville Public Utilities Board, City of Brownsville, Texas for a sum not less than five (5%) percent of the total amount bid. In lieu of a check, a Bid Bond with a Corporate Surety licensed to do business in the State of Texas, may be submitted in an amount not less than five (5%) percent of the total amount bid conditioned that the BIDDER will pay the BPUB, as mutually agreed to liquidated damages, and not as a penalty, the amount specified in the Bond, unless he enters into a BPUB contract in accordance with his bid. BIDDER is required to execute a contract and furnish a Performance Bond, Payment Bond and a Certificate of Insurance. If the BIDDER fails to execute the contract and to furnish satisfactory Performance and Payment Bonds and Insurance Certificates within ten (10) calendar days from the date on which he is notified that his bid has been accepted, the amount of his check or bid bond shall be forfeited to the BPUB as mutually agreed to liquidated damages, and not as a penalty. **No bid will be considered if the Bid Security is not submitted.**

The BPUB will not be responsible in the event that the U.S. Postal Service or any other courier system fails to deliver the sealed bids to the Brownsville Public Utilities Board, Purchasing Office by the given deadline above. **No bids will be accepted via facsimile or electronic transmission.**

The BPUB specifically reserves the right to reject any or all bids, to waive irregularities or informalities in any or all bids and to accept any bid which is deemed to be in the best interest of the Board or to reject the bids. The award will be made to the responsive and responsible bidder submitting the lowest bid as determined by the BPUB.

Equal Opportunity in Employment - All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin. Bidders will be required to comply with the President's Executive Order No. 11246, as amended by Executive Order 11375, and as supplemented in Department of Labor regulations 41 CFR, Part 60. The requirements for bidders and contractors under this Order are explained in the Specifications.

Diane Solitaire
Purchasing Department
(956) 983-6366

INSTRUCTIONS TO BIDDERS
Please submit this page upon receipt

Acknowledgment Form
Downtown Wastewater Project 1
BID #B001-24

Please e-mail this page upon receipt of the bid package or legal notice. If you only received the legal notice and you want the bid package mailed, please provide a method of shipment with account number in the space designated below.

Check one:

Yes, I will be able to send a bid; obtained bid package from website.

Yes, I will be able to send a bid; please email the bid package.

Email: _____

Yes, I will be able to send a bid; please mail the bid package using the carrier & account number listed below:

Carrier: _____

Account: _____

No, I will not be able to send a bid for the following reason:

If you are unable to send your bid, kindly indicate your reason for “No bid” above and return this form **via email to dsolitaire@brownsville-pub.com**. This will ensure you remain active on our vendor list.

Date _____

Company: _____

Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Phone: _____ Fax: _____

Email: _____

Special Instructions

Contract Information

- **Interpretation**

All requests, questions concerning terms, conditions, and technical specifications, or other communication about this solicitation shall be made in writing and addressed to the Entity's Sole Point of Contact. Only the Sole Point of Contact may be contacted regarding required elements for this IFB. The sole point of contact for this solicitation is

Diane Solitaire, Materials/Warehouse Manager
email: dsolitaire@brownsville-pub.com

Tentative Time Line

1. September 24, 2023 through October 18, 2023 – Vendor bid preparation.
2. October 18, 2023 at 2:00 PM - **Vendor must submit bid, in duplicate, sealed in an envelope to:**

Diane Solitaire, Materials/Warehouse Manager
1155 FM 511
Olmiteo, TX 78575

Bid #B001-24 – Downtown Wastewater Project 1
Due October 18, 2023 at 2:00 PM

The above noted information must be included on bid envelope and on any carrier's envelope/package. The Brownsville Public Utilities Board will not be held responsible for missing, lost or late mail. Brownsville Public Utilities Board will not accept electronic transmissions or facsimiles of sealed bids.

3. October 10, 2023 – Pre-Bid Conference at 10:00 AM
4. Pre-Bid Site Visit: Non-Mandatory, Highly Recommended to be completed by the bidder independently
5. DATE QUESTIONS DUE- October 12, 2023 at 5:00 PM
6. October 18, 2023 - Open bids at 2:15 PM
7. 24 Days - Evaluate bids
8. October 27, 2023 - Deadline to provide final recommendations for Board approval.
9. 7 Calendar days within written notice- Send to Utilities Board for formal and possible Contract award approval

- **“Or Equal”**

Brand name and/or manufacturer’s references used in this Request are descriptive – not restrictive – they are intended to generally indicate type and quality desired. Brands of like nature and quality will generally be considered. If bidding on other than referenced Specifications, please provide complete descriptive information of said material/equipment article. BPUB also reserves the legal right to specify a “sole source” component if such component is critical for integration to a larger BPUB assembly and alternative manufactured items will not meet the design and/or performance needs of the BPUB, in BPUB’s sole discretion.

- **Pricing**

Bid unit prices on BPUB estimated quantities specified, extend and show total. In case of errors in extension, unit prices expressed in written words and not numerals, shall govern. Prices shall remain firm throughout the Contract.

All fields (UNIT PRICE & TOTAL PRICE) in the Bid Schedule must be filled in. The data must be complete to identify any bidding brand called for specifically.

Failure to submit any of the above information with the sealed bid may disqualify bid as non-responsive.

- **Contractor Representative**

The successful contractor agrees to send a personal representative with binding authority for the company to the Brownsville Public Utilities Board, upon request, to make any minor clarifications or adjustments and/or assist with coordination of all transactions as needed to allow Contract entry.

- **Quality of Products**

All material and equipment items specified must be new, in first class condition, including containers suitable for shipment and storage. No substitutions in standard grades or lesser quality will be accepted.

- **Determining Factors for Award**

1. Price
2. Responsibility of contractor to perform the intended work and responsiveness to the bid request.
3. Compliance with requirements of the Technical Specifications
4. Quality of performance on previous work on similar contracts
5. Recent successful completion of similar projects
6. BPUB financial and legal responsibility evaluations of any identified teaming arrangements involving significant joint ventures, sub-contractors and suppliers
7. Safety record will be considered when determining the responsibility of the bidder

- **Contract with Vendor/Entity Indebted to BPUB**

It is a policy of the BPUB to refuse to enter into a contract or other transaction with an individual, sole proprietorship, joint venture, Limited Liability Company or other entity indebted to BPUB.

- **Vendor ACH (Direct Deposit) Services**

The BPUB has implemented a payment service for vendors/contractors by depositing the contract payment directly to the contractor's/vendor's bank account. Successful vendor(s)/contractors will be required to receive payments directly through Automated Clearing House (ACH) in lieu of a paper check. **The awarded vendor must agree to receive payments via ACH (Direct Deposit).**

- **Tax Identification Number (TIN)**

In accordance with IRS Publication 515, a W9 form, or a W8 form in cases of a foreign vendor, will be required of all vendors doing business with the Brownsville PUB. If a W9 or W8 form is not made available to Brownsville PUB, the first payment will be subject to income tax withholding at a rate of 28% or 30% depending on the U.S. status and the source of income as per IRS Publication 515. **The W9 or W8 form must be included with bid response.** Attached are sample forms.

- **Unique Entity Identifier through Sam.gov**

The Unique Entity ID is a 12-character alphanumeric ID assigned to an entity by SAM.gov and is required for all contractors and subcontractors.

- **Taxes**

The City of Brownsville and its Brownsville Public Utilities Board are exempt from Federal Excise Tax, State Tax and local sales Taxes. Do not include any taxes in the bid proposal. If it is later determined that tax was included in the bid it will not be included in the tabulation or any awards. Tax exemption certificates will be furnished by BPUB upon request.

- **Signing of Bid**

Failure to sign bid will disqualify it. Person signing bid should show title or legal authority to bind their firm to a Contract.

- **EEOC Guidelines**

During the performance of this Contract, the contractor agrees not to discriminate against any employee or applicant for employment because of race, national origin, age, religion, gender, sexual preference, marital or veteran status, or physically challenging condition.

- **Texas Prevailing Wage Rate**

This project is subject to the Texas Prevailing Wage Rates as described in Texas Government Code, Chapter 2258. In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. See Exhibit C for the prevailing wages applicable to this project. Workers employed by or on behalf of the Entity shall be paid (1) not less than the general prevailing wage of per diem wages for work of a similar character in the locality in which the work is performed, and (2) not less than the general prevailing rate of per diem wages for legal holiday and overtime work. Section 2258.023 – Penalty – A contractor or subcontractor who violates this section shall pay penalty to the Entity on whose behalf the contract is made. A public body awarding a contract shall specify this penalty in the contract. Section 2258.024 – Records – A contractor and subcontractor shall keep a record showing (1) the name and occupation of each worker employed by the contractor or subcontractor in the construction of the public work; and (2) the actual per diem wages paid to each worker. The record shall be open at all reasonable hours to inspection by the officers and agents of the Entity.

- **Contract and Purchase Order**

The services shall be completed in a timely manner as specified in Specifications. A Contract for the services will be placed into effect by means of a purchase order and/or Construction Agreement issued by the Brownsville Public Utilities Board after tabulation and final Contract approval by the Board.

- **Brownsville Public Utilities Board Rights**

1. If only one or no bid is received by "submission date", the BPUB has the right to reject, re-bid, accept and/or extend the bid by up to an additional two (2) weeks from original submission date.
2. The right to reject any/or all bids and to make award as it may appear to be advantageous to the Brownsville Public Utilities Board.
3. The right to hold bid for 90-calendar days from submission date without action, and to waive all informalities in any bid.
4. The right to extend the total bid beyond the original 90-calendar day period prior to an award, if agreed upon in writing by all parties (BPUB and vendor/contractor) and if bidder/vendor holds original bid prices firm.
5. The right to terminate for cause or convenience all or any part of the unfinished portion of the Project resulting from this solicitation within seven (7) calendar days written notice; for cause: upon default by the vendor/contractor, for delay or non-performance by the vendor/contractor; or if it is deemed in the best interest of the BPUB for BPUB's convenience. (See, General Conditions Article 15)

- **Corrections**

Any interpretation, correction, or change of the Invitation to Bid will be made by written ADDENDUM. Changes or corrections will be issued by the Brownsville PUB Purchasing Department. **Addenda will be emailed to all who have returned the Bid Acknowledgment form.** Addenda will be issued as expeditiously as possible. It is the responsibility of the vendors/contractors to determine whether all Addenda have been received. It will be the responsibility of all respondents to contact the Brownsville PUB prior to submitting a response to the Invitation to Bid to ascertain if any/all Addenda have been issued, and to obtain any all Addenda, execute them, and return Addenda with the response to the Invitation to Bid. Addenda may also be posted on BPUB's website.

1. RECEIPT AND OPENING OF BIDS:

The Brownsville Public Utilities Board, City of Brownsville, Texas (hereinafter called OWNER), invites bids on the form attached hereto, all blanks of which must be appropriately filled in, in ink, for Project entitled "**Bid B001-24, Downtown Wastewater Project 1**".

The OWNER may consider informal and non-responsive, any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. Any bid may be withdrawn by vendor/contractor prior to the above scheduled time for the opening of bids or OWNER authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No BIDDER may withdraw a bid within at least ninety (90) calendar days after the actual date of the opening thereof.

2. INSPECTION OF SITE:

Each BIDDER shall visit the Project site of the proposed Work and fully acquaint himself with the existing conditions there relating to construction and labor, and shall fully inform himself as to the facility involved, the difficulties and restrictions attending the performance of the Contract. The BIDDER shall thoroughly examine and familiarize himself with the Drawings, Technical Specifications, and all other Contract Documents. The Contractor, by the execution of the Contract, shall in no way be relieved of any obligation under it due to his failure to receive or examine any form or legal instrument, or to visit the Project site and acquaint himself with the conditions there existing and the OWNER will be justified in rejecting any claim for extra time, or compensation, or both, based on facts regarding which Contractor should have been on notice as a result of such a diligent Project site visitation.

3. PREPARATION OF BID AND USE OF SEPARATE BID FORMS:

These Contract Documents include a complete set of bidding documents. The BIDDER shall copy all Documents listed in the table of contents under the heading BIDDING DOCUMENTS and shall submit two sets (original signed and one signed photocopy) of his bid on these forms. A bid shall be comprised of the BIDDING DOCUMENTS completed by the BIDDER plus supplemental information required by the Specifications and Contract Documents.

If any of the information submitted as part of the bid is considered to be proprietary by the BIDDER, he shall conspicuously identify such intended confidential information in his bid. BPUB

is subject to the provisions of the Texas Public Information Act and cannot legally guarantee confidentiality of submittals and may need to consult with its legal counsel and the Texas Attorney General in rendering decisions on any requested disclosures.

- a) Preparation. Each bid shall be carefully prepared using the bid and bid data forms included as a part of the bidding documents. Entries on the bid and bid data forms shall be typed, using dark black ink, or legibly written in black ink. All prices shall be stated in written words and numeric figures, except where the forms provide for figures only. In case of discrepancy, especially in any sum total extensions, the amount shown in written words will generally prevail over numeric unit prices.

The BIDDER shall acknowledge, in the space provided in the bid form, receipt of each Addendum issued for the Specifications and Documents during the bidding period.

The BIDDER shall assemble all drawings, catalog data, and other supplementary information necessary to thoroughly describe Work, materials and equipment covered by the bid, and shall attach such supplemental information to the copies of the Specifications and documents submitted.

- b) Signatures. Each BIDDER shall sign the bid with his usual signature and shall give his full business title and address. The BIDDER's corporate name stated on the bid shall be the exact legal name of the firm. The names of all persons signing should also be typed or printed below the signature.

Bids by partnerships shall be signed with the partnership name followed by the signature and designation title/officer of one of the partners or other authorized representative. A complete list of the partners shall be included with the bid.

Bids by a corporation shall be signed in the official corporate name of the corporation, followed by the signature and designation of the "president," "secretary," or other legally appropriate person authorized to bind the corporation.

A bid by a person who affixes to his signature the word "president," "secretary," "agent," or other designation, without disclosing his principal corporation, will be rejected. Satisfactory evidence of the legal authority of the officer signing on behalf of the corporation shall be furnished. Bidding corporations shall designate the state in which they are incorporated and the address of their principal office.

- c) Submittal. The original signed bid (and its accompanying photocopy) shall be transmitted to arrive at the designated BPUB address not later than the date and time stipulated in the Legal Notice and Invitation to Bid.

Submit the original signed bid (and its accompanying photocopy) to:

Brownsville Public Utilities Board
1155 FM 511
Olmito, Texas 78575
Attention: Ms. Diane Solitaire
Purchasing Department

Each bid must be submitted in duplicate as stated above (original signature and photocopy), in a sealed envelope bearing on the outside the name of the BIDDER, the bidder's address, and the name of the Project for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid itself must be enclosed in another mailing envelope addressed as specified in the bid form.

4. METHOD OF BIDDING: UNIT PRICE AND LUMP SUM.

Prices shall be firm, not subject to qualification, condition or adjustment. Prices shall be in United States dollars. Prices shall be lump sum, except where unit prices are requested by the bid forms. When unit price items are required by the bid, the unit prices for each of the several items in the bid of each BIDDER shall include its prorata share of overhead, so that the sum of the products obtained by multiplying the quantity shown for each item, by the unit price bid, represents the total bid. -Any bid not conforming to that requirement may be rejected as informal and nonresponsive. -The special attention of all BIDDERS is called to this provision, (See: General Conditions paragraph 11.9) for should conditions make it necessary to revise any unit price quantities, generally, a fifteen (15%) percent plus or minus tolerance quantity limit will be fixed for such increased or decreased quantities for which no extra compensation will be allowed, provided the net monetary value of all such additive and subtractive changes in quantities of such items of work pursuant to public competitive bidding statutes (i.e., difference in cost) shall not cumulatively increase or decrease the original Contract Price by more than twenty-five- (25%) percent. A proposed decrease only, that exceeds twenty-five (25%) percent of the original Contract Price must be agreed to in writing in advance by the Contractor.

5. DISCLOSURE BY BIDDER:

Each BIDDER shall submit with the bid documents, on the form furnished for that purpose, his Pre-Bid Disclosure Statement showing his experience record in performing the type of work embraced in the contract, his organization and equipment available for the work contemplated, and, when specifically requested by the OWNER, a detailed financial statement. The OWNER shall have the right to take such steps as it deems necessary, including telephonic contact to other owner references, to determine the ability and responsibility of the BIDDER to perform his obligations under the Contract and the BIDDER shall be responsive in furnishing the OWNER all such information and data for this purpose as it may request. OWNER reserves the right to reject any bid where an investigation of the available evidence or information does not satisfy the OWNER that the BIDDER is responsible to properly carry out the terms of the Contract. This shall also apply to any proposed subcontractor(s).

6. SUBCONTRACTS:

The BIDDER is specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this Contract must be acceptable to the OWNER, and that a Pre-Bid Disclosure Statement for each proposed subcontractor must also be submitted with the bid documents.

7. BID SECURITY:

Each bid must be accompanied by a certified or cashier's check, or a bid bond prepared on the form of the bid bond attached hereto, duly executed by the BIDDER as principal, and having as surety therein a surety company approved by the OWNER, and authorized to do business in the State of Texas, in the amount of not less than five (5%) percent of the total bid amount, but not less than \$2,500.00. Such checks, or bid bonds will be returned to all except the three lowest BIDDERS within fifteen (15) calendar days after the opening of bids, and the remaining checks, or bid bonds will be returned promptly after the OWNER and the accepted successful BIDDER have executed the Contract or if no award has been made, within Ninety (90) calendar days after the date of the opening of bids. The bid security will be returned upon demand of the BIDDER at any time thereafter, so long as he has not been notified of the acceptance of his bid.

8. ADDENDA AND INTERPRETATIONS:

No oral interpretations by OWNER and its representatives shall be binding upon OWNER as to the meaning of the Plans, Specifications, Contract Documents, or other pre-bid documents.

Every request for such interpretation should be made in writing, addressed to Diane Solitaire, BPUB Purchasing Department. Any interpretation, correction, or change to the Invitation to Bid will be made by ADDENDUM. Changes or corrections will be issued by the Brownsville PUB Purchasing Department only and will be on file at the BPUB Department mentioned above. Addenda will be emailed to all who have returned the Bid Acknowledgement form. Addenda will be issued as expeditiously as possible. It is the BIDDER's responsibility to inquire as to any Addenda issued and failure of any BIDDER to receive any such Addenda or interpretation shall not relieve such BIDDER from any obligation under his bid as submitted. All Addenda so issued shall become part of the Contract Documents. Addenda may also be posted on BPUB's webpage.

Exceptions or conditional qualifications by the BIDDER to the Plans, Technical Specifications, Contract Documents, or other pre-bid documents will not be permitted at the time of submitting the Bid Documents to the OWNER, and any exceptions or conditional qualifications taken by BIDDER, will automatically deem the bid conditional and non-responsive and subject to OWNER rejection.

9. FACSIMILE MODIFICATION:

Any BIDDER may modify (not originally submit) his bid by facsimile communication at any time prior to the scheduled bid closing time for receipt of bids, provided such communication is received

by the OWNER, in the BPUB Purchasing Department, prior to the bid closing time, and provided further, the OWNER is satisfied that a written confirmation of the facsimile modification, over the original signature of the BIDDER, was also mailed prior to the bid closing time. The facsimile communication should not reveal the total bid price, but only should provide the clarification, addition or subtraction, or other modification, so that the final bid prices or terms intended will not be known by the OWNER, until the original sealed bid is opened and the Bidder's intended modification computed by OWNER.

Revised bids submitted before the opening of bids, whether forwarded by mail or facsimile, if representing an increase in excess of two percent (2%) of the original bid submittal, must have the bid security (bid bond or check) adjusted accordingly; otherwise the bid will not be considered responsive.

If the written and originally signed confirmation of a bid revision is not received within three (3) calendar days after the bid closing time, no consideration will be given to any proposed adjustment contained in the facsimile modification.

10. TIME FOR RECEIVING BIDS:

Bids received prior to the advertised hour of opening will be securely kept sealed by BPUB. The officer whose duty it is to open them will decide when the specified time has arrived, and no bid received thereafter will be considered; except that when a bid arrives by mail after the time fixed for opening, but before the public reading of all other bids is completed, and it is shown to the satisfaction of the OWNER that the non-arrival on time was due solely to delay in the mails for which the BIDDER was not responsible, such bid will be received and considered.

BIDDERS are cautioned that, while facsimile modifications of bids may be received as provided above, such modifications, if not explicit and if in any sense subject to misinterpretation, shall make the bid so modified or amended, subject to rejection for non-responsiveness.

11. OPENING OF BIDS:

At the time and place fixed for the public opening of bids, the OWNER will cause to be opened and publicly read aloud every bid received within the time set for receiving bids, irrespective of any irregularities therein. BIDDERS and other persons properly interested in a bid (subcontractors, suppliers, etc.) may be present, in person or by representative, but shall carry identification and present same to BPUB as requested.

12. WITHDRAWAL OF BIDS:

Bids may be withdrawn on written, facsimile or electronic transmission request dispatched by the BIDDER in time for delivery in the normal course of business prior to the time fixed for bid opening; provided, that written confirmation of any facsimile withdrawal over the signature of the BIDDER is placed in the mail and postmarked prior to the time set for bid opening. The bid security of any BIDDER withdrawing the bid in accordance with the foregoing conditions will be returned promptly.

13. AWARD OF CONTRACT: REJECTION OF BIDS:

The Contract will be awarded to the responsive and responsible BIDDER submitting the lowest bid complying with the conditions of the Legal Notice and Invitation for Bids. The BIDDER to whom the award is made will be notified at the earliest possible date. The OWNER, however, reserves the right to reject any and all bids and to waive any informality in bids received, whenever such rejection or waiver is in BPUB's interest.

The OWNER reserves the right to consider as not responsible, any BIDDER who does not habitually perform with his own forces the major portions of the Work involved in construction of the improvements embraced in this proposed Contract. This provision is meant to prevent wholesale assignment and "brokering" of awarded contracts.

14. EXECUTION OF AGREEMENT: PERFORMANCE AND PAYMENT BOND:

Subsequent to the Notice of Award and within ten (10) calendar days after the prescribed forms are presented for signature, the successful BIDDER shall execute and deliver to the OWNER an Agreement in the form included in the Contract Documents in such number of copies as the OWNER may require.

Having satisfied all conditions of award as set forth elsewhere in these Documents, the successful BIDDER shall, within the period specified in the preceding paragraph, furnish a Performance Bond and Payment Bond, in accordance with the following parameters:

- a.) For a Contract in excess of \$100,000.00, a Performance Bond shall be executed in the full amount of the Contract, conditioned upon the faithful and timely performance of the Work in accordance with the Plans, Specifications, and Contract Documents. Said Bond shall be solely for the protection of the OWNER.
- b.) For a Contract in excess of \$50,000.00, a Payment Bond shall be executed in the full amount of the Contract, solely for the protection of all proper claimants supplying labor and material in the prosecution of the Work provided for in the Contract, for the use of each such claimant perfecting a proper and timely claim. Payment Bonds are required under Texas law, since no mechanics' liens are allowed against BPUB's public property assets.

When bonds are required, they shall serve as security for the faithful performance of the Contract, and for the payment of all persons, firms or corporations to whom the Contractor may become legally indebted to for labor, materials, tools, equipment, or services of any nature, including utility and transportation services employed or used by him in performing the Work. Such bonds shall be in the same form as that included in the Contract Documents and shall bear the same date as, or a date subsequent to that of the Agreement. The current power of attorney for the person who signs for any surety company shall be attached to such bonds. These bonds shall be signed by a guaranty or surety company legally authorized to do business in the State of Texas and appearing on the most recently issued (as of the date of bid opening) federally qualified U. S. Treasury

Circular 570 List of Approved Sureties.

The failure of the successful BIDDER to execute such Agreement and to supply the required bonds and insurance certificates within ten (10) calendar days after the prescribed forms are presented for signature, or within such extended period as the OWNER may grant in writing, based upon reasons determined sufficient by the OWNER, shall constitute a default, and the OWNER may either award the Contract to the next lowest responsive and responsible BIDDER, or re-advertise for bids, and may charge against the defaulting BIDDER the difference between the amount of the defaulted bid and the amount for which a final Contract for the Work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the bid bond. If a more favorable bid is received by re-advertising, the defaulting BIDDER shall have no claim against the OWNER for a bid bond refund.

15. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT:

The successful BIDDER, upon his failure or refusal to execute and deliver the Contract, Bonds and insurance certificates required within ten (10) calendar days after he has received BPUB notice of the acceptance of his bid, shall forfeit to the OWNER, as mutually agreed to liquidated damages (and not as a penalty) for such failure or refusal, the security provided in the bid bond or otherwise deposited with his bid.

16. TIME OF COMPLETION AND LIQUIDATED DAMAGES:

BIDDER agrees by submission of his bid that PERFORMANCE TIME IS OF THE ESSENCE OF THIS CONTRACT and further agrees to commence Work on the date to be specified in a BPUB written "Notice to Proceed" issued by the OWNER and to Substantially Complete the Project as provided in Article 3 of the Construction Agreement.

BIDDER agrees by submission of his bid to pay as mutually agreed to liquidated damages, and not as a penalty, the sum as provided in said Construction Agreement, Article 3.

17. NOTICE OF SPECIAL CONDITIONS:

Attention is particularly called to those parts of the Contract Documents and Specifications which address the following:

- A. Access to Work - Inspection and testing of materials.
- B. Insurance requirements.
- C. Indemnification by Contractor
- D. Wage and Hour Provisions.
- E. State Sales and Use Tax Exemption Provisions.
- F. Subsurface Geologic Conditions.
- G. Certification Regarding Debarment, Suspension and other Responsibility Requirements (EPA 5700-49).

18. LAWS AND REGULATIONS:

The BIDDER's attention is directed to the fact that all applicable federal, State and local laws, statutes, ordinances, codes and the rules and regulations of all authorities having jurisdiction over construction of the Project, as may be periodically amended, shall apply to the Contract throughout, and they will be mutually deemed to be included in the Contract, the same as though herein written out in full.

19. EQUAL EMPLOYMENT OPPORTUNITY:

Attention of BIDDERS is particularly called to the requirement for ensuring that employees and applicants for employment are not discriminated against because of their race, religion, gender, age, sexual preference, physically challenging condition or national origin.

Equal Opportunity in Employment - All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin. Bidders will be required to comply with the President's Executive Order No. 11246, as amended by Executive Order 11375, and as supplemented in Department of Labor regulations 41 CFR, Part 60. The requirements for bidders and contractors under this order are explained in the General Conditions.

20. PRE-BID CONFERENCE:

A pre-bid virtual or in-person meeting between the OWNER, prospective bidders, suppliers, etc., will be held to answer any questions concerning the Work. No Addenda will be issued at this meeting. Subsequent thereto, if necessary to clear up any written questions, a written Addendum will be issued by the OWNER to all pre-bid conference attendees. The pre-bid meeting will be held at the place, time and date indicated in the Legal Notice. Attendance at the Pre-Bid Conference is NOT mandatory for prospective bidders.

21. SUBMITTAL OF TRENCH SAFETY DESIGN: (RESERVED)

For Work involving excavations generally deeper than five (5) feet within narrow trenches, the apparent low BIDDER shall provide the OWNER with a Trench Safety System Plan and a certificate signed and sealed by a Registered Professional Engineer licensed by the State of Texas, within twenty-one (21) calendar days after the date of the opening of Bids prior to award of the Contract. Failure to timely comply may disqualify BIDDER. This Section may be "Reserved" by BPUB if not applicable to the Work.

22. INFORMATION TO BE SUBMITTED WITH BID:

Each BIDDER shall submit with his bid, the following:

a) Equipment and Materials. In addition to the information submitted on the bid and bid data forms, each BIDDER shall submit all specifications, preliminary drawings, and similar descriptive information necessary to describe completely the equipment and materials he proposes to furnish.

The bid shall be based on using new equipment and materials, which comply with the Specifications and Contract Documents in every respect, unless existing equipment is specifically noted by OWNER for reuse. If alternate or "equal" equipment and materials are indicated in the bid, it shall be understood that the OWNER will have the option of selecting any one of the alternates so indicated and such selection shall not be a cause for extra contractor compensation or extension of time. OWNER specifically reserves the legal right to specify "sole source" equipment or materials in the Specifications when unique circumstances warrant.

- b) Contractor's Field Organization and Safety Record.
- (i) An organization chart showing the names of field management, supervisory, technical personnel, and number of employees/workforce available and the details of the management, supervisory, and technical organization which he proposes to use for this Project. The successful BIDDER's organizational concept will be subject to the review and acceptance of the OWNER.
 - (ii) The experience record of the Contractor's field superintendent(s) shall be submitted with the bid.
 - (iii) The Contractor's job-safety record summary for the previous five (5) years
 - (iv) The two most recent year's independently audited Financial Statements
 - (v) List of three (3) projects completed by CONTRACTOR of both similar size and scope over the past five (5) years

23. PREFERENCE LAW:

Bid evaluations will take into consideration any Preference Laws of the State of Texas, and any reciprocity laws of other states as they may be addressed by current Texas law.

24. SUBSURFACE GEOLOGIC CONDITIONS: (RESERVED)

Each BIDDER shall be responsible for determining prior to bidding, the types of subsurface materials which will be found. If test borings have been made on the Project site by the BPUB or its consultants, the locations and logs of the test borings are bound as an appendix to these Specifications and Documents.

It is to be expressly understood and acknowledged by the BIDDER, that any information on subsurface geology made available by OWNER for BIDDER'S convenience shall **not be a part of the Contract Documents and there is no expressed or implied guarantee of the data given, nor of the interpretation thereof.**

All excavation for this Project will be unclassified and the BIDDER shall be responsible for investigating and satisfying himself of subsurface geologic conditions (including the presence or likelihood of encountering soils requiring dewatering, rock or rock-like materials) prior to submitting his bid, which shall include any and all costs BIDDER associates with avoiding, managing or removing said subsurface geologic conditions without claim for extra compensation against OWNER.

Should BIDDER desire to perform on-site investigations prior to submitting his bid, he is required to notify the OWNER of such intentions and obtain OWNER's written permission not less than 48 hours prior to performing the investigation. BIDDER is responsible for obtaining all related insurance and necessary permits from all sources.

25. DISPOSAL OF EXCESS MATERIALS:

After completion of this Project there may be in some instances an excess of spoil material or waste material left over. In such cases where there is an excess of material, BIDDER shall load and haul it away from the job site and dispose of it in a legal manner so as not to: trespass; adversely impact any protected wetlands; adversely impact the 100 year flood plain; adversely impact any endangered species; or otherwise create drainage diversions or impoundments. No extra remuneration for this Work will be allowed.

26. EROSION AND SEDIMENT CONTROL MEASURES:

The BIDDER is expected to conduct his Work in such a manner as to minimize any soil erosion or sediment runoff from the construction site. Earth cuts and fills shall have smooth, flat side slopes, as generally indicated on the PLANS, to preclude erosion of the soil. Such operations should be timed consistent with the actual need for doing the Work and only to leave raw, unprotected surfaces for a minimum of time.

Existing lawns are to remain intact as far as practical. Such areas as are disturbed shall be duly restored by the BIDDER to as good as or better than original condition using the same type of grass, shrubs, or cover as the original. The BIDDER shall be responsible for correcting any erosion that occurs at his sole cost without claim for extra compensation.

As construction progresses, and in accordance with State and federal laws regulating stormwater runoff and management from construction sites greater than five acres in size, if applicable, (See: Section 405 of the Water Quality Act of 1987, Section 402(P) as amended), and at locations where erosion with sediment runoff occurs or is likely to occur, the BIDDER shall construct temporary ditches, perimeter siltation screens, retainage levees, drains, inlets, or other works to manage, prevent, or correct the possible conditions. Upon completion of the Work, such facilities shall be removed by contractor.

During construction, the BIDDER shall take the necessary precautions to see that erosion is controlled and sediment runoff is prevented so as to protect the quality of any neighboring water bodies.

27. SAFETY PROVISIONS:

BIDDER shall provide barricades, flares, warning signs, and/or flagmen so that danger and inconvenience to the OWNER, public, and any job site working personnel, will be mitigated. In addition to any other requirements of the Contract Documents, the BIDDER shall be responsible for familiarity and compliance with all Federal (OSHA), State, railroad and local safety rules, laws and requirements.

28. PROTECTION OF PROPERTY AND EXISTING UTILITIES:

Within developed areas, all public and private property along and adjacent to the BIDDER'S operations, including roads, driveways, lawns, yards, shrubs, drainage gradients, and trees, shall be adequately protected, and when damages occur, they shall be repaired, replaced, or renewed or otherwise put in a condition equal to, or better than, that which existed before the BIDDER caused the damage or removal.

An attempt has been made by BPUB and the ENGINEER to locate and show all known existing utilities on the PLANS, but the possibility remains strong that some underground utilities may exist that have not been shown. The BIDDER, through mandatory contact with local utility owners, shall keep himself informed and take such precautions as necessary to avoid utility damage and unsafe working conditions for employees.

29. WAGES AND HOURS:

The most recent wage rate determination from the U.S. Department of Labor for Cameron County, Texas as amended within the previous three (3) years and as locally adopted by the BPUB, is a part of the Supplementary Conditions and controls minimum wage, hour and any fringe benefits, with the exception that no wage shall be paid below \$8.00 as established locally by the BPUB.

A copy of the appropriate (building and/or heavy/highway) wage rate schedule(s) must be posted at the job site in both English and Spanish and kept posted in a conspicuous place on the site of the Project at all times during construction. The BIDDER shall familiarize himself with the included General and Supplementary Conditions Section entitled "Wage and Labor Standard Provisions." Copies of the current pre-bid wage rate schedule(s) are included in the Contract Documents, but the responsibility for initial posting and keeping same posted, rests upon the BIDDER.

30. WARRANTY/GUARANTEE:

The BIDDER shall warranty and guarantee the Work, equipment and materials for a period of at least one (1) year after date of final acceptance in writing by the OWNER. During this period, the BIDDER shall make any repairs and/or replacements of defective equipment and materials and corrections of Work due to poor workmanship or manufacturing, all as may be required for full compliance with the General Conditions, Plans and Specifications. This combined workmanship quality guarantee, and minimal equipment and materials warranty, shall apply to all matters reported by the OWNER in writing within said one (1) year period and this post-construction guarantee/warranty period shall be included in the coverage period set forth in the Performance Bond.

31. STATE SALES AND USE TAX EXEMPTION:

Pursuant to 34 Texas Administrative Code 3.291, in order for the Brownsville PUB to continue to benefit from its status as a State Sales and Use Tax Exempt Organization. Construction contracts

must be awarded on a "separated contract" basis. A "separated contract" is one that distinguishes the value of the tangible personal property (materials such as pipe, bricks, lumber, concrete, paint, etc.) to be physically incorporated into the Project realty, from the total Contract Price. Under the "separated contract" format, the Contractor in effect becomes a "seller" to the Brownsville PUB of materials that are to be physically incorporated into the Project realty. As a "seller", the Contractor will issue a "Texas Certificate of Resale" to the supplier in lieu of paying the sales tax on materials at the time of purchase. The Contractor will also issue a "Certificate of Exemption" to the supplier demonstrating that the personal property is being purchased for resale and that the resale is to the Brownsville PUB, which is a sales tax exempt entity under UTCA Tax Code Section 151.309(5). Contractors should be careful to consult the most recent guidelines of the State Comptroller of Public Accounts regarding the sales tax status of supplies and equipment that are used and/or consumed during Project Work (gas, oil, rental equipment), but that are not physically incorporated into the Project realty. Such items are generally not tax exempt. Contractors that have questions about the implementation of this statute are asked to inquire directly with the State Comptroller of Public Accounts, Tax Administration Division, State of Texas, Austin, Texas 78774. Bidders will not include any federal taxes in bid prices since the City of Brownsville and Brownsville PUB are exempt from payment of such federal taxes. "Texas Certificates of Exemption", "Texas Certificates of Resale" and "Texas Sales Tax Permits" are forms available to the Contractor through the regional offices of the State Comptroller of Public Accounts.

32. ADDITIONAL FEDERAL AND STATE REQUIRED CONTRACT PROVISIONS:

2 CFR 200.327 Contract provisions. The non-Federal entity's contracts should contain applicable provisions described in Appendix II to Part 200—Contract Provisions for non-Federal Entity Contracts Under Federal Awards. The non-Federal entity's contracts must contain the provisions described in Appendix II to Part 200—Contract Provisions for non-Federal Entity Contracts Under Federal Awards, as applicable. *Language as of September 1, 2022.

THRESHOLD	PROVISION	CITATION	PROVISION APPLIES TO
>\$250,000 (Simplified Acquisition Threshold)	Contracts for more than the simplified acquisition threshold, which is the inflation adjusted amount determined by the Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (Councils) as authorized by 41 U.S.C. 1908 , must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate.	2 CFR 200 APPENDIX II (A)	Contractor RFP/IFB Contractor RFQ Subrecipients
>\$10,000	All contracts in excess of \$10,000 must address termination for cause and for convenience by the non-Federal entity including the manner by which it will be affected and the basis for settlement.	2 CFR 200 APPENDIX II (B)	Contractor RFP/IFB Contractor RFQ Subrecipients
None	Equal Employment Opportunity. Except as otherwise provided under 41 CFR Part 60 , all contracts that meet the definition of "federally assisted construction contract" in 41 CFR Part 60-1.3 must include the equal opportunity clause provided under 41 CFR 60-1.4(b) , in accordance with Executive Order 11246, "Equal Employment Opportunity" (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing regulations at 41 CFR part 60 , "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor." 41 CFR 60-1.4 Equal opportunity clause. (b) Federally assisted construction contracts. (1) Except as otherwise provided, each administering agency shall require the inclusion of the following language as a condition of any grant, contract, loan, insurance, or guarantee involving federally assisted construction which is not exempt from the requirements of the equal opportunity clause: The [recipient] hereby agrees that it will incorporate or cause to be incorporated into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR Chapter 60, which is paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to a grant, contract, loan, insurance, or guarantee, or undertaken pursuant to any Federal program involving	2 CFR 200 APPENDIX II I and 41 CFR §60-1.4(b)	Contractor RFP/IFB Contractor RFQ Subrecipients

	<p>such grant, contract, loan, insurance, or guarantee, the following equal opportunity clause:</p> <p>During the performance of this contract, the contractor agrees as follows:</p> <p>(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:</p> <p>Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.</p> <p>(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.</p> <p>(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.</p> <p>(4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.</p> <p>(5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.</p> <p>(6) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.</p> <p>(7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.</p> <p>(8) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:</p> <p>Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.</p> <p>The [recipient] further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: Provided, that if the [recipient] so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.</p> <p>The [recipient] agrees that it will assist and cooperate actively with the</p>		
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	<p>administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the recipient agency in the discharge of the agency's primary responsibility for securing compliance.</p> <p>The recipient further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the [recipient] agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the [recipient] under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such [recipient]; and refer the case to the Department of Justice for appropriate legal proceedings.</p>		
>\$10,000,000 for ARPA but State Provision Applies at any amount and/or >\$2,000 for CDBG/Braided Funds	<p>Davis-Bacon Act, as amended (40 U.S.C. 3141-3148). When required by Federal program legislation, all prime construction contracts in excess of \$10,000,00 awarded by non-Federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction"). In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week. The non-Federal entity must place a copy of the current prevailing wage determination issued by the Department of Labor in each solicitation. The decision to award a contract or subcontract must be conditioned upon the acceptance of the wage determination. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency. The contracts must also include a provision for compliance with the Copeland "Anti-Kickback" Act (40 U.S.C. 3145), as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States"). The Act provides that each contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency.</p>	2 CFR 200 APPENDIX II (D)	Contractor RFP/IFB Subrecipients
>\$100,000	<p>Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708). Where applicable, all contracts awarded by the non-Federal entity in excess of \$100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.</p>	2 CFR 200 APPENDIX II I	Contractor RFP/IFB Subrecipients
None	<p>Rights to Inventions Made Under a Contract or Agreement. If the Federal award meets the definition of "funding agreement" under 37 CFR § 401.2 (a) and the recipient or subrecipient wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that "funding agreement," the recipient or subrecipient must comply with the requirements of 37 CFR Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by the awarding agency.</p>	2 CFR 200 APPENDIX II (F)	Contractor RFP/IFB Contractor RFQ Subrecipients
>\$150,000	<p>Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended – Contracts and subgrants of amounts in excess of \$150,000 must contain a provision that requires the non-Federal award</p>	2 CFR 200 APPENDIX II (G)	Contractor RFP/IFB Contractor RFQ Subrecipients

	to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671g) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).		
>\$25,000	Debarment and Suspension (Executive Orders 12549 and 12689) – A contract award (see 2 CFR 180.220) must not be made to parties listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), “Debarment and Suspension.” SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.	2 CFR 200 APPENDIX II (H)	Contractor RFP/IFB Contractor RFQ Subrecipients Vendors
>\$100,000	Byrd Anti-Lobbying Amendment (31 U.S.C. 1352) – Contractors that apply or bid for an award exceeding \$100,000 must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352 . Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award.	2 CFR 200 APPENDIX II (I) and 24 CFR §570.303	Contractor RFP/IFB Contractor RFQ Subrecipients
	See 2 CFR §200.323 - Procurement of Recovered Materials.	2 CFR 200 APPENDIX II (J)	Contractor RFP/IFB Contractor RFQ Subrecipients
	See 2 CFR §200.216 - Prohibition on certain telecommunications and video surveillance services or equipment	2 CFR 200 APPENDIX II (K)	Contractor RFP/IFB Contractor RFQ Subrecipients
	See 2 CFR §200.322 - Domestic Preferences for Procurements.	2 CFR 200 APPENDIX II (L)	Contractor RFP/IFB Contractor RFQ Subrecipients
>\$10,000	An NFE (non-Federal Entity) that is a state agency or an agency of a political subdivision of a state, and the NFE’s contractors must comply with Section 6002 of the Solid Waste Disposal Act. Applicable NFEs must include a contract provision requiring compliance with this requirement. This includes contracts awarded by a state agency or political subdivision of a state and its contractors for certain items, as designated by the EPA, with a purchase price greater than \$10,000. Indian Tribal Governments and nonprofit organizations are not required to comply with this provision. Additional requirements are listed below.	2 CFR 200.323	Contractor RFP/IFB Contractor RFQ Subrecipients
None	The Federal awarding agency must establish conflict of interest policies for Federal awards. The non-Federal entity must disclose in writing any potential conflict of interest to the Federal awarding agency or pass-through entity in accordance with applicable Federal awarding agency policy.	2 CFR 200.112	Contractor RFP/IFB Contractor RFQ Subrecipients
None	The Federal awarding agency and the non-Federal entity should, whenever practicable, collect, transmit, and store Federal award-related information in open and machine-readable formats rather than in closed formats or on paper in accordance with applicable legislative requirements. A machine-readable format is a format in a standard computer language (not English text) that can be read automatically by a web browser or computer system. The Federal awarding agency or pass-through entity must always provide or accept paper versions of Federal award-related information to and from the non-Federal entity upon request. If paper copies are submitted, the Federal awarding agency or pass-through entity must not require more than an original and two copies. When original records are electronic and cannot be altered, there is no need to create and retain paper copies. When original records are paper, electronic versions may be substituted through the use of duplication or other forms of electronic media provided that they are subject to periodic quality control reviews, provide reasonable safeguards against alteration, and remain readable.	2 CFR 200.336	Contractor RFP/IFB Contractor RFQ Subrecipients
None	Contracting with HUB, small and minority businesses, women's business enterprises, and labor surplus area firms.	2 CFR 200.321	Contractor RFP/IFB Contractor RFQ

	<p>(a) The non-Federal entity must take all necessary affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible.</p> <p>(b) Affirmative steps must include:</p> <ol style="list-style-type: none"> (1) Placing qualified small and minority businesses and women's business enterprises on solicitation lists; (2) Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources; (3) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises; (4) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises; (5) Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce; and (6) Requiring the prime contractor, if subcontracts are to be let, to take the affirmative steps listed in paragraphs (b)(1) through (5) of this section. 		<p>Subrecipients</p>
<p>None</p>	<p>Financial records, supporting documents, statistical records, and all other non-Federal entity records pertinent to a Federal award must be retained for a period of three years from the date of submission of the final expenditure report or, for Federal awards that are renewed quarterly or annually, from the date of the submission of the quarterly or annual financial report, respectively, as reported to the Federal awarding agency or pass-through entity in the case of a subrecipient. Federal awarding agencies and pass-through entities must not impose any other record retention requirements upon non-Federal entities. All records related to ARPA shall be maintained for 5 years per the ARPA terms, conditions, and regulations. The only exceptions are the following:</p> <ol style="list-style-type: none"> (a) If any litigation, claim, or audit is started before the expiration of the 3-year period, the records must be retained until all litigation, claims, or audit findings involving the records have been resolved and final action taken. All records related to ARPA shall be maintained for 5 years per the ARPA terms, conditions and regulations. (b) When the non-Federal entity is notified in writing by the Federal awarding agency, cognizant agency for audit, oversight agency for audit, cognizant agency for indirect costs, or pass-through entity to extend the retention period. (c) Records for real property and equipment acquired with Federal funds must be retained for three years after final disposition. All records related to ARPA shall be maintained for 5 years per the ARPA terms and conditions and regulations. (d) When records are transferred to or maintained by the Federal awarding agency or pass-through entity, the 3-year retention requirement is not applicable to the non-Federal entity. All records related to ARPA shall be maintained for 5 years per the ARPA terms and conditions and regulations. All records related to ARPA shall be maintained for 5 years per the ARPA terms, conditions, and regulations. (e) Records for program income transactions after the period of performance. In some cases, recipients must report program income after the period of performance. Where there is such a requirement, the retention period for the records pertaining to the earning of the program income starts from the end of the non-Federal entity's fiscal year in which the program income is earned. (f) Indirect cost rate proposals and cost allocations plans. This paragraph applies to the following types of documents and their supporting records: Indirect cost rate computations or proposals, cost allocation plans, and any similar accounting computations of the rate at which a particular group of costs is chargeable (such as computer usage chargeback rates or composite fringe benefit rates). <ol style="list-style-type: none"> (1) <i>If submitted for negotiation.</i> If the proposal, plan, or other computation is required to be submitted to the Federal Government (or to the pass-through entity) to form the basis for negotiation of the rate, then the 3-year retention period for its supporting records starts from the date of such submission. All records related to ARPA shall be maintained for 5 years per the ARPA terms, conditions, and regulations. (2) <i>If not submitted for negotiation.</i> If the proposal, plan, or other computation is not required to be submitted to the Federal Government (or to the pass-through entity) for negotiation purposes, then the 3-year retention period for the proposal, plan, or computation and its supporting records starts from the end of the fiscal year (or other accounting period) covered by the proposal, plan, or other computation. All records related to ARPA 	<p>2 CFR 200.334</p>	<p>Contractor RFP/IFB Contractor RFQ Subrecipients Vendors</p>

	shall be maintained for 5 years per the ARPA terms, conditions, and regulations.		
None	CONTRACTS WITH COMPANIES ENGAGED IN BUSINESS WITH IRAN, SUDAN, OR FOREIGN TERRORIST ORGANIZATION PROHIBITED. A governmental entity may not enter into a governmental contract with a company that is identified on a list prepared and maintained under Section 806.051, 807.051, or 2252.153 . The term "foreign terrorist organization" in this paragraph has the meaning assigned to such a term in Section 2252.151(2) of the Texas Government Code.	Texas Government Code 2252.152	Contractor RFP/IFB Contractor RFQ Subrecipients
>\$100,000	PROVISION REQUIRED IN CONTRACT. (a) This section applies only to a contract that: (1) is between a governmental entity and a company with 10 or more full-time employees; and (2) has a value of \$100,000 or more that is to be paid wholly or partly from public funds of the governmental entity. (b) A governmental entity may not enter into a contract with a company for goods or services unless the contract contains a written verification from the company that it: (1) does not boycott Israel; and (2) will not boycott Israel during the term of the contract.	Texas Government Code 2271	Contractor RFP/IFB Contractor RFQ Subrecipients Vendors
	Mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.	42 U.S.C. 6201	Contractor RFP/IFB Subrecipients
	The Firm agrees that no otherwise qualified individual with disabilities shall, solely by reason of his/her disability, be denied the benefits of, or be subjected to discrimination, including discrimination in employment, under any program or activity receiving federal financial assistance.	Section 504 of the Rehabilitation Act of 1973, as amended.	Subrecipients
ARPA Terms, Conditions, & Records	Use of Funds. a. Recipient understands and agrees that the funds disbursed under this award may only be used in compliance with section 603(c) of the Social Security Act (the Act), Treasury's regulations implementing that section, and guidance issued by Treasury regarding the foregoing. b. Recipient will determine prior to engaging in any project using this assistance that it has the institutional, managerial, and financial capability to ensure proper planning, management, and completion of such project.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603 (c) as applicable	Subrecipients
ARPA Terms, Conditions, & Records	Period of Performance. The period of performance for this award begins on the date hereof and ends on December 31, 2026. As set forth in Treasury's implementing regulations, Recipients may use award funds to cover eligible costs incurred during the period that begins on March 3, 2021 and ends on December 31, 2024.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603 (c) as applicable	Subrecipients
ARPA Terms, Conditions, & Records	Reporting. Recipient agrees to comply with any reporting obligations established by Treasury as they relate to this award.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603 (c) as applicable	Subrecipients
ARPA Terms, Conditions, & Records	Maintenance of and Access to Records a. Recipient shall maintain records and financial documents sufficient to evidence compliance with section 603(c) of the Act, Treasury's regulations implementing that section, and guidance issued by Treasury regarding the foregoing. b. The Treasury Office of Inspector General and the Government Accountability Office, or their authorized representatives, shall have the right of access to records (electronic and otherwise) of Recipient in order to conduct audits or other investigations. c. Records shall be maintained by Recipient for a period of five (5) years after all funds have been expended or returned to Treasury, whichever is later.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603 (c) as applicable	Contractor RFP/IFB Contractor RFQ Subrecipients Vendors
ARPA Terms, Conditions, & Records	Pre-award Costs. Pre-award costs, as defined in 2 C.F.R. § 200.458, may not be paid with funding from this award.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603 (c) as applicable	Subrecipients

ARPA Terms, Conditions, & Records	Administrative Costs. Recipient may use funds provided under this award to cover both direct and indirect costs.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603 (c) as applicable	Subrecipients
ARPA Terms, Conditions, & Records	Cost Sharing. Cost sharing or matching funds are not required to be provided by Recipient.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603 (c) as applicable	Subrecipients
ARPA Terms, Conditions, & Records	Conflicts of Interest. Recipient understands and agrees it must maintain a conflict of interest policy consistent with 2 C.F.R. § 200.318(c) and that such conflict of interest policy is applicable to each activity funded under this award. Recipient and subrecipients must disclose in writing to Treasury or the pass-through entity, as appropriate, any potential conflict of interest affecting the awarded funds in accordance with 2 C.F.R. § 200.112.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603 (c) as applicable	Contractor RFP/IFB Contractor RFQ Subrecipients Vendors
ARPA Terms, Conditions, & Records	<p>Compliance with Applicable Law and Regulations.</p> <p>a. Recipient agrees to comply with the requirements of section 603 of the Act, regulations adopted by Treasury pursuant to section 603(f) of the Act, and guidance issued by Treasury regarding the foregoing. Recipient also agrees to comply with all other applicable federal statutes, regulations, and executive orders, and Recipient shall provide for such compliance by other parties in any agreements it enters into with other parties relating to this award.</p> <p>b. Federal regulations applicable to this award include, without limitation, the following:</p> <p>i. Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, 2 C.F.R. Part 200, other than such provisions as Treasury may determine are inapplicable to this Award and subject to such exceptions as may be otherwise provided by Treasury. Subpart F – Audit Requirements of the Uniform Guidance, implementing the Single Audit Act, shall apply to this award.</p> <p>ii. Universal Identifier and System for Award Management (SAM), 2 C.F.R. Part 25, pursuant to which the award term set forth in Appendix A to 2 C.F.R. Part 25 is hereby incorporated by reference.</p> <p>iii. Reporting Subaward and Executive Compensation Information, 2 C.F.R. Part 170, pursuant to which the award term set forth in Appendix A to 2 C.F.R. Part 170 is hereby incorporated by reference.</p> <p>iv. OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Non-procurement), 2 C.F.R. Part 180, including the requirement to include a term or condition in all lower tier covered transactions (contracts and subcontracts described in 2 C.F.R. Part 180, subpart B) that the award is subject to 2 C.F.R. Part 180 and Treasury’s implementing regulation at 31 C.F.R. Part 19.</p> <p>v. Recipient Integrity and Performance Matters, pursuant to which the award term set forth in 2 C.F.R. Part 200, Appendix XII to Part 200 is hereby incorporated by reference.</p> <p>vi. Governmentwide Requirements for Drug-Free Workplace, 31 C.F.R. Part 20. (Subrecipient Only)</p> <p>vii. New Restrictions on Lobbying, 31 C.F.R. Part 21.</p> <p>viii. Uniform Relocation Assistance and Real Property Acquisitions Act of 1970 (42 U.S.C. §§ 4601-4655) and implementing regulations.</p> <p>ix. Generally applicable federal environmental laws and regulations.</p> <p>c. Statutes and regulations prohibiting discrimination applicable to this award include, without limitation, the following:</p> <p>i. Title VI of the Civil Rights Act of 1964 (42 U.S.C. §§ 2000d et seq.) and Treasury’s implementing regulations at 31 C.F.R. Part 22, which prohibit discrimination on the basis of race, color, or national origin under programs or activities receiving federal financial assistance;</p> <p>ii. The Fair Housing Act, Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§ 3601 et seq.), which prohibits discrimination in housing on the basis of race, color, religion, national origin, sex, familial status, or disability;</p> <p>iii. Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794), which prohibits discrimination on the basis of disability under any program or activity receiving federal financial assistance;</p> <p>iv. The Age Discrimination Act of 1975, as amended (42 U.S.C. §§ 6101 et seq.), and Treasury’s implementing regulations at 31 C.F.R. Part 23, which prohibit</p>	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603 (c) as applicable	Contractor RFP/IFB Contractor RFQ Subrecipients Vendors

	discrimination on the basis of age in programs or activities receiving federal financial assistance; and v. Title II of the Americans with Disabilities Act of 1990, as amended (42 U.S.C. §§ 12101 et seq.), which prohibits discrimination on the basis of disability under programs, activities, and services provided or made available by state and local governments or instrumentalities or agencies thereto.		
ARPA Terms, Conditions, & Records	Remedial Actions. In the event of Recipient's noncompliance with section 603 of the Act, other applicable laws, Treasury's implementing regulations, guidance, or any reporting or other program requirements, Treasury may impose additional conditions on the receipt of a subsequent tranche of future award funds, if any, or take other available remedies as set forth in 2 C.F.R. § 200.339. In the case of a violation of section 603(c) of the Act regarding the use of funds, previous payments shall be subject to recoupment as provided in section 603(e) of the Act.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603(c) as applicable	Subrecipients
ARPA Terms, Conditions, & Records	Hatch Act. Recipient agrees to comply, as applicable, with requirements of the Hatch Act (5 U.S.C. §§ 1501-1508 and 7324-7328), which limit certain political activities of State or local government employees whose principal employment is in connection with an activity financed in whole or in part by this federal assistance.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603(c) as applicable	Subrecipients
ARPA Terms, Conditions, & Records	False Statements. Recipient understands that making false statements or claims in connection with this award is a violation of federal law and may result in criminal, civil, or administrative sanctions, including fines, imprisonment, civil damages and penalties, debarment from participating in federal awards or contracts, and/or any other remedy available by law.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603(c) as applicable	Contractor RFP/IFB Contractor RFQ Subrecipients Vendors
ARPA Terms, Conditions, & Records	Publications. Any publications produced with funds from this award must display the following language: "This project [is being] [was] supported, in whole or in part, by federal award number [enter project FAIN] awarded to [name of Recipient] by the U.S. Department of the Treasury."	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603(c) as applicable	Subrecipients
ARPA Terms, Conditions, & Records	Debts Owed the Federal Government. a. Any funds paid to Recipient (1) in excess of the amount to which Recipient is finally determined to be authorized to retain under the terms of this award; (2) that are determined by the Treasury Office of Inspector General to have been misused; or (3) that are determined by Treasury to be subject to a repayment obligation pursuant to section 603(e) of the Act and have not been repaid by Recipient shall constitute a debt to the federal government. b. Any debts determined to be owed the federal government must be paid promptly by Recipient. A debt is delinquent if it has not been paid by the date specified in Treasury's initial written demand for payment, unless other satisfactory arrangements have been made or if the Recipient knowingly or improperly retains funds that are a debt as defined in paragraph 14(a). Treasury will take any actions available to it to collect such a debt.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603(c) as applicable	Subrecipients
ARPA Terms, Conditions, & Records	Disclaimer. a. The United States expressly disclaims any and all responsibility or liability to Recipient or third persons for the actions of Recipient or third persons resulting in death, bodily injury, property damages, or any other losses resulting in any way from the performance of this award or any other losses resulting in any way from the performance of this award or any contract, or subcontract under this award. b. The acceptance of this award by Recipient does not in any way establish an agency relationship between the United States and Recipient.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603(c) as applicable	Subrecipients
ARPA Terms, Conditions, & Records	Protections for Whistleblowers. a. In accordance with 41 U.S.C. § 4712, Recipient may not discharge, demote, or otherwise discriminate against an employee in reprisal for disclosing to any of the list of persons or entities provided below, information that the employee reasonably believes is evidence of gross mismanagement of a federal contract or grant, a gross waste of federal funds, an abuse of authority relating to a federal contract or grant, a substantial and specific danger to public health or safety, or a violation of law, rule, or regulation related to a federal contract (including the competition for or negotiation of a contract) or grant. b. The list of persons and entities referenced in the paragraph above includes the following: i. A member of Congress or a representative of a committee of Congress; ii. An Inspector General; iii. The Government Accountability Office;	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603(c) as applicable	Contractor RFP/IFB Contractor RFQ Subrecipients Vendors

	<ul style="list-style-type: none"> iv. A Treasury employee responsible for contract or grant oversight or management; v. An authorized official of the Department of Justice or other law enforcement agency; vi. A court or grand jury; or vii. A management official or other employee of Recipient, contractor, or subcontractor who has the responsibility to investigate, discover, or address misconduct. <p>c. Recipient shall inform its employees in writing of the rights and remedies provided under this section, in the predominant native language of the workforce.</p>		
ARPA Terms, Conditions, & Records	Increasing Seat Belt Use in the United States. Pursuant to Executive Order 13043, 62 FR 19217 (Apr. 18, 1997), Recipient should encourage its contractors to adopt and enforce on-the-job seat belt policies and programs for their employees when operating company-owned, rented or personally owned vehicles.	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603 (c) as applicable	Contractor RFP/IFB Contractor RFQ Subrecipients Vendors
ARPA Terms, Conditions, & Records	Reducing Text Messaging While Driving. Pursuant to Executive Order 13513, 74 FR 51225 (Oct. 6, 2009), Recipient should encourage its employees, subrecipients, and contractors to adopt and enforce policies that ban text messaging while driving, and Recipient should establish workplace safety policies to decrease accidents caused by distracted drivers	Section 9901 of the American Rescue Plan Act, Pub. L. No. 117-2; Section 602(b), 603(b) and/or 603 (c) as applicable	Contractor RFP/IFB Contractor RFQ Subrecipients Vendors

BID
B001-24
BPUB Purchasing Department
1155 FM 511
Olmito, Texas 78575
Due: October 18, 2023 at 2:00 PM

Bid of _____ hereinafter called BIDDER, a corporation organized and existing under the laws of the State of _____, or, a partnership, or an individual doing business as _____.

To the Brownsville Public Utilities Board of the City of Brownsville, Texas, hereinafter called OWNER.

Respected Board Members:

The undersigned BIDDER, in compliance with your Invitation to Bid for the **Downtown Wastewater Project 1**, having read and examined the Plans and Specifications with related Contract Documents and visited the site of the proposed Work, and being familiar with all of the federal, state and local conditions surrounding the construction of the proposed Project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, equipment and supplies, and to construct the Project in accordance with the Contract Documents, within the time set forth herein, and at the Total Base Bid Amount prior to OWNER options on additive/deductive alternates of: (in words and numeric figures)

_____. These price(s) are to cover all expenses incurred in performing the Work required under the Contract Documents, of which this bid is a part. These price(s) are firm and shall not be subject to adjustment, provided this Bid is accepted by OWNER within ninety (90) calendar days after the time set for BPUB receipt of bids.

BIDDER hereby agrees to commence Work under this Contract on or before a date to be specified in a written "Notice to Proceed" to be issued by the OWNER, and to then fully complete the Project within the times established in Article 3 of the Construction Agreement. BIDDER further agrees to pay as liquidated damages, not as a penalty, for failure to do so, the sum(s) established in Article 3 of the Construction Agreement.

BIDDER agrees to perform all Work for which he contracts as described in the Technical Specifications and as shown on the Plans, for the prices indicated on the following Bid Form.

BID SCHEDULE
BASE BID – B001-24
BROWNSVILLE PUBLIC UTILITIES BOARD

The Bidder, in compliance with the Invitation for Bids for the **Downtown Wastewater Project 1** having examined the scope of work and written Specifications, hereby proposes to furnish construction services for the following Unit prices and lump sums.

PRICE PROPOSAL LINE ITEMS

ITEM NO.	SPEC NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL PRICE
1	01 56 10	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	12	\$	\$
2	02 41 13.13	REMOVE CONCRETE PAVING (INCL. SAW CUTTING)	SY	286	\$	\$
3	02 41 13.13	REMOVE ASPHALT PAVING (INCL. SAW CUTTING)	SY	1753	\$	\$
4	02 41 13.13	SURFACE MILLING (2")	SY	6578	\$	\$
5	3 41 13.13	SURFACE MILLING (3")	SY	2267	\$	\$
6	02 41 13.13	REMOVE BRICK PAVING	SY	400	\$	\$
7	02 45 00	REMOVE CONCRETE CURB & GUTTER (INCL. SAW CUTTING)	LF	753	\$	\$
8	02 45 00	REMOVE CONCRETE SIDEWALKS AND DRIVEWAYS (INCL. SAW CUTTING)	SY	149	\$	\$
9	03 30 10	CONCRETE JOINING COLLARS	EA	23	\$	\$
10	04 41 10	INSTALLATION OF BRICK PAVERS	SY	400	\$	\$
11	31 23 19	TRENCH DEWATERING	LF	5030	\$	\$
12	31 23 23.33	FLOWABLE FILL (LOW STRENGTH)	CY	1128	\$	\$
13	31 25 00	TEMPORARY EROSION, SEDIMENTATION AND WATER POLLUTION PREVENTION AND CONT	MO	12	\$	\$
14	31 41 33	TRENCH EXCAVATION SAFETY PROTECTION	LF	5030	\$	\$
15	32 11 13.13	LIME TREATED SUBGRADE (12" COMPACTED DEPTH)	SY	286	\$	\$
16	32 11 26	ASPHALTIC BASE COURSE (10" COMPACTED DEPTH)	SY	1425	\$	\$
17	32 11 26	ASPHALTIC BASE COURSE (12" COMPACTED DEPTH)	SY	329	\$	\$
18	32 12 16	HOT MIX ASPHALTIC CONCRETE PAVEMENT, TYPE D (2" COMPACTED DEPTH)	SY	6578	\$	\$
19	32 12 16	HOT MIX ASPHALTIC CONCRETE PAVEMENT, TYPE D (3" COMPACTED DEPTH)	SY	2267	\$	\$
20	32 12 16.01	PRIME COAT	GAL	454	\$	\$
21	32 12 16.02	TACK COAT	GAL	114	\$	\$
22	32 12 16.16	4" WIDE WHITE LINE	LF	60	\$	\$
23	32 12 16.16	8" WIDE WHITE LINE	LF	640	\$	\$
24	32 12 16.16	STRAIGHT WHITE ARROW	EA	3	\$	\$
25	32 12 16.16	RIGHT WHITE ARROW	EA	1	\$	\$
26	32 13 13	CONCRETE PAVEMENT (8" DEPTH)	SY	286	\$	\$
27	32 13 13.10	CONCRETE CURB AND GUTTER	LF	753	\$	\$
28	32 13 13.10	CONCRETE SIDEWALK - CONVENTIONALLY FORMED (4" THICKNESS)	SY	10	\$	\$
29	32 16 33	PORTLAND CEMENT CONCRETE DRIVEWAY (4" THICKNESS)	SY	27	\$	\$
30	32 31 13	CHAIN LINK WIRE FENCE (4' HIGH)	LF	20	\$	\$
31	32 31 13	CHAIN LINK WIRE FENCE (6' HIGH)	LF	30	\$	\$
31	32 31 13	GATES - PEDESTRIAN	EA	0	\$	\$
32	33 21 20	SANITARY SEWER LATERALS (ONE-WAY CLEAN-OUT)	EA	162	\$	\$
33	33 31 00	SANITARY SEWER (6", PVC, SDR 26, OPEN CUT, 0'-8' DEPTH)	LF	10	\$	\$
34	33 31 00	SANITARY SEWER (8", PVC, SDR 26, OPEN CUT, 0'-8' DEPTH)	LF	10	\$	\$
35	33 31 00	SANITARY SEWER (8", PVC, SDR 26, OPEN CUT, 8'-10' DEPTH)	LF	10	\$	\$
36	33 31 00	SANITARY SEWER (8", PVC, SDR 26, OPEN CUT, 10'-12' DEPTH)	LF	10	\$	\$
37	33 31 00	SANITARY SEWER (10", PVC, SDR 26, OPEN CUT, 0'-8' DEPTH)	LF	10	\$	\$
37	33 31 00	SANITARY SEWER (10", PVC, SDR 26, OPEN CUT, 8'-10' DEPTH)	LF	0	\$	\$
37	33 31 00	SANITARY SEWER (10", PVC, SDR 26, OPEN CUT, 10'-12' DEPTH)	LF	0	\$	\$
38	33 31 00	SANITARY SEWER (10", PVC, SDR 26, OPEN CUT, 12'-14' DEPTH)	LF	10	\$	\$
39	33 31 00	SANITARY SEWER (12", PVC, SDR 26, OPEN CUT, 0'-8' DEPTH)	LF	305	\$	\$
40	33 31 00	SANITARY SEWER (12", PVC, SDR 26, OPEN CUT, 8'-10' DEPTH)	LF	1313	\$	\$
41	33 31 00	SANITARY SEWER (12", PVC, SDR 26, OPEN CUT, 10'-12' DEPTH)	LF	1177	\$	\$
42	33 31 00	SANITARY SEWER (12", PVC, SDR 26, OPEN CUT, 12'-14' DEPTH)	LF	931	\$	\$
43	33 31 00	SANITARY SEWER (12", PVC, SDR 26, OPEN CUT, 14'-16' DEPTH)	LF	480	\$	\$
44	33 31 00	SANITARY SEWER (12", PVC, SDR 26, OPEN CUT, 16'-18' DEPTH)	LF	124	\$	\$
45	33 31 00	SANITARY SEWER (12", PVC, 150 PSI PRESSURE RATED, OPEN CUT, 0'-8' DEPTH)	LF	65	\$	\$
46	33 31 00	SANITARY SEWER (12", PVC, 150 PSI PRESSURE RATED, OPEN CUT, 8'-10' DEPTH)	LF	397	\$	\$
47	33 31 00	SANITARY SEWER (12", PVC, 150 PSI PRESSURE RATED, OPEN CUT, 10'-12' DEPTH)	LF	121	\$	\$
48	33 31 00	SANITARY SEWER (12", PVC, 150 PSI PRESSURE RATED, OPEN CUT, 12'-14' DEPTH)	LF	40	\$	\$
48	33 31 10	SANITARY SEWER MANHOLE (4' DIA., 0'-8' DEPTH)	EA	0	\$	\$
49	33 31 10	SANITARY SEWER MANHOLE (4' DIA., 8'-10' DEPTH)	EA	7	\$	\$
50	33 31 10	SANITARY SEWER MANHOLE (4' DIA., 10'-12' DEPTH)	EA	5	\$	\$
51	33 31 10	SANITARY SEWER MANHOLE (4' DIA., 12'-14' DEPTH)	EA	2	\$	\$
52	33 31 10	SANITARY SEWER MANHOLE (4' DIA., 14'-16' DEPTH)	EA	2	\$	\$
53	33 31 10	SANITARY SEWER MANHOLE (4' DIA., 16'-18' DEPTH)	EA	1	\$	\$
53	33 31 20	SANITARY SEWER LATERAL AND RECONNECTIONS (OPEN CUT LATERAL CONNECTION, 8"	EA	0	\$	\$
53	33 31 30	SANITARY SEWER MAIN TELEVISION INSPECTION (8" THROUGH 15")	LF	0	\$	\$
54	33 31 40	BYPASS PUMPING SMALL DIAMETER SANITARY SEWER MAINS	LS	1	\$	\$
55	33 31 50	ABANDONMENT OF SANITARY SEWER MAINS (GROUT FILL)	LF	1235	\$	\$
56	33 40 00	REINFORCED CONCRETE PIPE (CLASS IV) (W/ STD. DIAMETERS OF 8", 12" AND 15")	LF	64	\$	\$
57	33 40 00	REINFORCED CONCRETE PIPE (CLASS IV) (W/ STD. DIAMETERS OF 18" AND 24")	LF	462	\$	\$
58	33 40 00	INLET (4' X 6')(GRATE INLET)	EA	2	\$	\$
59	33 40 00	SPECIAL INLETS (1' X 2') (GRATE INLET)	EA	4	\$	\$
60	34 41 10	R6-2 ONE WAY (18" X 24")	EA	1	\$	\$
61	34 41 10	R7-1 NO PARKING ANYTIME (18" X 24")	EA	1	\$	\$
SUBTOTAL (ITEMS 1-61)					\$	
62	01 35 13.43	CONTAMINATED SOIL/WATER DISPOSAL	ALW	1	\$ 55,000	\$ 55,000
63	01 15 00	POWER POLE BRACING	ALW	1	\$ 100,000	\$ 100,000
64	01 15 00	RELOCATION AND REPAIR OF EXISTING WATER MAIN	ALW	1	\$ 65,000	\$ 65,000
65	01 15 00	RELOCATION AND REPAIR OF EXISTING FIBER OPTIC	ALW	1	\$ 100,000	\$ 100,000
66	01 15 00	RELOCATION AND REPAIR OF EXISTING GAS	ALW	1	\$ 50,000	\$ 50,000
SUBTOTAL (ITEMS 1-66)					\$	
67	01 10 10	MOBILIZATION AND DEMOBILIZATION (MAX 5% OF LINE ITEMS 1-61)	LS	1	\$	\$
68	31 10 10	PREPARING RIGHT OF WAY (MAX 5% OF LINE ITEMS 1-61)	LS	1	\$	\$

Mobilization shall be limited to the maximum percentage shown. If the percentage exceeds the allowable maximum stated for mobilization, Owner reserves the right to cap the amount at the percentage shown and adjust the extensions of the bid items accordingly.

TOTAL BID PRICE (TOTAL ITEMS 1-68) \$ _____

TOTAL AMOUNT OF BID (ITEMS 1- 68): \$ _____

(written in words)

NOTE: Quantities are estimated. The Brownsville PUB reserves the right to increase or decrease quantities as allowed by Texas law (plus or minus 25%) percent and as deemed necessary by OWNER, without impacting the quoted unit prices. Prospective bidders are encouraged to visit and assess the existing Project site and structures prior to submitting a bid.

BIDDER Acknowledges receipt of the following Addenda:

SUBCONTRACTORS. The undersigned BIDDER proposes that he will be responsible to perform major portions of the Work at the Project site with his own forces and that specific portions of the Work not performed by the undersigned will be subcontracted and performed by the following subcontractors.

Work Subcontracted	Name of Subcontractor
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Bid amounts are to be legibly shown in both words and figures. In case of discrepancy, the unit price amount written in words will govern.

The above lump sum and unit prices shall include all labor, materials, excavation, bailing, shallow groundwater dewatering, shoring, removal, backfill, overhead, profit, insurance, etc., to cover the finished Work of the several kinds called for.

BIDDER understands that the OWNER reserves the right to reject any or all bids and to waive any informalities in the bidding and to elect to opt for any additive or deductive alternates in arriving at a final Contract price.

BIDDER agrees that this bid shall be good and may not be withdrawn for a period of ninety (90) calendar days after the scheduled bid opening.

The undersigned hereby declares that only the persons or firms interested in the bid as principal or principals are named herein, and that no other persons or firms than are herein mentioned have any interest in this Bid or in the Contract to be entered into; that this Bid is made without connection with any other person, company, or entities likewise submitting a bid or bid; and that it is in all respects for and in good faith, without collusion or fraud.

Upon receipt of written notice of the acceptance of this bid, BIDDER will execute the formal Contract attached within ten (10) calendar days and deliver the Bonds and Insurance Certificates as required under the GENERAL CONDITIONS. The Bid security attached in the sum of _____ (\$_____) is to become the property of the OWNER in the event the Contract, Bonds, and insurance certificates are not executed or delivered within the time above set forth, as mutually agreed to liquidated damages and not as a penalty for the delay and additional administrative expense to the OWNER caused thereby; otherwise the Bid security will be returned upon the signing of the Contract and delivering the approved Bonds and Insurance Certificates.

Seal affixed here if BID is by a Corporation:
Respectfully submitted,

By: _____
Signature (Failure to sign disqualifies bid)

Title

Address

Attest: _____

Signed, this _____ day of _____, 20__.

Principal

Surety

By: _____

IMPORTANT - Surety companies executing BONDS must be legally authorized by the State Board of Insurance to transact business in the State of Texas, and be currently listed as approved federal sureties in the most recently issued (as of the date of bid opening) edition of the U. S. Treasury Circular 570.

**CONTRACTOR'S
PRE-BID DISCLOSURE STATEMENT**

All questions must be answered or your bid may be deemed non-responsive and subject to rejection. The data given must be clear and comprehensive. **This statement must be notarized.** If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional relevant information he desires.

1. This Pre-Bid Disclosure Statement is submitted to the Brownsville Public Utilities Board by:

_____ a Corporation, ___ a Partnership, ___ a Texas Joint Venture, or ___ an Individual.
 Address: _____ Contractor's Telephone #: _____
 City _____ State _____ Zip Code _____

2. Years in business under present business name: _____

3. Years of experience in construction work of the type called for in this Contract as: A General Contractor _____, A Subcontractor _____.

4. What projects has your organization completed? List most recent FIRST.

Contract	Type of Work	Date Completed	Owners Name and Address	Amount

5. What projects does your organization have under way as of this date?

Contract	Type of Work	Date Completed	Owners Name and Address	Amount

6. Have you ever failed to complete any work awarded to you?
 ___ Yes ___ No. If "Yes", state where and why. _____

7. Are you at present in any binding arbitrations and/or lawsuits involving construction work of any type?
 ___ Yes ___ No. If "Yes", explain: _____

8. Explain in detail the manner in which you have inspected the work and jobsite proposed in this contract: _____

9. Explain in detail your plan or layout for performing the work proposed in this contract: _____

10. If this contract is awarded to you, your company's office administrative manager for the work will be Mr. (Ms.) _____, and your resident construction superintendent will be Mr. (Ms.) _____.

11. What experience in this type of work does the individual designated as resident superintendent above have? _____

12. What portions of the work do you intend to subcontract? _____

13. What equipment do you own or lease that is available for the proposed work?

Quantity	Description, Size Capacity, Etc.	Condition	Years in Service	Present Location

14. Have you received firm offers from all suppliers or manufacturers for all major items of material and/or equipment within the Base Bid Amount used in preparing your bid? Yes No

15. Attach resumes for the principal members of your organization, including the officers as well as the proposed superintendent for the project.

Credit available: \$ _____ Bank Reference: _____

Bonding Capacity available: \$ _____

The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by either the Owner’s Engineer or Owner in verification of the recitals comprising this Pre-Bid Disclosure Statement.

The signatory of this questionnaire guarantees the truth and accuracy of all statements herein made and all answers herein expressed.

Dated this ____ day of _____, 20__.

By: _____

Title: _____

STATE OF _____

COUNTY OF _____

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

Notary Public

My commission expires: _____

**SUBCONTRACTOR'S
PRE-BID DISCLOSURE STATEMENT**

All Subcontractor questions must be answered or the General Contractor's Bid may be deemed non-responsive and subject to rejection. The data given must be clear and comprehensive. **This statement must be notarized**. If necessary, questions may be answered on separate attached sheets. The prospective Subcontractor may submit any additional relevant information he desires.

1. This Pre-Bid Disclosure Statement is submitted to the Brownsville Public Utilities Board by: _____

__ a Corporation, __ a Partnership, __ a Texas Joint Venture, or __ an Individual.

Address: _____ Contractor's #: _____
City _____ State _____ Zip Code _____

2. Years in business under present business name: _____

3. Years of experience in construction work of the type called for in this Contract as: A General Contractor _____, A Sub-contractor _____.

4. Have you ever previously worked as a subcontractor for this General Contractor? _____
Yes; _____ No; If yes, list three most recent projects in which your company has served as a subcontractor to this General Contractor.

5. What projects has your organization completed? List most recent FIRST.

Contract	Type of Work	Date Completed	Owners Name and Address	Amount

6. What projects does your organization have under way as of this date?

Contract	Type of Work	Date Completed	Owners Name and Address	Amount

7. Have you ever failed to complete any work awarded to you?

___ Yes ___ No. If "Yes", state where and why. _____

8. Are you at present in any binding arbitrations and/or lawsuits involving construction work of any type?

___ Yes ___ No. If "Yes", explain: _____

9. Explain in detail the manner in which you have inspected the work and jobsite proposed in this contract: _____

10. Explain in detail your plan or layout for performing the work proposed in this contract: _____

11. If this subcontract is awarded to you by the general contractor, your company's office administrative manager for the work will be Mr. (Ms.) _____, and your resident construction superintendent will be Mr. (Ms.) _____.

12. What experience in this type of work does the individual designated as resident superintendent above have? _____

13. What portions of the work do you intend to subtier subcontract?

14. What equipment do you own that is available for the proposed work?

Quantity	Description, Size Capacity, Etc.	Condition	Years in Service	Present Location

15. Have you received firm offers from suppliers or manufacturers for all major items of material and/or equipment within the price totals used in preparing your subcontractor bid?
 ___ Yes ___ No

16. Attach resumes for the principal members of your organization, including the officers as well as the proposed superintendent for the project.

Credit available: \$ _____ Bank Reference: _____

Bonding Capacity available: \$ _____

The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by either the Owner’s Engineer or Owner in verification of the recitals comprising this Subcontractor Pre-Bid Disclosure Statement.

The signatory of this questionnaire guarantees the truth and accuracy of all statements herein made and all answers herein expressed.

Dated this ____ day of _____, 20__.

By: _____

Title: _____

STATE OF _____

COUNTY OF _____

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

Notary Public

My commission expires: _____

REQUIRED FORMS CHECKLIST

The following documents are to be submitted as a part of the Bid/RFP/RFQ document

NAME	FORM DESCRIPTION	SUBMITTED WITH BID	
		YES <input type="checkbox"/>	NO <input type="checkbox"/>
Required Forms (if applicable)	Acknowledgement Form	<input type="checkbox"/>	<input type="checkbox"/>
	Debarment Certificate	<input type="checkbox"/>	<input type="checkbox"/>
	Ethic Statement	<input type="checkbox"/>	<input type="checkbox"/>
	Conflict of Interest Questionnaire	<input type="checkbox"/>	<input type="checkbox"/>
	W9 or W8 Form	<input type="checkbox"/>	<input type="checkbox"/>
	Disclosure of Lobbying Activities	<input type="checkbox"/>	<input type="checkbox"/>
	Form 1295	<input type="checkbox"/>	<input type="checkbox"/>
	Direct Deposit Form (will be provided to the awarded vendor)	<input type="checkbox"/>	<input type="checkbox"/>
	Residence Certification Form	<input type="checkbox"/>	<input type="checkbox"/>
Special Instructions (if applicable)	Bid Schedule/Cost sheet completed and signed	<input type="checkbox"/>	<input type="checkbox"/>
	Cashier Check or Bid Bond of 5% of Total Amount of Bid	<input type="checkbox"/>	<input type="checkbox"/>
	OSHA 300 Log	<input type="checkbox"/>	<input type="checkbox"/>
	Contractor Pre-Bid Disclosure completed, signed and notarized		
	Sub-Contractor Pre-Bid Disclosure completed, signed, and notarized		
		<input type="checkbox"/>	<input type="checkbox"/>
References	Complete the Previous Customer Reference Worksheet for each reference provided	<input type="checkbox"/>	<input type="checkbox"/>
Addenda		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Prospective Bidders are respectfully reminded to completely read and thoroughly respond to the BPUB Instructions for Bidders and Pre-Bid Disclosure Statement. When BPUB evaluates the Bids, it reviews indices regarding the prospective contractors' responsibility to perform the project based upon prior job performances for BPUB and other public owners. Additionally, BPUB carefully reviews the prospective contractors' responsiveness to the BPUB Bid Advertisement. Bidders should thoroughly check their submittal for completeness prior to responding to BPUB. Do not imbalance your Bid line items to overload portions of the work. Remember to answer all written questions in the Pre-Bid Disclosure Statement and then notarize it when signing. Bidders are often required to submit OSHA 300 Logs from prior job performance records as well. BPUB can, has, and will reject Bids that fail the responsibility and/or responsiveness

standards so as to protect the integrity of the bidding process for all participants. The Bidding community's compliance with these guideline standards will be appreciated by the BPUB.

**ETHICS STATEMENT
(Complete and return with bid)**

The undersigned bidder, by signing and executing this bid, certifies and represents to the Brownsville Public Utilities Board that bidder has not offered, conferred or agreed to confer any pecuniary benefit, as defined by (1.07 (a) (6) of the Texas Penal Code, or any other thing of value as consideration for the receipt of information or any special treatment of advantage relating to this bid; the bidder also certifies and represents that the bidder has not offered, conferred or agreed to confer any pecuniary benefit or other thing of value as consideration for the recipient's decision, opinion, recommendation, vote or other exercise of discretion concerning this bid, the bidder certifies and represents that bidder has neither coerced nor attempted to influence the exercise of discretion by any officer, trustee, agent or employee of the Brownsville Public Utilities Board concerning this bid on the basis of any consideration not authorized by law; the bidder also certifies and represents that bidder has not received any information not available to other bidders so as to give the undersigned a preferential advantage with respect to this bid; the bidder further certifies and represents that bidder has not violated any state, federal, or local law, regulation or ordinance relating to bribery, improper influence, collusion or the like and that bidder will not in the future offer, confer, or agree to confer any pecuniary benefit or other thing of value of any officer, trustee, agent or employee of the Brownsville Public Utilities Board in return for the person having exercised their person's official discretion, power or duty with respect to this bid; the bidder certifies and represents that it has not now and will not in the future offer, confer, or agree to confer a pecuniary benefit or other thing of value to any officer, trustee, agent, or employee of the Brownsville Public Utilities Board in connection with information regarding this bid, the submission of this bid, the award of this bid or the performance, delivery or sale pursuant to this bid.

THE VENDOR/CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD HARMLESS THE CITY OF BROWNSVILLE AND THE BROWNSVILLE PUBLIC UTILITIES BOARD, ALL OF THEIR OFFICERS, AGENTS AND EMPLOYEES FROM AND AGAINST ALL CLAIMS, ACTIONS, SUITS, DEMANDS, PROCEEDINGS, COSTS, DAMAGES, AND LIABILITIES, ARISING OUT OF, CONNECTED WITH, OR RESULTING FROM ANY NEGLIGENT ACTS OR OMISSIONS OF CONTRACTOR OR ANY AGENT, EMPLOYEE, SUBCONTRACTOR, OR SUPPLIER OF CONTRACTOR IN THE EXECUTION OR PERFORMANCE OF THIS BID.

I have read all of the specifications and general bid requirements and do hereby certify that all items submitted meet specifications.

COMPANY: _____

AGENT NAME: _____

AGENT SIGNATURE: _____

ADDRESS: _____

CITY: _____

STATE: _____ ZIP CODE: _____

TELEPHONE: _____ TELEFAX: _____

FEDERAL ID#: _____ AND/OR SOCIAL SECURITY #: _____

DEVIATIONS FROM SPECIFICATIONS IF ANY:

NOTE: QUESTIONS AND CONCERNS FROM PROSPECTIVE CONTRACTORS SHOULD BE RAISED WITH OWNER AND ITS CONSULTANT (IF APPLICABLE) AND RESOLVED IF POSSIBLE, PRIOR TO THE BID SUBMITTAL DATE. ANY LISTED DEVIATIONS IN A FINALLY SUBMITTED BID MAY ALLOW THE OWNER TO REJECT A BID AS NON-RESPONSIVE.

NON-COLLUSION AFFIDAVIT

STATE OF TEXAS

§

§

COUNTY OF _____ §

By the signature below, the signatory for the bidder certifies that neither he/she nor the firm, corporation, partnership or institution represented by the signatory or anyone acting for the firm bidding this project has violated the antitrust laws of this State, codified at Section 15.01, *et seq.*, Texas Business and Commerce Code, or the Federal antitrust laws, nor communicated directly or indirectly the bid made to any competitor or any other person engaged in the same line of business, nor has the signatory or anyone acting for the firm, corporation or institution submitting a bid committed any other act of collusion related to the development and submission of this bid proposal.

Signature: _____

Printed Name: _____

Title: _____

Company: _____

Date: _____

SUBSCRIBED and sworn to before me the undersigned authority by _____ on the _____ day of _____, 20____ on behalf of said bidder.

Notary Public in and for the
State of Texas

My commission expires: _____

CERTIFICATION REGARDING DEBARMENT, SUSPENSION,
AND OTHER RESPONSIBILITY MATTERS
(Complete and Return with Bid)

Name of Entity: _____

Entity Unique Entity Identifier Number _____

The prospective participant certifies to the best of their knowledge and belief that they and their principals:

- a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- b) Have not within a three (3) year period preceding this bid been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, Local) with commission of any of the offenses enumerated in paragraph (b) of this certification; and
- d) Have not within a three (3) year period preceding this bid had one or more public transactions (Federal, State, Local) terminated for cause or default.

I understand that a false statement on this certification may be grounds for rejection of this bid or termination of the award. In addition, under 18 USC Section 1001, a false statement may result in a fine up to a \$10,000.00 or imprisonment for up to five (5) years, or both.

Name and Title of Authorized Representative (Typed)

Signature of Authorized Representative

Date

I am unable to certify to the above statements. My explanation is attached.

EPA FORM 5700-49 (11-88)

THIS FORM MUST BE COMPLETED IN ITS ENTIRETY & SUBMITTED WITH BID RESPONSE

CONFLICT OF INTEREST QUESTIONNAIRE For vendor doing business with local governmental entity		FORM CIQ
<p>This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.</p> <p>This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).</p> <p>By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code.</p> <p>A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.</p>	OFFICE USE ONLY	
<p>1 Name of vendor who has a business relationship with local governmental entity.</p>	<p>Date Received</p>	
<p>2 <input type="checkbox"/> Check this box if you are filing an update to a previously filed questionnaire. (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)</p>		
<p>3 Name of local government officer about whom the information is being disclosed.</p> <p style="text-align: center;">_____</p> <p style="text-align: center;">Name of Officer</p>		
<p>4 Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.</p> <p style="margin-left: 40px;">A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?</p> <p style="margin-left: 80px;"> <input type="checkbox"/> Yes <input type="checkbox"/> No </p> <p style="margin-left: 40px;">B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?</p> <p style="margin-left: 80px;"> <input type="checkbox"/> Yes <input type="checkbox"/> No </p>		
<p>5 Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.</p>		
<p>6 <input type="checkbox"/> Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).</p>		
<p>7</p> <p style="text-align: center;"> _____ Signature of vendor doing business with the governmental entity </p> <p style="text-align: right; margin-right: 100px;"> _____ Date </p>		

CONFLICT OF INTEREST QUESTIONNAIRE
For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at <http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm>. For easy reference, below are some of the sections cited on this form.

Local Government Code § 176.001(1-a): "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

- (A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;
- (B) a transaction conducted at a price and subject to terms available to the public; or
- (C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

Local Government Code § 176.003(a)(2)(A) and (B):

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds \$2,500 during the 12-month period preceding the date that the officer becomes aware that

- (i) a contract between the local governmental entity and vendor has been executed; or
- (ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than \$100 in the 12-month period preceding the date the officer becomes aware that:

- (i) a contract between the local governmental entity and vendor has been executed; or
- (ii) the local governmental entity is considering entering into a contract with the vendor.

Local Government Code § 176.006(a) and (a-1)

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

- (1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);
- (2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or
- (3) has a family relationship with a local government officer of that local governmental entity.

(a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(1) the date that the vendor:

- (A) begins discussions or negotiations to enter into a contract with the local governmental entity; or
- (B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

- (A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);
- (B) that the vendor has given one or more gifts described by Subsection (a); or
- (C) of a family relationship with a local government officer.

BROWNSVILLE PUBLIC UTILITIES BOARD
RESIDENCE CERTIFICATION

In accordance with Chapter 2252 of the Texas Government Code, the following will apply. The pertinent portion of the Code has been extracted and is as follows:

Section 2252.001

- (3) "Nonresident bidder" refers to a person who is not a resident of Texas.
- (4) " Resident bidder " refers to a person whose principal place of business is in this State, including a contractor whose ultimate parent company or majority owner has its place of business in this State.

Section 2252.002

A governmental entity may not award a governmental contract to a nonresident bidder unless the nonresident bidder underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in:

- (1) The state in which the nonresident's principal place of business is located; or
- (2) A state in which the nonresident is a resident manufacturer.

I certify that _____ (Company Name)
is a **resident Texas bidder** as defined in Section 2252.001(4) of the Texas Government Code.

Signature: _____

Print Name: _____

I certify that _____ (Company Name)
is a **nonresident bidder** as defined in Section 2252.001(3) of the Texas Government Code and
our principal place of

business is: _____
(City and State)

Signature: _____

Print Name: _____

Request for Taxpayer Identification Number and Certification

**Give Form to the
requester. Do not
send to the IRS.**

▶ Go to www.irs.gov/FormW9 for instructions and the latest information.

Print or type. See Specific Instructions on page 3.	1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.
2 Business name/disregarded entity name, if different from above	3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only one of the following seven boxes. <input type="checkbox"/> Individual/sole proprietor or single-member LLC <input type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____ Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is not disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner. <input type="checkbox"/> Other (see instructions) ▶ _____
4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3): Exempt payee code (if any) _____ Exemption from FATCA reporting code (if any) _____ <small>(Applies to accounts maintained outside the U.S.)</small>	5 Address (number, street, and apt. or suite no.) See instructions. Requester's name and address (optional)
6 City, state, and ZIP code	7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number								
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-	-	-	-					
or								
Employer identification number								
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-	-	-	-					

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here	Signature of U.S. person ▶	Date ▶
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General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to www.irs.gov/FormW9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)

- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, later.

Form **W-8BEN-E**

(Rev. October 2021)
Department of the Treasury
Internal Revenue Service

**Certificate of Status of Beneficial Owner for
United States Tax Withholding and Reporting (Entities)**

▶ For use by entities. Individuals must use Form W-8BEN. ▶ Section references are to the Internal Revenue Code.
▶ Go to www.irs.gov/FormW8BENE for instructions and the latest information.
▶ Give this form to the withholding agent or payer. Do not send to the IRS.

OMB No. 1545-1621

Do NOT use this form for:

- U.S. entity or U.S. citizen or resident W-9
- A foreign individual W-8BEN (Individual) or Form 8233
- A foreign individual or entity claiming that income is effectively connected with the conduct of trade or business within the United States (unless claiming treaty benefits) W-8ECI
- A foreign partnership, a foreign simple trust, or a foreign grantor trust (unless claiming treaty benefits) (see instructions for exceptions) W-8IMY
- A foreign government, international organization, foreign central bank of issue, foreign tax-exempt organization, foreign private foundation, or government of a U.S. possession claiming that income is effectively connected U.S. income or that is claiming the applicability of section(s) 115(2), 501(c), 892, 895, or 1443(b) (unless claiming treaty benefits) (see instructions for other exceptions) W-8ECI or W-8EXP
- Any person acting as an intermediary (including a qualified intermediary acting as a qualified derivatives dealer) W-8IMY

Instead use Form:

Part I Identification of Beneficial Owner

1 Name of organization that is the beneficial owner	2 Country of incorporation or organization
--	---

3 Name of disregarded entity receiving the payment (if applicable, see instructions)

4 Chapter 3 Status (entity type) (Must check one box only):

<input type="checkbox"/> Simple trust	<input type="checkbox"/> Tax-exempt organization	<input type="checkbox"/> Corporation	<input type="checkbox"/> Partnership
<input type="checkbox"/> Central Bank of Issue	<input type="checkbox"/> Private foundation	<input type="checkbox"/> Complex trust	<input type="checkbox"/> Foreign Government - Controlled Entity
<input type="checkbox"/> Grantor trust	<input type="checkbox"/> Disregarded entity	<input type="checkbox"/> Estate	<input type="checkbox"/> Foreign Government - Integral Part
		<input type="checkbox"/> International organization	

If you entered disregarded entity, partnership, simple trust, or grantor trust above, is the entity a hybrid making a treaty claim? If "Yes," complete Part III. Yes No

5 Chapter 4 Status (FATCA status) (See instructions for details and complete the certification below for the entity's applicable status.)

<input type="checkbox"/> Nonparticipating FFI (including an FFI related to a Reporting IGA FFI other than a deemed-compliant FFI, participating FFI, or exempt beneficial owner).	<input type="checkbox"/> Nonreporting IGA FFI. Complete Part XII.
<input type="checkbox"/> Participating FFI.	<input type="checkbox"/> Foreign government, government of a U.S. possession, or foreign central bank of issue. Complete Part XIII.
<input type="checkbox"/> Reporting Model 1 FFI.	<input type="checkbox"/> International organization. Complete Part XIV.
<input type="checkbox"/> Reporting Model 2 FFI.	<input type="checkbox"/> Exempt retirement plans. Complete Part XV.
<input type="checkbox"/> Registered deemed-compliant FFI (other than a reporting Model 1 FFI, sponsored FFI, or nonreporting IGA FFI covered in Part XII). See instructions.	<input type="checkbox"/> Entity wholly owned by exempt beneficial owners. Complete Part XVI.
<input type="checkbox"/> Sponsored FFI. Complete Part IV.	<input type="checkbox"/> Territory financial institution. Complete Part XVII.
<input type="checkbox"/> Certified deemed-compliant nonregistering local bank. Complete Part V.	<input type="checkbox"/> Excepted nonfinancial group entity. Complete Part XVIII.
<input type="checkbox"/> Certified deemed-compliant FFI with only low-value accounts. Complete Part VI.	<input type="checkbox"/> Excepted nonfinancial start-up company. Complete Part XIX.
<input type="checkbox"/> Certified deemed-compliant sponsored, closely held investment vehicle. Complete Part VII.	<input type="checkbox"/> Excepted nonfinancial entity in liquidation or bankruptcy. Complete Part XX.
<input type="checkbox"/> Certified deemed-compliant limited life debt investment entity. Complete Part VIII.	<input type="checkbox"/> 501(c) organization. Complete Part XXI.
<input type="checkbox"/> Certain investment entities that do not maintain financial accounts. Complete Part IX.	<input type="checkbox"/> Nonprofit organization. Complete Part XXII.
<input type="checkbox"/> Owner-documented FFI. Complete Part X.	<input type="checkbox"/> Publicly traded NFFE or NFFE affiliate of a publicly traded corporation. Complete Part XXIII.
<input type="checkbox"/> Restricted distributor. Complete Part XI.	<input type="checkbox"/> Excepted territory NFFE. Complete Part XXIV.
	<input type="checkbox"/> Active NFFE. Complete Part XXV.
	<input type="checkbox"/> Passive NFFE. Complete Part XXVI.
	<input type="checkbox"/> Excepted inter-affiliate FFI. Complete Part XXVII.
	<input type="checkbox"/> Direct reporting NFFE.
	<input type="checkbox"/> Sponsored direct reporting NFFE. Complete Part XXVIII.
	<input type="checkbox"/> Account that is not a financial account.

6 Permanent residence address (street, apt. or suite no., or rural route). Do not use a P.O. box or in-care-of address (other than a registered address).

City or town, state or province. Include postal code where appropriate.	Country
---	---------

7 Mailing address (if different from above)

City or town, state or province. Include postal code where appropriate.	Country
---	---------

ATTACHMENT J: DISCLOSURE OF LOBBYING ACTIVITIES SF-LLL CERTIFICATION
(To be submitted with each bid or offer exceeding \$100,000)

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

- (a) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (b) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.
- (c) The undersigned shall require that the language in paragraphs (a) and (b) of this anti-lobbying certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995).

The Contractor, _____ (insert business name), certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. § 3801 et seq., apply to this certification and disclosure, if any.

SIGNATURE	
NAME OF AUTHORIZED AGENT	
TITLE OF AUTHORIZED AGENT	

DATE	
------	--

ATTACHMENT J: DISCLOSURE OF LOBBYING ACTIVITIES SF-LLL CERTIFICATION (CONTINUED)
(To be submitted with each bid or offer exceeding \$100,000)

COMPLETE THIS FORM ONLY IF YOUR BID OR OFFER EXCEEDS \$100,000 AND FUNDS HAVE BEEN OR WILL BE PAID FOR LOBBYING ACTIVITIES RELATED TO THIS RFP

1. Type of Federal Action: <input type="checkbox"/> a. contract <input type="checkbox"/> b. grant <input type="checkbox"/> c. cooperative agreement <input type="checkbox"/> d. loan <input type="checkbox"/> e. loan guarantee <input type="checkbox"/> f. loan insurance	2. Status of Federal Action: <input type="checkbox"/> a. bid/offer/application <input type="checkbox"/> b. initial award <input type="checkbox"/> c. post-award	3. Report Type: <input type="checkbox"/> a. initial filing <input type="checkbox"/> b. material change
4. Name and Address of Reporting Entity: <input type="checkbox"/> Prime <input type="checkbox"/> Subawardee Tier _____, <i>if known:</i> Name: Street Address: City, State, Zip: Congressional District, if known:	5. If Reporting Entity in No. 4 is Subawardee, Enter Name and Address of Prime: Name: Street Address: City, State, Zip: Congressional District, if known:	
6. Federal Department/Agency:	7. Federal Program Name/Description: CFDA Number, <i>if applicable</i> : _____	
8. Federal Action Number, if known:	9. Award Amount, if known: \$	
10a. Name and Address of Lobbying Registrant Name (First, MI, Last): Street Address: City, State, Zip:	10b. Individuals Performing Services <i>(including address if different from No. 10a)</i> Name (First, MI, Last): Street Address: City, State, Zip:	
11. Information requested through this form is authorized by Title 31 U.S.C., Section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.		
Signature: _____		

Name: _____ _____	Title:
Telephone: _____ _____	Date:
Federal Use Only	Authorized for Local Reproduction Standard Form – LLL (Rev. 7-97)

NOTICE OF AWARD

TO: _____

Project Description: DOWNTOWN WASTEWATER PROJECT 1

Dear Sir/Madam:

The Owner, BPUB has considered the BID submitted by you for the above-described Work in response to its Legal Notice and Invitation to Bid dated <DATE> and Instruction to Bidders.

You are hereby notified that after any Owner adjustments to the Base Bid Amount to account for Owner options regarding additive and deductive alternates, your BID has been accepted in the final Contract Price amount of \$ _____.

You are required by the Instructions to Bidders to execute the Construction Agreement and furnish any required Contractor's Performance Bond, Payment Bond and Certificates of Insurance within ten (10) calendar days from the date you receive this Notice.

In addition with the Bonds and Insurance Certificates, you must complete, execute, and submit a Contractor Job Safety Analysis (JSA) form. The JSA form is required prior to entering into a contractual agreement with the OWNER, and will be valid for a period of thirty (30) calendar days after which you must complete, execute and submit an updated JSA form. The completed JSA form is included as a part of the Contract Documents.

If you fail to execute this Agreement and furnish any required Bonds, Insurance Certificates, or other certifications within ten (10) calendar days from the date of this Notice, Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your BID as abandoned, and as a forfeiture of your BID BOND.

The Owner will be entitled to such other rights as may be granted by law and equity.

You are required to promptly sign and return an acknowledged copy of this NOTICE OF AWARD to the Owner.

Dated this ____ day of _____, 20__.

BROWNSVILLE PUBLIC UTILITIES BOARD OF THE CITY OF BROWNSVILLE, TEXAS

By: _____
Name: Marilyn D. Gilbert, MBA
Title: General Manager & CEO

ACCEPTANCE OF NOTICE OF AWARD

Receipt of the above NOTICE OF AWARD is hereby acknowledged by:

_____ this ____ day
of _____, 20__.

By: _____

Name: _____

Title: _____

NOTICE TO PROCEED

TO:

ADDRESS:

Contract for: Downtown Wastewater Project 1

You are notified that the Contract Time under the above Contract will commence to run on _____, 20__ . By that date, you are to start performing your obligations under the Contract Documents. In accordance with the Agreement, the date of Substantial Completion prior to final payment is _____, 20__.

Before you may start any Work at the site, Bonds and Insurance Certificates along with certain material submittals must be submitted and approved by the BPUB before a BPUB Purchase Order is issued and prior to the purchase and shipment of Work materials.

Brownsville Public Utilities Board:
(Owner)

BY: _____
(Authorized Signature)
NAME: Marilyn D. Gilbert, MBA
TITLE: General Manager & CEO
DATE: _____

CONSTRUCTION AGREEMENT

THIS AGREEMENT is by and between the BROWNSVILLE PUBLIC UTILITIES BOARD of the City of Brownsville, Texas (hereinafter called OWNER or BPUB) and <CONTRACTOR NAME> of <CITY & STATE> (hereinafter called CONTRACTOR), performing as an independent contractor.

OWNER and CONTRACTOR, as the Parties hereto, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK.

CONTRACTOR shall furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the Work described herein and complete all the Work as specified or indicated in the Contract Documents. The Work is generally described as: Downtown Wastewater Project 1 (hereinafter referred to as "Work" and/or "Project").

Article 2. ENGINEER.

The Project has been designed by OWNER'S independent professional engineering consultant(s): STV, Inc. (hereinafter called ENGINEER).

Article 3. CONTRACT TIME.

3.1 The Work shall be Substantially Completed in accordance with paragraph 14.8 of the General Conditions within Three hundred sixty-five (365) consecutive Calendar Days after the date when the Contract Time commences to run as provided in paragraph 2.3 of the General Conditions, and finally completed and ready for final payment in accordance with paragraph 14.13 of the General Conditions within thirty (30) consecutive Calendar Days after the date of Substantial Completion as established in accordance with paragraph 14.8 of the General Conditions.

CONTRACTOR hereby acknowledges and agrees that the ENGINEER has already included in the calculation of the performance Calendar Days, normal, monthly, non-compensable rain days for Cameron County, Texas, based upon historical monthly National Oceanic and Atmospheric Administration (NOAA) record averages.

3.2 **Liquidated Damages.** OWNER and CONTRACTOR recognize that the **TIME OF PERFORMANCE IS OF THE ESSENCE** in this Agreement and that OWNER will suffer financial loss if the Work is not Substantially Complete within the time specified in Article 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. Both Parties hereto 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 Substantially Complete on time. Accordingly, instead of requiring such proof, OWNER and CONTRACTOR agree that as liquidated damages for the delay (but not as a penalty) CONTRACTOR shall pay

OWNER **FIVE HUNDRED DOLLARS AND NO CENTS (\$500.00)** for each Calendar Day that expires after the time specified in Article 3.1 for Substantial Completion, until the Work is Substantially Complete.

Article 4. CONTRACT PRICE.

4.1 CONTRACTOR shall perform the Work described in the Contract Documents for the amounts shown in the CONTRACTOR'S Bid Schedule, and OWNER shall pay CONTRACTOR in current funds based on the Bid Schedule.

Article 5. PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by OWNER as provided for 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 mathematically correct Applications for Payment on or about the twentieth-fifth (25th) Calendar Day after submittal of the Application for Payment each month as provided below. All progress payments shall be on the basis of the progress of the Work measured by the Schedule of Values provided for in paragraph 14.1 of the General Conditions.

5.1.2. Prior to Substantial Completion, progress payments shall be in an amount equal to ninety-five percent (95%) of the amount requested in the Application for Payment, with five percent (5%) remaining as OWNER's retainage for the Project, to be released by OWNER in accordance with Article 5.2 below.

5.1.3. Upon Substantial Completion, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR to ninety-five percent (95%) of the Contract Price, less such amounts OWNER shall determine in accordance with paragraphs 14.7 and 14.8 of the General Conditions.

5.2 **Final Payment.** Upon final completion and acceptance of the Work after resolution of any punch list items in accordance with paragraph 14.8 and 14.13 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by Engineer as provided in said paragraphs 14.13.

Article 6. CONTRACTOR'S REPRESENTATIONS.

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

6.1 CONTRACTOR has familiarized himself with the Project, nature and extent of the Contract Documents, Work, and with all local conditions and federal, state and local

laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work.

6.2 CONTRACTOR has made, or caused to be made, examinations and investigations of information as he deems necessary for the performance of the Work at the Contract Price, as determined by the Bid Schedule and finalized Schedule of Values as determined by Article 2 of the General Conditions, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations or similar data are, or will be required by CONTRACTOR for such purposes.

6.3 CONTRACTOR has given OWNER advanced written notice of all obvious conflicts, errors or discrepancies that he has discovered in the Contract Documents prior to bidding, and the written resolution thereof by OWNER was acceptable to CONTRACTOR.

6.4 CONTRACTOR is skilled and experienced to responsibly perform the type of Work described in the Contract Documents in a workmanlike and timely manner.

Article 7. CONTRACT DOCUMENTS.

The Contract Documents which comprise the entire Agreement between OWNER and CONTRACTOR are attached to this Construction Agreement, made a part hereof, and consist of the following:

- 7.1 Legal Notice and Invitation to Bid
- 7.2 Instructions to Bidders
- 7.3 Bid Forms and Bid Schedule
- 7.4 Bid Bond
- 7.5 Contractor's and Subcontractor's Pre-Bid Disclosure Statements
- 7.6 Notice of Award and Acceptance of Notice
- 7.7 Notice to Proceed
- 7.8 This Construction Agreement
- 7.9 Performance Bond
- 7.10 Payment Bond
- 7.11 General Conditions
- 7.12 Supplementary General Conditions
- 7.13 Technical Specifications
- 7.14 Addendum number(s) __ (page __).
- 7.15 CONTRACTOR's Certificate(s) of Insurance.
- 7.16 Construction Drawings bearing the following general title: B001-24 Downtown Wastewater Project 1 (Sheets 1 through 40)
- 7.17 Any Written Amendment, including Change Orders, duly delivered after execution of this Agreement.

There are no Contract Documents other than those listed above in this Article 7. The Contract Documents may only be altered, amended or repealed by a Written Amendment (as defined in Article 1 of the General Conditions).

Article 8. MISCELLANEOUS.

8.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions shall have the meanings indicated in the General Conditions.

8.2 No assignment by a Party hereto of any rights under, or interest 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 prior written consent (except to the extent that 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 himself, his partners, successors, assigns and legal representatives to the other Party hereto, his partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

8.4 The invalidity or unenforceability of any provision of the Contract Documents shall not affect the validity or enforceability of any other provision of the Contract Documents.

8.5 This Construction Agreement and the Contract Documents are subject to all applicable local, Texas, federal laws, statutes, codes, ordinances, rules and regulations.

8.6 In the event of default by CONTRACTOR under the Contract Documents, OWNER shall have all rights and remedies afforded to it at law or in equity to enforce the terms of the Contract Documents. The exercise of any one right or remedy shall be without prejudice to the enforcement of any other right or remedy allowed at law or in equity.

8.7 If any action at law or in equity is necessary by OWNER to enforce or interpret the terms of the Contract Documents, OWNER shall be entitled to reasonable attorneys' fees, court costs, expert witness fees, and any necessary and reasonable supporting disbursements, in addition to any other relief to which the OWNER is entitled.

8.8 The Contract Documents constitute the **ENTIRE AGREEMENT BETWEEN THE PARTIES** hereto and supersede any prior written or oral agreements and understandings between the Parties. The Contract can only be modified or amended by written agreement of the Parties.

8.9 These Contract Documents are governed by the laws of the State of Texas and the Parties agree that venue for any litigation/arbitration/mediation arising from these Contract Documents shall lie in Cameron County, Texas.

Article 9. OTHER REQUIREMENTS

- 9.1 Workers' Compensation Insurance (For additional detail see: General Conditions paragraphs 5.3.1 and 5.5.1-2)
- A. By signing this Agreement, CONTRACTOR certifies that it provides workers' compensation insurance coverage for all employees employed on this Project pursuant to Tex. Lab. Code Sections 401 and 406.096(a).
 - B. As required by Section 406.096(b) of same Code, CONTRACTOR must require each Subcontractor to certify in writing to the CONTRACTOR that the Subcontractor provides workers' compensation insurance coverage for all of the employees it employs on this Project. CONTRACTOR must provide these certifications to the OWNER within ten (10) calendar days of the Effective Date of this Agreement.
- 9.2 Prohibition of Contracts with Companies Engaged in Business with Iran, Sudan, or Foreign Terrorist Organizations
- A. See: Tex. Gov't Code Section 2252.152, Subchapter F, which prohibits the award of governmental contracts to companies engaged in business with Iran, Sudan, or foreign terrorist organizations.
 - B. By signing this Agreement, CONTRACTOR certifies that it is not ineligible to be awarded this Contract under said Chapter 2252, Subchapter F.
- 9.3 Prohibition of Contracts with Certain Companies that Boycott Israel
- A. See: Tex. Gov't Code Chapter 2271 which prohibits the award of governmental contracts to companies boycotting Israel.
 - B. By signing this Agreement, CONTRACTOR certifies that it does not boycott Israel and will not boycott Israel during the term of this Contract.
- 9.4 Certificate of Interested Parties: CONTRACTOR must complete and submit a Certificate of Interested Parties (Form 1295) to the OWNER with the signed Agreement as required by Tex. Gov't Code Section 2252.908(e).

(THE REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK)

IN WITNESS WHEREOF, the Parties hereto have signed this Construction Agreement in triplicate originals. One counterpart each has been delivered to OWNER and CONTRACTOR, and the third will be filed with the ENGINEER.

This Construction Agreement will be Effective on _____, 20__, the date when OWNER signs below.

[NOTE: THE DATE OF THE PAYMENT AND PERFORMANCE BONDS CANNOT PRECEDE THIS EFFECTIVE CONTRACT DATE.]

BROWNSVILLE
PUBLIC UTILITIES BOARD

<CONTRACTOR>

By: _____

By: _____

Name: Marilyn D. Gilbert, MBA

Name: _____

Title: General Manager & CEO

Title: _____

Signature Date: _____

Signature Date: _____

Attest: _____

Attest: _____

Address for giving notices:

Address for giving notices:

Attn: _____

Attn: _____

1425 Robinhood Drive

Brownsville, TX 78521

(956) 983-6572

<ENTER EMAIL ADDRESS>

CONTRACTOR hereby acknowledges and understands that this is a “separated contract” pursuant to 34 Texas Administrative Code 3.291. The following amount of money represents that part of the total Contract Price representative of the value of tangible personal property to be physically incorporated into the Project realty: \$ _____.

[NOTE: SEE GENERAL CONDITIONS PARAGRAPH 6.16, “Taxes”, and “STATE SALES AND USE TAX EXEMPTION.”]

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

THAT _____
(Name of Contractor as Principal)

(Address of Contractor)

a _____
(corporation, partnership, or individual)

hereinafter called Principal, and

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto the PUBLIC UTILITIES BOARD of the City of Brownsville, Texas, hereinafter called OWNER as Obligee, in the penal sum of _____ Dollars (\$ _____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the OWNER, dated the ____ day of _____, 20 ____, a copy of which is hereto attached and made a part hereof, for the construction of the Project: **Downtown Wastewater Project 1.**

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one (1) year post-construction workmanship guaranty and minimum materials/equipment warranty period, and if he shall satisfy all claims and demands incurred under such Contract, and **SHALL FULLY INDEMNIFY AND SAVE HARMLESS THE OWNER FROM ALL COSTS AND DAMAGES WHICH IT MAY SUFFER BY REASON OF FAILURE TO DO SO**, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received, hereby stipulates and agrees: that no written change, extension of time, alteration or addition to the terms of the Contract or to Project Work to be performed thereunder, or the Specifications accompanying the same, shall in any ways affect its obligation on this PERFORMANCE BOND, and it does hereby waive notice

of any such written change, extension of time, alteration or addition to the terms of the Contract, or to the Project Work, or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose timely filed and legally perfected claim may be unsatisfied.

This PERFORMANCE BOND is subject to and governed by Sections 2253.01-079 of the Texas Government Code (Vernon's Texas Codes Annotated) and Chapter 3503 of the Texas Insurance Code (VTCA), and all amendments thereto.

IN WITNESS WHEREOF, this instrument is executed in triplicate originals, each counterpart of which shall be deemed an original, this the ____ day of _____, 20__.

A. ATTEST:

(Principal)

(Principal) Secretary

By: _____(s)
(Signature of legally authorized representative of Principal)
Print Name _____
Print Title _____

(SEAL)

(Witness as to Principal)

(Address)

(Address)

B. ATTEST:

(Surety)

(Surety) Secretary

By: _____
(Signature of Attorney-in-Fact for Surety)
Print Name _____

(SEAL)

(Witness as to Surety)

(Address)

(Address)

NOTE: Date of PERFORMANCE BOND must not be prior to Effective Date (execution date by OWNER) of Contract. If CONTRACTOR is a Partnership, all partners should execute PERFORMANCE BOND.

IMPORTANT: Surety companies executing PERFORMANCE BONDS must be legally authorized by the Texas State Board of Insurance to transact business in the State of Texas, and be currently listed as an approved federal surety in the most recently issued edition (prior to Contract's Effective Date) of the U. S. Treasury Circular 570.

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS:

THAT _____
(Name of Contractor as Principal)

(Address of Contractor)

a _____
(corporation, partnership, or individual)

hereinafter called Principal, and

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto the PUBLIC UTILITIES BOARD of the City of Brownsville, Texas, hereinafter called OWNER as Obligee, the penal sum of _____ Dollars (\$ _____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the OWNER, dated the ____ day of _____, 20____, a copy of which is hereto attached and made a part hereof, for the construction of the: **Downtown Wastewater Project 1.**

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for, or performing labor in the prosecution of the WORK provided for in such Contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK, whether by SUBCONTRACTORS or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to WORK to be performed thereunder, or the SPECIFICATIONS accompanying the same, shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the WORK, or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge any remaining, timely and legally perfected right of any lawful beneficiary hereunder, whose timely filed and legally perfected claim may be unsatisfied.

This Bond is subject to and governed Sections 2253.01 of the Texas Government Code (Vernon's Texas Codes Annotated) and Chapter 3503 of the Texas Insurance Code (VTCA), and all amendments thereto.

IN WITNESS WHEREOF, this instrument is executed in triplicate, each counterpart of which shall be deemed an original, this the ____ day of _____, 20__.

ATTEST: _____
(Principal)

(Principal) Secretary By: _____ (s)
(Signature)

(SEAL)

(Witness as to Principal) _____
(Address)

(Address)

ATTEST: _____
(Surety)

(Surety) Secretary By: _____
(Attorney-in-Fact)

(SEAL)

(Witness as to Surety) _____
(Address)

(Address)

NOTE: Date of PAYMENT BOND must not be prior to Effective Date (execution date by OWNER) of Contract. If Contractor is a Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing PAYMENT BONDS must be legally authorized by the Texas Board of Insurance to transact business in the State of Texas, and be currently listed as an approved federal surety in the most recently issued edition (prior to Contract's Effective Date) of the U. S. Treasury Circular 570.

ATTACH POWER OF ATTORNEY

INSERT CERTIFICATE OF INSURANCE

**GENERAL CONDITIONS
OF THE
CONSTRUCTION CONTRACT**

Prepared by
The Public Utilities Board of the City of Brownsville, Texas,
as a periodically reviewed and revised
Adaptation From the 1983 Base Document Prepared by

Engineers' Joint Contract Documents Committee

and originally

Issued and Published Jointly By:

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN CONSULTING ENGINEERS COUNCIL

AMERICAN SOCIETY OF CIVIL ENGINEERS

CONSTRUCTION SPECIFICATION INSTITUTE

The base document from which this adaptation (Spring 2020 BPUB) was prepared
(1983 edition) was approved and endorsed by:

The Associated General Contractors of America

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GENERAL CONDITIONS

SCOPE. The Standard General Conditions of the Construction Contract prepared by the National Society of Professional Engineers (NSPE-1910-8, 1983 Edition) as periodically amended and adapted by the OWNER to meet local requirements, shall form a part of this Contract, together with the following Supplementary General Conditions. A copy of the locally amended Standard General Conditions (based upon NSPE-1910-8) is bound herewith. The following supplements modify, change, delete, or add to the General Conditions. Where any part of the General Conditions is modified or voided by any Supplementary General Conditions, the unaltered provisions of that part shall remain in effect.

ARTICLE 1. DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural, male and female thereof:

Addenda - Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding documents or the Contract Documents. These Addenda are a part of the Contract Documents and modify the Drawings, Specifications or other bid documents as indicated. No verbal changes in the Work not depicted or described in writing shall be binding.

Supplements to, changes in, or corrections to the Drawings and/or Specifications issued in writing by OWNER during the period of bidding. These Addenda are a part of the Contract and modify the Drawings and/or Specifications as indicated. No verbal changes in the Work as shown or described shall become binding.

Agreement - The written and signed short-form Construction Agreement (Contract or Agreement) between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents including these General Conditions are attached to the Construction Agreement and made a part thereof as provided therein.

Alternates. Additions to; deletions from; or changes to requirements for the Project, each of which shall be bid separately and shall be included in or deleted/deducted from the Contract at the discretion of OWNER.

Application for Payment - The form developed by OWNER which is to be used by CONTRACTOR in requesting interim progress or final Contract payments and which is to include such supporting documentation as is required by the Contract Documents.

Bid - The written offer or proposal of the bidder submitted on the OWNER prescribed form setting forth in figures and in script, the prices for the Work to be performed.

Bonds - Bid, Performance and Payment Bonds procured by the CONTRACTOR from a surety authorized by the Texas Department of Insurance to conduct business in the State of Texas, and any other instruments of security as may be specified by the OWNER.

Calendar Day –A calendar day consists of twenty-four hours and is measured from midnight, to the next midnight, and shall constitute a single calendar day. Calendar days include Saturdays and Sundays. THIS IS A CALENDAR DAY CONTRACT.

Change Order - A document developed by ENGINEER, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion or revision to the Work, or an adjustment in the Contract Price and/or the Contract Time, issued after the Effective Date of the Construction Agreement. Executed Change Orders are part of the amended Contract Documents.

Contract Documents – The Legal Notice and Invitation to Bid; Instructions to Bidder(s); Pre-Bid Disclosure Statements; Notice of Award; Notice to Proceed; The Construction Agreement; Addenda (which pertain to the Contract Documents); CONTRACTOR's Bid (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award); the Bid, Performance and Payment Bonds; these General Conditions; the Supplementary Conditions; the Specifications and the Drawings; and those documents enumerated in Article 7 of the Construction Agreement; and those outlined in paragraphs 3.4 and 3.5 of the General Conditions..

Contract Price - The moneys payable by OWNER to CONTRACTOR under the Contract Documents as stated in the Agreement (subject to the General Conditions provisions of paragraphs 9.1 and 11.9.1 in the case of Unit Price Work).

Contract Time - The number of days (“calendar” days computed as provided in General Conditions paragraph 17.2) or the date specifically stated in the Agreement for the Substantial Completion of the Work.

CONTRACTOR - The person, firm or corporation with whom OWNER has entered into the Agreement to construct the Work.

Defective - An adjective which when modifying the word "Work" refers to "Work" that is unsatisfactory, faulty or deficient, or does not conform to, or comply with the Contract Documents, or does not meet the requirements of any inspection, referenced standard, test or approval referred to in the Contract Documents, or has been damaged prior to the time OWNER makes the final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with General Conditions paragraph 14.8 or 14.10).

Drawings - The drawings (plans) which depict the character, design, and scope of the Work to be performed and which have been prepared and/or approved by ENGINEER and are referred to in the Contract Documents.

Effective Date of the Agreement - The date indicated in the short-form Construction Agreement document upon which it becomes legally binding and effective, but if no such date is indicated, it means the date on which the Construction Agreement is signed by OWNER.

Engineer- The private, outside, independent professional engineering consulting firm(s) named as such in the Agreement.

Field Order - A written order issued by ENGINEER which orders minor changes or contains interpretations in the Work in accordance with General Conditions paragraph 9.5, but which does not involve a change in the Contract Price or the Contract Time.

Furnish. To supply at the Work jobsite the materials, supplies, equipment, etc., referred to in the Specifications and/or Drawings. Installation is not always required of the Supplier by the Specifications, but shall be performed or arranged for by the General CONTRACTOR.

General Requirements – Division 1 of the Specifications.

Laws and/or Regulations - Federal and/or State Laws, rules, administrative agency regulations, local ordinances, local codes and/or court orders applicable to the Work performance.

Notice of Award - The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Construction Agreement.

Notice to Proceed - A written notice given by OWNER to CONTRACTOR (with copy to ENGINEER) fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.

OWNER'S Project Team (OPT) - The OWNER, OWNER'S Field Representative, ENGINEER, ENGINEER's Resident Project Representative, and the other entities identified in the Supplementary Conditions and the consultants, subconsultants, individuals or entities directly or indirectly employed or retained by them to provide services to the Owner.

OWNER - The City of Brownsville, acting through its Public Utilities Board (BPUB) of the City of Brownsville, Texas and its directly employed authorized representatives.

Partial Utilization - Placing a portion of the Work in service for the benefit of the OWNER and for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion for all the Work.

Project – The construction of the Work to be provided to OWNER under the Contract Documents which may be the whole, or a part, as indicated elsewhere in the Contract Documents.

Provide – To furnish and install the materials, supplies, equipment, etc. referred to in the Specifications and/or Drawings, at the location shown or otherwise approved at the Project Work job-site.

Site Observers - Resident Project Representative - The authorized representative of ENGINEER who is assigned to periodically observe the Work at the site of the Project, or any part

thereof, on behalf of OWNER. OWNER'S Field Representative – the authorized representative of OWNER who observes the daily Work progress on behalf of OWNER. These two Representatives will coordinate with each other.

Shop Drawings - All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by, or for CONTRACTOR, to illustrate some portion of the Work, and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by CONTRACTOR to ENGINEER, to illustrate material or equipment for some portion of the Work.

Special Conditions – Those portions of the Contract Documents unique to this Project and often mandated by third-party regulatory and funding authorities.

Specifications - Those portions of the Contract Documents consisting of written technical descriptions for the design configuration and/or performance standard for materials, equipment, any specified construction systems, standards and workmanship, as applied to the Work and certain administrative details applicable thereto.

Standard Abbreviations. Wherever reference is made to standard specifications, standards of quality or performance, as established by a recognized national authority, the reference may be by initials and acronyms as generally recognized throughout the engineering and construction industries.

Subcontractor – An individual, firm or corporation having a direct contract with CONTRACTOR, or with any other Subcontractor (subtier), for the performance of a part of the Work at the Project site.

Substantial Completion - The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by its ENGINEER's definitive written and signed certificate of Substantial Completion, and that it is apparently sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the OWNER's purposes for which it is intended; or if there is no such certificate issued by ENGINEER, when final payment is due in accordance with General Conditions paragraph 14.13. The terms "Substantially Complete" and "Substantially Completed" as applied to any Work refer to the Substantial Completion thereof.

Supplementary Conditions - The part of the Contract Documents which amends or supplements these General Conditions.

Supplier - A manufacturer, fabricator, supplier, distributor, materialman or third-party vendor.

Underground Facilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such manmade facilities or attachments, and any outer encasements containing such facilities (vaults, conduits) which have been installed underground to furnish/transport any of the following services or materials: electricity, gases, steam, liquid

petroleum products, telephone or other related data communications, cable television, sewage, storm drainage, traffic or other electronic control systems or potable water.

Unit Price Work - Work to be paid for on the basis of unit prices for ENGINEER/OWNER estimated quantities.

Work - The entire completed construction or the various separately identifiable parts thereof, required to be furnished by the CONTRACTOR under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction Project, all as required by the Contract Documents.

Work Directive Change - A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER, ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in General Conditions paragraph 4.2 or 4.3 or to emergencies under General Conditions paragraph 6.24. A Work Directive Change may not change the Contract Price or the Contract Time, but is evidence that the parties expect that the change directed or documented by a Work Directive Change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Time as provided in General Conditions paragraph 10.2.

Working Day. When and if applicable, a week day (Monday through Friday only, inclusive) in which weather conditions are such that Work can be performed in a normal manner. Weekends (Saturday, Sunday) and OWNER holidays shall not be considered working days.

Written Amendment - A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the non-engineering or non-technical (rather the commercial terms, legal provisions, etc.), rather than Work-related, aspects of the Contract Documents. Written Amendments are normally embodied in a Change Order once construction commences.

ARTICLE 2. PRELIMINARY MATTERS

Delivery of Bonds:

2.1 When CONTRACTOR delivers the triplicate original executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

2.2 OWNER shall furnish to CONTRACTOR up to ten (10) copies (unless otherwise specified in the Supplementary Conditions) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished to CONTRACTOR, upon request, at the cost of reproduction reimbursable to OWNER.

Commencement of Contract Time; Notice to Proceed:

2.3 The Contract Time will commence to run and be accounted for on the date indicated in the Notice to Proceed. A Notice to Proceed may be given by OWNER at any time after the Effective Date of the Agreement. The CONTRACTOR should be prepared to perform Work as soon as Contract Time commences.

Starting the Project:

2.4 CONTRACTOR is obligated to perform the Work on the date when the Contract Time commences to run, but no Work shall be done at the Project site prior to the date on which the Contract Time commences to run per the Notice to Proceed.

Before Starting Construction:

2.5 Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby. CONTRACTOR shall be in **DEFAULT** to OWNER for failure to report to ENGINEER any obvious conflict, error, or discrepancy in the Contract Documents, if CONTRACTOR had actual knowledge thereof, or should reasonably have known thereof pursuant to customary construction industry standards.

2.6 Within ten (10) calendar days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

2.6.1 an estimated Work Progress Schedule indicating the starting and completion dates of the various critical stages of the Work; and

2.6.2 a preliminary Schedule of Shop Drawing submissions; and

2.6.3 a preliminary Schedule of Values for all of the Work, which will include quantities and prices of items aggregating the total Contract Price and will subdivide the Work into logical component parts in sufficient detail to later serve as the basis for measuring actual Project progress and substantiating monthly payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be automatically confirmed in writing by CONTRACTOR at the time of submission to ENGINEER.

2.7 By the tenth (10th) calendar day after award of the Contract by OWNER, CONTRACTOR shall deliver to OWNER (with copy to ENGINEER) original certificates (and any other evidence of insurance requested by OWNER) which CONTRACTOR is required to purchase and maintain in accordance with Article 5.

Preconstruction Conference:

2.8 After the Effective Date of the Agreement, but before CONTRACTOR starts the Work at the Project site, a mandatory conference attended by CONTRACTOR, ENGINEER, OWNER and others as appropriate, will be held to discuss the Schedules referred to in paragraph 2.6, to discuss procedures for managing exchanges of Shop Drawings and other submittals and for processing Applications for Payment; and to establish a working and pragmatic understanding among the Project participants as to the general progress and administration of the Work.

Finalizing Schedules:

2.9 At least ten (10) calendar days before submission of the first monthly Application for Payment, a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to finalize the various Schedules submitted in accordance with Article 2.6. The finalized Progress Schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within the Contract Time, but such acceptance will neither impose on ENGINEER responsibility for the progress or scheduling of the Work, nor relieve CONTRACTOR from full responsibility therefore. CONTRACTOR acknowledges the ENGINEER has already included in the calculation of the performance calendar days agreed to by CONTRACTOR by its Bid submission in this calendar day Contract, normal non-compensable monthly rain days for Cameron County, Texas. The CONTRACTOR shall update this Progress Schedule no less than monthly at each payment submittal. The CONTRACTOR shall only include in the submittal any abnormal and unusual rain days that exceed those typically experienced in Cameron County, Texas, based upon historical monthly National Oceanic and Atmospheric Administration (NOAA) record averages (rain days will be verified by the ENGINEER and the Site Observers weekly), and any OWNER approved time extensions in the modified Progress Schedule. The amended monthly Work Progress Schedule shall be reviewed and accepted by the ENGINEER and the OWNER monthly as a pre-condition to payment to CONTRACTOR. The finalized Schedule of Shop Drawing submissions will be acceptable to ENGINEER as providing a workable arrangement for processing the exchange of submissions. The finalized Schedule of Values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3. CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

Intent:

3.1 The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of Cameron County, Texas.

3.2 It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents as being required of CONTRACTOR to produce the OWNER'S intended result will be supplied by CONTRACTOR, whether or not specifically called for. When words which have a well-known

technical or trade meaning are used to describe Work, materials or equipment, such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, whether such reference is specific or by implication, shall mean the latest amended standard specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Construction Agreement, if there were no Bids for a specialty project), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR, ENGINEER or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to ENGINEER, or any of ENGINEER's subconsultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of paragraphs 9.15 or 9.16. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER in writing as provided in paragraph 9.4.

3.3 If, during the performance of the Work, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall immediately report same to ENGINEER in writing, and before proceeding with the Work affected thereby, shall obtain a written interpretation or clarification from ENGINEER. CONTRACTOR shall be in **DEFAULT** to OWNER for failure to report any obvious conflict, error or discrepancy in the Contract Documents if CONTRACTOR had actual knowledge thereof, or should reasonably have known thereof, pursuant to customary construction industry standards.

Amending and Supplementing Contract Documents:

3.4 The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following written ways:

- 3.4.1 a formal Written Amendment,
- 3.4.2 a Change Order (pursuant to definition and paragraph 10.4), or
- 3.4.3 a Work Directive Change (pursuant to definition and paragraph 10.1).

As indicated in paragraphs 11.2 and 12.1, Contract Price and Contract Time may only be changed by a Change Order or a Written Amendment.

3.5 In addition, the requirements of the Contract Documents may be supplemented and minor variations and deviations in the Work may be authorized in one or more of the following ways:

- 3.5.1 a Field Order (pursuant to definition and paragraph 9.5),
- 3.5.2 OWNER Engineer's approval of a Shop Drawing or sample (pursuant to

definition and paragraphs 6.25 through 6.30), or

3.5.3 OWNER Engineer's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents:

3.6 Neither CONTRACTOR, nor any Subcontractor (including sub-tier subcontractors) or Supplier, or other related person or organization performing or furnishing any of the Project Work to OWNER, shall have or acquire any title to, or ownership rights in, any of the Drawings, Specifications or other Contract Documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER, and they shall not reuse any of them on extensions of the Project or any other project without written consent of OWNER and ENGINEER, and specific written verification or adaptation by ENGINEER for a fee. All Drawings, Specifications or other Documents (or copies of any thereof) are upon completion of the Project to become the property of OWNER. Further use thereof without written consent of OWNER and ENGINEER is prohibited and solely at the risk of the user.

ARTICLE 4. AVAILABILITY OF LANDS: PHYSICAL CONDITIONS: REFERENCE POINTS

Availability of Lands:

4.1 OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way, licenses and easements for access thereto and such other lands which are specifically designated by OWNER for the use of CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR believes that any delay in OWNER's furnishing of these lands, rights-of-way, licenses or easements entitles CONTRACTOR to an extension of the Contract Time, CONTRACTOR may make a claim therefore as provided in Article 12. CONTRACTOR may privately and separately provide at his own option and non-reimbursable cost, for any and all additional lands, and access thereto, that may be required for CONTRACTOR'S temporary construction facilities or storage of materials and equipment.

4.2 Physical Condition:

4.2.1 Explorations and Reports: Reference is made to the Supplementary Conditions for any identification of any reports of geotechnical explorations and tests of subsurface conditions at the Project site that may have been utilized by ENGINEER in preparation of the Contract Documents. Any of these geotechnical explorations and reports are expressly not part of these Contract Documents. CONTRACTOR may not rely upon the accuracy of the technical data contained in any such reports, nor upon non-technical data, interpretations or opinions contained therein or for the completeness thereof, for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to CONTRACTOR'S advanced, pre-bid exploration, testing and

determining any CONTRACTOR risk and cost associated with encountering any subsurface conditions at the Project site.

4.2.2 Existing Structures: Reference is made to the Supplementary Conditions for any identification of those Drawings of physical conditions in or relating to existing surface or subsurface structures (except Underground Facilities referred to in paragraph 4.3) which are at or contiguous to the Project site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data actually contained in such drawings, but not for the current physical conditions or description completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to current locating, verification, investigation of, and encountering physical conditions in or relating to such structures.

4.2.3. Report of Differing Conditions: If CONTRACTOR believes that:

4.2.3.1 any technical data on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is inaccurate, or

4.2.3.2 any physical condition uncovered or revealed at the Project site differs materially from that indicated, reflected or referred to in the Contract Documents,

CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.22), notify OWNER's Field Representative and ENGINEER's Resident Project Representative in writing about the inaccuracy or difference.

4.2.4 ENGINEER's Review: ENGINEER will promptly review the pertinent conditions, determine the necessity of obtaining any additional explorations or tests with respect thereto, and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

4.2.5 Possible Document Change: If ENGINEER concludes that there is a material error in the Contract Documents, or that because of newly discovered, latent physical conditions, a change in the Contract Documents is required, a Work Directive Change or a Change Order may be issued as provided in Article 10 to reflect and document the consequences of the inaccuracy or difference.

4.2.6 Possible Price and Time Adjustments: In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, may be allowable to the extent that they are attributable to any such inaccuracy or difference. If OWNER and CONTRACTOR are unable to agree as to the financial impact or length thereof, a CONTRACTOR or OWNER claim may be made therefore as provided in Articles 11 and 12. All increases or decreases in the Contract Price shall be governed by all State and local statutes, codes, laws, ordinances, rules and regulations governing public competitive bidding and Change Orders.

Physical Conditions

4.3 Underground Facilities:

4.3.1 **Shown or Indicated:** The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Project site is only based on existing available information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities, (Non-OWNER utilities, pipeline companies, railroads, etc.) or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

4.3.1.1 OWNER and ENGINEER shall not be responsible for the actual current conditions, accuracy or completeness of any such third-party information or data; and,

4.3.1.2 CONTRACTOR shall have full responsibility before commencement of related Work for reviewing and checking all such current information and data; for locating all actual current Underground Facilities shown or indicated in the Contract Documents, for coordination of the Work with the owners of such Underground Facilities during construction; for the safety and protection thereof as provided in paragraph 6.20 and; paying for the repair of any damage thereto resulting from the Work; the cost of all of which is mutually considered between OWNER and CONTRACTOR as having been included in the CONTRACTOR'S original Contract Price.

4.3.2 **Not Shown or Indicated:** If an Underground Facility is uncovered or revealed at or contiguous to the Project site which was not shown or indicated in the Contract Documents, and which CONTRACTOR could not reasonably have been expected to be aware of under customary construction industry standards, CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work affected thereby (except in an emergency as permitted by paragraph 6.22), identify the owner of such Underground Facility and give written notice thereof to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility to determine the extent to which the Contract Documents should be modified to reflect and document any consequences of the existence of the Underground Facility, and the Contract Documents may be amended or supplemented to the extent necessary. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR may be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents, and which CONTRACTOR could not reasonably have been expected to be aware of pursuant to customary construction industry standards. If the parties are unable to agree as to the financial impact or length thereof, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. All increases or decreases in the Contract Price shall be governed by all State and local statutes, codes, laws, ordinances, rules and regulations governing public competitive bidding and Change Orders.

Reference Points:

4.4. CONTRACTOR shall be responsible for laying out the Work (unless otherwise specified by OWNER in the General Requirements), and shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of ENGINEER. CONTRACTOR shall report to ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and CONTRACTOR shall be responsible for the accurate replacement or relocation of such reference points by CONTRACTOR-retained professionally qualified personnel (not including OWNER or ENGINEER representatives).

ARTICLE 5. BONDS AND INSURANCE

Performance and Payment Bonds:

For a Contract in excess of \$100,000.00, a Performance Bond shall be procured and executed by CONTRACTOR in the full amount of the Contract Price conditioned upon the faithful performance of the Work for OWNER in accordance with the Plans, Specifications and Contract Documents. Said Bond shall be solely for the protection of the OWNER.

For a Contract in excess of \$50,000.00, a Payment Bond shall be executed in the full amount of the Contract Price, for the primary protection of all claimants against the surety for non-payment in supplying labor, materials and equipment in the prosecution of the Work provided for in the Contract, for the use of each such claimant timely perfecting a proper claim against surety.

5.1 CONTRACTOR shall furnish Performance and Payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance of the Work for OWNER and payment of all CONTRACTOR's labor, materials, equipment and supply obligations under the Contract Documents. **These Bonds shall remain in effect by CONTRACTOR at least until one year after the date when final payment becomes due**, except as otherwise provided by Law or Regulation or by the Contract Documents. CONTRACTOR shall also furnish any such other bonds as may be required by the Supplementary Conditions (e.g. any maintenance, extended warranty, special indemnity, etc.). All Bonds shall be in the forms prescribed by Law or Regulation or by the Contract Documents and be executed by such sureties as are authorized to do business in the State of Texas. All Bonds signed by an agent ("attorney in fact") must be accompanied by a certified copy of the authority to act on behalf of the surety.

5.2 If the surety on any Bond furnished by CONTRACTOR is declared a bankrupt or becomes insolvent, or its right to do business in Texas is terminated or it ceases to meet the requirements of paragraph 5.1, CONTRACTOR shall within five (5) calendar days thereafter substitute another Bond and surety, both of which must be acceptable to OWNER.

Contractor's Liability Insurance:

5.3 CONTRACTOR shall purchase and maintain such commercial general liability and other insurance coverages as are appropriate for the Work being performed and furnished, and as

will provide protection from claims set forth below which may arise out of, or result from, CONTRACTOR's performance and furnishing of the Work and CONTRACTOR's other obligations under the Contract Documents; whether it is to be performed or furnished by CONTRACTOR, by any Subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the Work; or by anyone for whose acts and/or omissions any of them may be liable:

5.3.1 Claims under workers' compensation, disability benefits and other similar employee benefit acts. This is a Texas public works Contract and any CONTRACTOR'S or Subcontractor's attempted rejection of the worker's compensation act, and thereby substituting a CONTRACTOR'S or Subcontractor's self-insurance reserve, is specifically prohibited by Texas law.

5.3.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees traditionally covered by employer's liability insurance;

5.3.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

5.3.4 Claims for damages insured by personal injury liability coverage which are sustained: (a) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR; or (b) by any other person for any other reason;

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

5.3.6 Claims arising out of operation of Laws or Regulations for damages because of bodily injury or death of any person or for damage to property; and

5.3.7 Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any owned or hired motor vehicle.

The various insurance coverages required by this Article 5 shall include the specific type coverage and be underwritten for not less than the limits of liability and coverage amounts provided herein below or in the Supplementary Conditions, or required by law, whichever is greater. The commercial general liability insurance shall include completed operations insurance. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall be of an "occurrence"-type, when applicable, and shall contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least (30) thirty days prior written notice has been given to OWNER by certified mail. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing defective Work in accordance with paragraph 13.12. In addition, CONTRACTOR shall maintain such completed operations insurance for at least two (2) years after final payment and furnish OWNER with evidence of

continuation of such insurance at final payment and one year thereafter. Insurance coverage furnished under the Contract Documents (except for Workmen's Compensation and any professional engineering errors and omissions liability insurance that CONTRACTOR or his agent might carry applicable to this Project) shall include the City of Brownsville and BPUB as OWNER, and their respective City Commissioners, public officials, officers, Board Members, and employees, as named additional insureds and hereinafter known as "additional insureds."

The following entities are to also be specifically named as additional insureds:

1. City of Brownsville, Texas
Attn: City Secretary Griselda Rosas
City Plaza, First Floor
1034 E. Levee St.
Brownsville, Texas 78520

2. Brownsville Public Utilities Board
1425 Robinhood Drive
Brownsville, TX 78521

Contractual Liability Insurance:

5.4 The commercial general liability insurance required by paragraph 5.3 will include contractual liability insurance applicable to CONTRACTOR's INDEMNITY obligations under paragraphs 6.32 and 6.33.

5.5 Specific Coverages of Insurance Required by Owner:

5.5.1 Workmen's Compensation and Employer's Liability. This insurance shall protect the laborer, and insure the CONTRACTOR, and insulate the additional insureds, against all claims under applicable Texas workmen's compensation laws, pursuant to subparagraph 5.3.1. The additional insureds shall also be protected under an Employer's Liability policy against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a workmen's compensation law. This Employer's Liability policy shall include an "all states" endorsement.

5.5.2. **Mandatory TWCC Rule 28 TAC Sect. 110.110 Adapted Language**

(A) **Definitions:**

Certificate of coverage ("certificate") - A copy of a certificate of insurance, or a coverage agreement, showing statutory workers' compensation insurance coverage for the person's or entity's (CONTRACTOR's) employees providing services on this public works Project, for the duration of this Project.

"Duration of the Project" - includes the time from the beginning of the Work on this Project until the CONTRACTOR's/person's Work on this Project has been completed and accepted by the OWNER.

“Persons providing services on the Project” (“subcontractor” in § 406.096) - includes all persons or entities performing all or part of the services the CONTRACTOR has undertaken to perform on this Project, regardless of whether that person contracted directly with the CONTRACTOR and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on this Project.

"Services" - include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to this Project.

- (B) The CONTRACTOR shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, § 401.011(44) for all employees of the CONTRACTOR providing services on this Project, for the duration of this Project.
- (C) The CONTRACTOR must provide a certificate of coverage to the OWNER prior to being awarded the Contract.
- (D) If the coverage period shown on the CONTRACTOR'S current certificate of coverage ends during the duration of this Project, the CONTRACTOR must, prior to the end of the coverage period, file a new certificate of coverage with the OWNER showing that coverage has been extended.
- (E) The CONTRACTOR shall obtain from each person providing services on this Project, and provide to the OWNER:
 - (1) a certificate of coverage, prior to that person beginning Work on this Project, so the OWNER will have on file certificates of coverage showing coverage for all persons providing services on this Project; and
 - (2) no later than seven (7) calendar days after receipt by the CONTRACTOR, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of this Project.
- (F) The CONTRACTOR shall retain all required certificates of coverage for the duration of this Project and for three (3) years thereafter.
- (G) The CONTRACTOR shall notify the OWNER in writing by certified mail or personal delivery, within ten (10) calendar days after the CONTRACTOR knew or should have known, of any change that materially affects the provision of coverage

of any person providing services on this Project.

- (H) The CONTRACTOR shall post on this Project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on this Project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.
- (I) The CONTRACTOR shall contractually require each person with whom it contracts to provide services on this Project, to:
 - (1) provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, § 401.011(44) for all of its employees providing services on this Project, for the duration of this Project;
 - (2) provide to the CONTRACTOR, prior to that person beginning Work on this Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on this Project, for the duration of this Project;
 - (3) provide the CONTRACTOR, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of this Project;
 - (4) obtain from each other person with whom it contracts, and provide to the CONTRACTOR:
 - (a) a certificate of coverage, prior to the other person beginning Work on this Project; and
 - (b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of this Project;
 - (5) retain all required certificates of coverage on file for the duration of this Project and for three (3) years thereafter;
 - (6) notify the OWNER in writing by certified mail or personal delivery, within ten (10) calendar days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on this Project; and
 - (7) contractually require each person with whom it contracts, to perform as

required by clauses (I)-(1-7) of this subparagraph, with the certificates of coverage to be provided to the person for whom they are providing services.

- (J) By signing this Contract or providing or causing to be provided a certificate of coverage, the CONTRACTOR is representing to the OWNER that all employees of the CONTRACTOR who will provide services on this Project will be covered by workers' compensation coverage for the duration of this Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier. Providing false or misleading information may subject the CONTRACTOR to administrative penalties, criminal penalties, civil penalties, or other civil actions.
- (K) The CONTRACTOR's failure to comply with any of these provisions is a breach of Contract by the CONTRACTOR which entitles the OWNER to declare the Contract void if the CONTRACTOR does not remedy the breach within ten (10) calendar days after receipt of notice of breach from the OWNER.

The liability limits shall not be less than:

Workmen's compensation	Texas Statutory Limits
Employer's liability	\$100,000.00 each occurrence

5.5.3 Comprehensive Business Automobile Liability. This insurance shall be written in comprehensive business form and shall protect the CONTRACTOR and the additional insureds against all claims described under Section 5.3.7. of the General Conditions of the Contract Documents and arising from the use of motor vehicles, and shall cover, on or off the Project site, all motor vehicles licensed for highway use, whether they are owned, non-owned, or hired.

The liability limits shall not be less than:

Bodily Injury and property damage	\$500,000.00 combined single limit each occurrence
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5.5.4 Commercial General Liability. This insurance shall be an "occurrence" type policy written in commercial form and shall protect the CONTRACTOR and the additional insureds against all claims described in Sections 5.3, 5.3.3., 5.3.4., 5.3.5., 5.3.6, 5.4 of the General Conditions of the Contract Documents arising out of any intentional or negligent act and/or omission of the CONTRACTOR or his agents, employees, or subcontractors. This policy shall also include protection against claims insured by usual personal injury liability coverage.

The liability limits shall not be less than:

Personal Injury and property damage	\$1,000,000.00 combined single limit each occurrence and
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and \$1,000,000.00 aggregate

If the CONTRACTOR'S Work, or Work under his direction, requires blasting, explosive conditions, or underground operations, the commercial general liability coverage shall contain no exclusion relative to blasting, exploding, collapse of structures, or damage to underground property.

5.5.5 Excess Umbrella Liability Policy. This insurance shall protect the CONTRACTOR and the additional insureds against all claims in excess of the limits provided under the employer's liability, comprehensive business automobile liability, and commercial general liability policies. The liability limits of the umbrella policy shall not be less than \$2,000,000.00. The policy shall be an "occurrence" type policy.

5.5.6 Transportation Insurance. This insurance shall be of the "all risks" type and shall protect the CONTRACTOR and the OWNER from all insurable risks of physical loss or damage to equipment and materials in transit to the Project jobsite and until the OWNER receives the equipment and materials at the Project jobsite. The coverage amount shall be not less than one-half of the full amount of the total Contract Price.

Transportation insurance shall provide for losses to be payable to the CONTRACTOR and the OWNER as their respective legal interests may appear.

5.5.7 All policies required under paragraph 5.5 herein shall contain a "cross liability" or "severability of interest" clause or endorsement. Notwithstanding any other provision of these policies, the insurance afforded shall apply separately to each insured, named insured, or additional insured with respect to any claim, suit, or judgment made or brought by or for any other insured, named insured, or additional insured, as though a separate policy had been issued to each, except the insurer's liability shall not be increased beyond the amount or amounts for which the insurer would have been liable had only one insured been named.

5.5.8 CONTRACTOR shall require each of his Subcontractors to procure and maintain during the life of his subcontract, Subcontractor's Commercial General Liability and Property Damage Insurance of the type specified in subparagraphs 5.5.1, 5.5.2, 5.5.3, 5.5.4 and paragraph 5.6 hereof, in the same amounts as required by OWNER for CONTRACTOR, unless alternative amounts are approved in writing by OWNER.

5.5.9 The insurance required under subparagraphs 5.5.1, 5.5.2, 5.5.3, 5.5.4 and paragraph 5.6 hereof shall provide adequate protection for CONTRACTOR and his Subcontractors respectively against damage claims which may arise from operations under this Contract, whether such operation is by the insured or by anyone directly or indirectly employed by him, and also, against any special hazards which may be encountered in the performance of this Contract.

5.5.10 CONTRACTOR shall not commence any Work under this Contract until he has obtained all the insurance coverage required under this Article 5. and such insurance has been approved by OWNER; nor shall CONTRACTOR allow any Subcontractor to commence Work on this Contract until the insurance required by the Subcontractor has been so obtained and

approved.

Property Insurance:

5.6 Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain property insurance upon the Work at the Project site to the full insurable value thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions, established by current customary construction industry standards given the type of Work in Cameron County, Texas and value thereof, or as may be required by Laws and Regulations). This insurance shall include the interests of OWNER, CONTRACTOR, and Subcontractors, in the Work, all of whom shall be listed as insured or additional insured parties, which shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and such other perils as may be provided in the Supplementary Conditions (e.g. flood, wind, etc.); and shall include damages, losses and expenses arising out of or resulting from any insured loss or cost incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals). If not covered under the "all risk" insurance or otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment. The policies of insurance required to be purchased and maintained by CONTRACTOR in accordance with this paragraph shall be of an "occurrence"-type, when applicable, and contain a provision that the coverage afforded will not be canceled or materially changed until at least (30) thirty calendar days prior written notice has been given to OWNER by certified mail.

5.6.1 Property Insurance Coverage. This insurance shall protect CONTRACTOR and the additional insureds against all claims described in Section 5.6 and shall provide the following minimum amounts:

Property Insurance Coverage: Provide Full Contract Price Amount or \$100,000.00 Minimum, whichever is greater.

Waiver of Rights:

5.7 Waiver

5.7.1 CONTRACTOR waives all rights against OWNER, (unless OWNER or other named entities as additional insureds were solely negligent), for all losses and damages caused by any of the perils covered by the policies of insurance provided in response to paragraph 5.6 and any other property insurance applicable to the Work, and also waives all such rights against all other entities named as additional insureds in such policies for losses and damages so caused. As required by paragraph 6.12, each subcontract between CONTRACTOR and a Subcontractor will contain similar "flow down" waiver provisions by the Subcontractor in favor of CONTRACTOR, OWNER, ENGINEER and their respective sub-consultants, and all other entities named as additional insureds.

5.7.2 CONTRACTOR intends that any policies provided in response to paragraph 5.6 shall protect all of the entities insured and provide primary coverage for all losses and damages caused by the perils covered thereby. Accordingly, all such policies shall 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 of the entities named as insured or additional insured, and if the insurers require separate waiver forms to be signed by any Subcontractor, CONTRACTOR will obtain the same.

Acceptance of Insurance:

5.8 If OWNER has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR in accordance with paragraphs 5.3, 5.4, 5.5 and 5.6 on the basis of the coverages not complying with the Contract Documents, OWNER will attempt to notify CONTRACTOR in writing thereof within ten (10) calendar days of the date of delivery of such certificates to OWNER in accordance with paragraph 2.7. CONTRACTOR shall provide to the OWNER such additional information regarding the insurance provided by CONTRACTOR as the OWNER may reasonably request. Failure on the part of the OWNER or its agents to detect an insurance deficiency as compared to the insurance requirements of the Contract shall not constitute a waiver by the OWNER of the insurance requirements which CONTRACTOR and/or Subcontractor must contractually meet to be in compliance herewith.

Partial Utilization - Property Insurance:

5.9 If OWNER finds it necessary to occupy, use, or operate a portion or portions of the Work prior to Substantial Completion of all the Work, such use, occupancy or operation may be accomplished in accordance with paragraph 14.10. CONTRACTOR shall have the obligation to inform the insurers of OWNER's intent to so occupy, use or operate a portion or portions of the Work. The insurers of CONTRACTOR providing the property insurance shall consent to such use, occupancy or operation by endorsement on the policy or policies, but the property insurance shall not be canceled or lapse on account of any such partial use, occupancy, or operation by OWNER.

ARTICLE 6. CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1 CONTRACTOR shall supervise 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 and customary construction industry standards. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, procedures, safety and quality control of construction, but CONTRACTOR shall not be responsible for any negligence of others in any design or selection of a specific means, method, technique, sequence or procedure of construction which is indicated in and required by the Contract Documents. CONTRACTOR shall be solely responsible to guarantee that the

finished Work complies accurately with the Contract Documents and CONTRACTOR shall not rely upon the OWNER's and/or ENGINEER'S construction observation to accomplish same.

6.2 CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to OWNER and ENGINEER, except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given directly to CONTRACTOR.

Labor, Materials and Equipment:

6.3 CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work, oversee quality control, monitor safety, and perform construction of the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Project site. Except in connection with the safety or protection of persons or the Work or property at the Project site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the Project site shall be performed during regular daily working hours (generally eight (8) hours between 7:00 A. M. and 6:00 P.M.) as may be specifically set forth by the OWNER, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER's advanced written consent. Preference employment shall be given to resident citizens of the Cameron County, Texas area where such persons are available and fully qualified to perform the Work to which the employment relates.

6.3.1 CONTRACTOR shall acquaint himself with all matters and conditions concerning the Project site and any existing construction. Any practical and constructive criticism or exception regarding any feature of the Work must be presented in writing to OWNER at least ten (10) calendar days prior to bidding. After the Contract Agreement to perform the Work has been signed by CONTRACTOR, it shall then be his responsibility to provide satisfactory Work that will meet the full intent of the Contract Documents. CONTRACTOR shall then pursue this Work with the other trades so that all phases of the Work may be properly coordinated without delays or damage to any parts of the Work.

6.4 Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all 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 furnishing, performance, testing, start-up and completion of the Work.

6.4.1 CONTRACTOR shall provide and maintain suitable weather-tight, washable, sanitary toilet facilities for all workers for the entire construction period. CONTRACTOR shall comply with all requirements of applicable health authorities. When toilet facilities are no longer required, promptly remove them from the Project site, disinfect and clean the surface area as required. CONTRACTOR shall keep each toilet facility swept and supplied with toilet tissue at all times.

6.5 All materials and equipment shall be of good quality and new, except as otherwise specifically provided in the Contract Documents. Sometimes a project specification may require salvage and reinstallation of OWNER's recently acquired machinery and equipment pre-existing at a project site. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment procured for the Project. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable Supplier, except as otherwise provided in the Contract Documents; but no provision of any such Supplier instructions will be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

6.6 CONTRACTOR shall notify OWNER and ENGINEER in writing of any conflict between the manufacturer's directions and the Contract Documents and shall not perform any Work on any item until such conflict has been resolved. Upon award of the Contract, CONTRACTOR will secure a certificate of exemption from the Texas State Comptroller to preserve the OWNER's exemption from Limited Sales, Excise and Use Tax in an amount representing that part of the total Contract Price representative of the value of tangible personal property to be physically incorporated into the Project realty. The certificate of exemption must contain a statement to the effect that such materials or property have been, or will be, utilized in the performance of the Contract to the full extent of the amount for which a certificate of exemption is requested.

6.6.1 Except where otherwise specified, CONTRACTOR shall, at all times, provide protection against weather, so as to maintain all Work, materials and fixtures free from injury or damages. All new Work likely to be damaged by weather shall be covered or otherwise protected as required.

6.6.2 While it is appreciated that CONTRACTOR has to maintain continuous construction operations and sequences, it should be understood that the OWNER's electric, gas, water, wastewater production and distribution systems must function during the Contract period with a minimum of inconvenience to the OWNER's customers and the OWNER. Requirements of the: Texas Commission on Environmental Quality (TCEQ); Texas Railroad Commission (TRC); Electric Reliability Council of Texas (ERCOT); and the State and federal regulatory agencies having jurisdiction over the Project site, must be met by CONTRACTOR. It is therefore incumbent on CONTRACTOR to plan ahead on the basis of integrating his construction sequencing program as far as possible into the normal operating sequence of the various utility systems to avoid or minimize disruption of services. No departure from the normal operating sequence of the utility systems will be allowed, except with the specific advanced written agreement of OWNER.

6.6.3 CONTRACTOR shall notify OWNER and ENGINEER in writing a minimum of forty-eight (48) hours in advance of any Work which will be tied into the existing utility systems. Method of tie-in shall be submitted to ENGINEER for his approval prior to any Work being performed. At no time shall contaminated water that has not been disinfected be

allowed to seep into any existing waterlines, and at no time shall sewage be allowed to flow into surrounding Project areas. Connections will be made during times of daily minimum sewage flows, if required by Project.

6.6.4 CONTRACTOR shall coordinate his Work with that of other contractors whose work may occur at a conflicting time and location. The coordination shall be such that CONTRACTOR's Work will be maintained at a normal rate. Any priority of contractors' performance disputes will be decided by OWNER, after consultation with ENGINEER.

6.6.5 All Work that is performed on, across or along International Boundary and Water Control Commission levees must conform to all I.B. & W.C.C. requirements. All Work performed on, across or along Brownsville Irrigation and Drainage District or the Cameron County Water Control and Improvement District No.16 canals or ditches must conform to all District requirements.

6.6.6 Satisfactory access or detour roads shall be provided by CONTRACTOR where necessary due to his construction.

6.6.7 If required by the Bid or Project Specifications, or by law for the type of excavation construction being performed, CONTRACTOR and his Registered Professional Engineer shall develop the Trench Safety System Plan and shall provide any necessary shoring, bracing and/or sheeting pursuant to Section 756.023 of the Texas Health and Safety Code and OSHA 29 C.F.R. 1926, Subpart P, Vol. 54 No. 209 of the Federal Register, October 31, 1989, pp. 45959-45991, and, as provided in Section 11 - "Trench Excavation and Shoring Safety Plan" of the OWNER's Standard Specifications.

6.6.8 CONTRACTOR shall routinely provide adequate barricades and warning devices in conformance with the guidelines for Traffic Control as established by the Texas Department of Transportation (TDOT) in the Texas Manual on Uniform Traffic Control Devices (TMUTCD). This provision shall be incidental and subsidiary to the rest of the Work in this Contract, and shall not constitute a separate CONTRACTOR pay item.

6.6.9 CONTRACTOR shall provide to OWNER the services of technical representative(s) from Supplier(s) for CONTRACTOR furnished equipment, for a sufficient period of time to assist in start-up and initial adjustment of all installed or delivered equipment, and to train, advise and consult with OWNER's operating personnel, if appropriate for the Project.

6.6.9.1 For each mechanical system, CONTRACTOR shall provide to OWNER a written certification from the manufacturer's representative that the products of the manufacturer have been installed by CONTRACTOR in conformance with the manufacturer's requirements and recommendations.

6.6.10 All items of equipment required for this Contract shall be Bid to provide as part of the Contract Price, any literature explaining "Operation and Maintenance" (O&M) of that item of equipment. If a manufacturer does not print such a standard O&M manual, CONTRACTOR shall develop and provide OWNER with a customized manual approved in

writing by the manufacturer.

Adjusting Progress Schedule:

6.7 CONTRACTOR shall submit to ENGINEER for the Project record and acceptance only, and not approval or concurrence to the extent indicated in paragraph 2.9, periodic adjustments in the Progress Schedule to reflect the impact thereon of new Project developments; these revised Schedules will conform generally to the Progress Schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

Substitutes or "Or-Equal" Items:

6.8

6.8.1 As a general rule, the OWNER and ENGINEER prefer all determinations regarding proposed Substitutions of materials or equipment as potential "or-equal-items" be resolved during the pre-Bid phase. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item, or the name of a particular Supplier, the naming of the item is intended to establish the type, function, performance standard and quality required. In some instances, the OWNER, after consultation with ENGINEER, is legally allowed to "sole source" a specific material or component of equipment when its design and/or performance is required to integrate with a larger OWNER system that will remain in place, or that OWNER has an inventory of spare parts for, or that OWNER has a long favorable, performance reliability history with. Unless the material or equipment name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers generally may be accepted by ENGINEER, if sufficient information is submitted by CONTRACTOR to allow ENGINEER to determine that the material or equipment proposed is equivalent, or equal to, that named by ENGINEER. The procedure for review by ENGINEER will include the following as supplemented in the General Requirements. Requests for review of substitute items of material and equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall make written application to ENGINEER for acceptance thereof, certifying in writing that the proposed substitute will adequately perform the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The CONTRACTOR'S written application will state that the evaluation and acceptance of the proposed substitute will not prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use 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 any other work on the Project by other contractors) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any vendor license fee or royalty. All variations of the proposed substitute from that specified will be identified in the CONTRACTOR'S written application and available maintenance, repair and replacement parts and service will be indicated. The CONTRACTOR'S written application will also contain an itemized estimate of all costs or savings that will result directly or indirectly from acceptance of such substitute, including costs of redesign, operation, performance, and potential claims or protests of other contractors

affected by any resulting change, all of which shall be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish at CONTRACTOR's non-compensable expense additional data about the proposed substitute.

6.8.2 If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, CONTRACTOR may generally furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to ENGINEER, if CONTRACTOR submits sufficient written information to allow ENGINEER to determine that the substitute proposed can be legally utilized by CONTRACTOR (e.g. patented or licensed processes) and is equivalent to that indicated or required by the Contract Documents. OWNER may have similar legal rights to "sole source" as generally indicated above in paragraph 6.8.1. The procedure for review by ENGINEER will be similar to that provided in paragraph 6.8.1 above, as applied by ENGINEER and as may be supplemented in the General Requirements.

6.8.3 ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. ENGINEER will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without ENGINEER's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR's non-compensable expense, a special performance guaranty bond or other form of surety with respect to any accepted substitute. ENGINEER will record time required by ENGINEER and any ENGINEER's outside technical consultants in evaluating substitutions proposed by CONTRACTOR and in making any required changes in the Contract Documents occasioned thereby. Whether or not ENGINEER accepts a proposed substitute, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and any ENGINEER's consultants for evaluating each proposed substitute.

Concerning Subcontractors, Suppliers and Others:

6.9

6.9.1 CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.9.2 The Pre-Bid documents require the CONTRACTOR to identify Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of material and equipment), to be submitted to OWNER at the time of bidding. OWNER's or ENGINEER's acceptance (either in writing or by failing to make written objection thereto) of any such Subcontractor, Supplier or other person or organization so identified by CONTRACTOR may be revoked by OWNER or ENGINEER on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute. The Contract Price may be increased by the difference in the cost occasioned by such substitution and an appropriate Change Order or written Amendment may be executed by the OWNER and

CONTRACTOR. All increases or decreases in the Contract Price shall be governed by all State and local statutes, codes, laws, ordinances, rules and regulations governing public competitive bidding and maximum Change Order limits. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject any defective or non-compliant Work.

6.10 CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and/or omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct contract or indirect relationship with CONTRACTOR, just as CONTRACTOR is responsible to the OWNER for CONTRACTOR's own acts and/or omissions. Nothing in the Contract Documents shall create any contractual relationship between OWNER or ENGINEER and any such Subcontractor, subtier subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER to pay or to supervise the payment of any moneys due any such Subcontractor, subtier subcontractor, Supplier or other person or organization, except as may otherwise be required by Laws and Regulations.

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

6.12 All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate written agreement between CONTRACTOR and the Subcontractor, which specifically binds the Subcontractor through appropriate "flow down" provisions, to the applicable terms and conditions of the Contract Documents for the benefit of OWNER, and contains waiver provisions as required by paragraph 5.7.

Patent Fees and Royalties:

6.13 CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device, which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work, and if to the actual knowledge of OWNER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. **CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE CITY OF BROWNSVILLE AND THE BROWNSVILLE PUBLIC UTILITIES BOARD, INCLUDING THEIR RESPECTIVE COMMISSIONERS, BOARD MEMBERS OFFICERS AND EMPLOYEES (INDEMNITEES) AGAINST ANY CLAIMS, DAMAGES, LOSSES AND EXPENSES (INCLUDING ATTORNEYS' FEES AND COURT COSTS) ARISING OUT OF 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, AND SHALL DEFEND ALL SUCH CLAIMS IN CONNECTION WITH ANY ALLEGED INFRINGEMENT OF SUCH RIGHTS. IT IS THE EXPRESSED**

INTENTION OF THE PARTIES HERETO THAT THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH IS INDEMNITY BY CONTRACTOR TO INDEMNIFY AND PROTECT INDEMNITEES FROM THE CONSEQUENCES OF OWNER'S OWN NEGLIGENCE WHERE THAT NEGLIGENCE ON THE PART OF THE OWNER IS A CONCURRING CAUSE OF THE CLAIMS, DAMAGES, LOSSES, AND EXPENSES REFERENCED ABOVE. FURTHERMORE, THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH SHALL HAVE NO APPLICATION TO ANY CLAIM, DAMAGE, LOSS AND EXPENSE REFERENCED ABOVE WHERE SUCH RESULTS FROM THE SOLE NEGLIGENCE OF THE OWNER INDEPENDENT OF THE FAULT OF ANY OTHER PERSON OR ENTITY.

Permits:

6.14 Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of Bids. CONTRACTOR shall pay all charges of utility owners with the exception of those normally charged by OWNER, for connections to the Work, and OWNER shall pay all charges of such third-party utility owners for facility capital costs related thereto such as impact fees or plant investment fees, if any.

6.14.1 Fires shall not be built on the Project premises except by the express consent of OWNER and Brownsville City and/or County Fire Marshall.

Laws and Regulations:

6.15

6.15.1 CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, OWNER shall not be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.15.2 If CONTRACTOR has actual knowledge that the Specifications or Drawings are at variance with any Laws or Regulations, CONTRACTOR shall give ENGINEER prompt written notice thereof, and any necessary changes will be authorized by OWNER by one of the methods indicated in paragraph 3.4. If CONTRACTOR performs any Work knowing, or having reason to know, that it is contrary to such Laws or Regulations, and without such advanced written notice to ENGINEER, CONTRACTOR shall bear all costs arising therefrom; however, it shall not be CONTRACTOR's original and primary responsibility to make certain that the Specifications and Drawings are in accordance with such Laws and Regulations.

Taxes:

6.16 "Pursuant to 34 Texas Administrative Code 3.291, in order for the OWNER to

continue to benefit from its status as a State Sales and Use Tax Exempt Organization, after August 14, 1991 public works construction contracts must be awarded on a "separated contract" basis. A "separated contract" is one where the CONTRACTOR distinguishes in writing prior to starting Work, between the value of the tangible personal property (materials such as pipe, bricks, lumber, concrete, paint, etc.) to be physically incorporated into the Project real estate from the total Contract price. Under the "separated contract" format, the CONTRACTOR in effect becomes a "seller" to the OWNER of materials that are to be physically incorporated into the Project real estate. As a "seller", the CONTRACTOR will issue a "Texas Certificate of Resale" to the CONTRACTOR'S supplier in lieu of paying the sales tax on the Project materials at the time of purchase. The CONTRACTOR will also issue a "Certificate of Exemption" to the supplier, demonstrating that the personal property is being purchased for resale and that the resale is to a public owner, the City of Brownsville, Texas, and its BPUB, which are sales tax exempt entities under UTCA Tax Code Section 151.309(5). CONTRACTOR should be careful to consult the most recent guidelines of the Texas State Comptroller of Public Accounts regarding the sales tax status of supplies and equipment that are used and consumed during Project Work (e.g. gas, oil, fluids, rental equipment, etc.), but that are not physically incorporated into the Project real estate. Such items are generally not tax exempt. If the CONTRACTOR has questions about the implementation of this policy he is asked to inquire with the State Comptroller of Public Accounts, Tax Administration Division, State of Texas, Austin, Texas 78774. The CONTRACTOR will not include any federal taxes in Bid prices since the OWNER is exempt from payment of such taxes. "Texas Certificates of Exemption", "Texas Certificates of Resale" and "Texas Sales Tax Permits" are forms available to the CONTRACTOR through the regional offices of the Texas State Comptroller of Public Accounts."

6.16.1. On the last page of the Construction Agreement a blank is provided for the CONTRACTOR to fill in an amount in dollars and cents indicating the Bid price of all materials and other tangible personal property included in the total Bid that will be physically incorporated into the Project real estate. The amount to be filled in by CONTRACTOR has reference to all of such materials and other tangible personal property as will actually be physically incorporated into the final result of the Work covered by the Contract. "Tangible personal property" means personal property which may be seen, weighed, measured, felt or touched, or which is in any other manner perceptible to the senses.

6.16.2. Upon award of the Contract, OWNER will, on written request of CONTRACTOR, furnish CONTRACTOR with a certificate of exemption from the Texas Limited Sales, Excise and Use Tax in only an amount not exceeding the above mentioned bid price for materials and other tangible personal property that will be physically incorporated into the Project real estate. Such written request by CONTRACTOR must contain a statement to the effect that such materials or property will be utilized in the performance of the Contract, to the full extent of the amount for which a certificate of exemption is requested. The Texas Comptroller of Public Accounts often audits contractors regarding compliance with these paragraph 6.16 provisions.

Use of Premises:

6.17 CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents, or otherwise privately acquired by the CONTRACTOR, and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements. CONTRACTOR shall assume full responsibility for any damage to any Project land or area, and to the owner or occupant of any land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against OWNER by any such adjacent owner or occupant because of the performance of the Work, CONTRACTOR shall promptly attempt to settle with such other party by agreement, or otherwise resolve the claim by mediation, arbitration or at law. **CONTRACTOR SHALL INDEMNIFY, AND HOLD HARMLESS THE CITY OF BROWNSVILLE AND THE BPUB INCLUDING THEIR RESPECTIVE COMMISSIONERS, BOARD MEMBERS OFFICER'S AND EMPLOYEES (INDEMNITEES) FROM AND AGAINST ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES (INCLUDING, BUT NOT LIMITED TO, FEES OF ENGINEERS, ARCHITECTS, ATTORNEYS AND OTHER PROFESSIONALS AND COURT COSTS) ARISING DIRECTLY, INDIRECTLY OR CONSEQUENTIALLY OUT OF ANY ACTION, LEGAL OR EQUITABLE, BROUGHT BY ANY SUCH OTHER THIRD PARTY ENTITY AGAINST OWNER, TO THE EXTENT BASED ON A CLAIM ARISING OUT OF CONTRACTOR'S NEGLIGENT PERFORMANCE OF THE WORK. IT IS THE EXPRESSED INTENT OF THE PARTIES HERETO THAT THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH IS INDEMNITY BY CONTRACTOR TO INDEMNIFY AND PROTECT THE INDEMNITEES FROM THE CONSEQUENCES OF THE INDEMNITEES' OWN NEGLIGENCE, WHEN THAT NEGLIGENCE ON THE PART OF THE INDEMNITEES IS A CONCURRING CAUSE OF THE INJURY, DEATH OR DAMAGE.**

FURTHERMORE, THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH SHALL HAVE NO APPLICATION TO ANY CLAIM, LOSS, DAMAGE, CAUSE OF ACTION, SUIT, AND LIABILITY WHERE THE INJURY, DEATH OR DAMAGE RESULTS FROM THE SOLE NEGLIGENCE OF THE INDEMNITEES, INDEPENDENT OF THE FAULT OF ANY OTHER PERSON OR ENTITY.

6.18 During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work, CONTRACTOR shall remove and legally dispose of all waste materials, rubbish and debris from and about the premises, as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the Project site clean and ready for occupancy by OWNER. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.19 CONTRACTOR shall be confined to all working real estate and easements provided by OWNER, unless CONTRACTOR separately and privately secures at his own non-reimbursable cost, additional private temporary construction easements. Generally, storage of excavation material and all CONTRACTOR equipment and material shall remain within the limits of Project and working easements.

6.20 CONTRACTOR shall not weight load or permit any part of any structure or utility to be loaded in any manner that will endanger the structure or utility, nor shall CONTRACTOR subject any part of the Work or adjacent property to surcharge stresses or pressures, or loss of subjacent or lateral support, that will endanger it.

Record Documents:

6.21 CONTRACTOR shall as a precondition to interim monthly progress payments, show evidence of regularly maintaining and updating and storing in a safe place at the Project site, one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Directive Changes, Field Orders and any written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and periodically annotated to show all changes made by CONTRACTOR during construction. These periodically updated record documents, together with all approved samples and a counterpart of all approved Shop Drawings, will be at all times available to ENGINEER for on-site reference. Upon completion of the Work, these record documents, samples and Shop Drawings, will be delivered to ENGINEER for OWNER record retention.

Safety and Protection:

6.22 CONTRACTOR shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of employees and the general public, and shall also provide the necessary protection to prevent damage, injury or loss to:

6.22.1 other persons and organizations who may be required to properly visit the Project site;

6.22.2 all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Project site; and

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

6.22.4 Driveways, culverts, storm sewer inlets and laterals, and other public or private property that is destroyed or removed during the construction shall be replaced to its original or better condition by CONTRACTOR. Temporary drainage and any subgrade dewatering is to be provided by CONTRACTOR in the total Contract Price as necessary to protect and complete the Work.

6.22.5 CONTRACTOR is responsible for locating any underground obstacles. It is not represented by OWNER or ENGINEER that the Plans show all previous or current sewers, waterlines, electric lines, gas lines, telephone lines and other underground obstacles and utilities. CONTRACTOR shall exercise caution to prevent damage to existing utilities and other obstacles or facilities not meant for demolition or construction modifications during the progress of the

construction Work, taking care to locate same in advance of the actual Work. OWNER or ENGINEER will render reasonable assistance to CONTRACTOR in the matter of determining the location of existing utilities by making available such existing maps, records, and other available existing information as may be accessible to OWNER or ENGINEER, when requested to do so, but the accuracy of such information will not be guaranteed by OWNER or ENGINEER. CONTRACTOR shall make repairs and/or replacements to all damage to existing utilities resulting from his operations. Where a pipe, duct or other structure of a utility is exposed, which, in the opinion of ENGINEER requires strengthening, altering, shielding or moving, if that utility owner does not cure the situation itself, CONTRACTOR shall perform such Work on same as ENGINEER may order in writing after consultation by ENGINEER with the affected utility owner, that Work, if any, may be paid for by OWNER as extra Work. Should CONTRACTOR, in the layout of his Work, encounter any pipe, underground utility or structure, the location of which has not been furnished to him by ENGINEER, he shall bring such conditions to the attention of ENGINEER for ENGINEER, OWNER and CONTRACTOR discussion to determine the CONTRACTOR'S method to be used to pin in place, remove or bypass such obstructions.

6.22.6 It is essential that in the event of any CONTRACTOR damage being caused to existing utilities, that immediate attention be given to their repair. Any repair work carried out shall be at the non-reimbursable cost of CONTRACTOR and shall be performed to the complete satisfaction of ENGINEER and OWNER, who will acknowledge same in writing. It is therefore, the duty of CONTRACTOR, prior to Bid submittal if possible, and no later than the commencement of construction, to inspect and accurately record in writing to OWNER and ENGINEER, the pre-existing condition of any utility which he reasonably suspects or knows to be damaged, faulty, or defective. In addition, any such utilities so recorded, which in the opinion of CONTRACTOR may deteriorate further as a result of the proposed mode of construction operations should be protected. CONTRACTOR shall discuss with OWNER and ENGINEER what appropriate remedial measures should be employed by CONTRACTOR or utility owner to reach a resolution.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for the safety of persons or property, or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners, the scheduling and location(s), that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, restoration and replacement of their property. All damage, injury or loss to any property referred to in paragraphs 6.22.3 and 6.22.4 caused, directly or indirectly, in whole or in part by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work; or anyone for whose acts any of them may be liable; shall be remedied by CONTRACTOR. CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable to ENGINEER (except as otherwise expressly provided in connection with Substantial Completion).

6.23 CONTRACTOR shall designate in writing to OWNER a responsible representative

at the Project site whose duty shall be the management of risk and safety, and that person shall make a concerted effort to assist workers and visitors at the Project site to prevent accidents. This person shall be CONTRACTOR's superintendent, unless otherwise designated in writing by CONTRACTOR to OWNER.

Emergencies:

6.24 In emergencies affecting the safety or protection of persons, or the Work, or property at the Project site or adjacent thereto, CONTRACTOR, without special written or oral instruction or authorization from ENGINEER or OWNER, is obligated to act to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Work or Contract Documents is recommended because of the CONTRACTOR's prompt action taken in response to an emergency, a Work Directive Change or Change Order may be issued by OWNER to document the consequences of any changes or variations.

Shop Drawings and Samples:

6.25 After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, CONTRACTOR shall submit to ENGINEER for review and approval, in accordance with the accepted Schedule of Shop Drawing submissions (see process in paragraphs 2.6 and 2.9), or for other appropriate action if so indicated in the Supplementary Conditions, a copy of all Shop Drawings, to ENGINEER, which will bear a stamp or specific written indication by ENGINEER that CONTRACTOR has satisfied CONTRACTOR's submission review responsibilities under the Contract Documents. All submissions will be identified as the ENGINEER may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable ENGINEER to efficiently and comprehensively review the CONTRACTOR's information as required.

6.25.1 Before ordering any material or doing any Work, CONTRACTOR will verify all measurements of any existing and new Work and shall be responsible for their correctness. Any differences which may be found shall be submitted to ENGINEER for consideration before proceeding with the Work. No extra compensation will be allowed to CONTRACTOR because of differences between actual dimensions and measurements indicated on the Drawings.

6.26 CONTRACTOR shall also submit to ENGINEER for review and approval with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that CONTRACTOR has internally satisfied CONTRACTOR's submission review responsibilities under the Contract Documents and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which the material is intended.

6.27

6.27.1 Before submission of each Shop Drawing or sample, CONTRACTOR shall have internally determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples, and with the requirements of the Work and the Contract Documents.

6.27.2 At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to ENGINEER for review and approval, of each such CONTRACTOR variation.

6.28 ENGINEER will review and approve with reasonable promptness, Shop Drawings and samples, but ENGINEER's review and approval will be only for general conformance with the design concept of the Project and for compliance with the information given in the Contract Documents, and shall not extend to CONTRACTOR's means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents), or to CONTRACTOR's safety precautions or programs incident thereto. The review and approval of a separate or component item will not indicate approval of the assembly into which the item integrally functions. 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 ENGINEER's specific attention in writing to the most current revisions, other than the corrections called for by ENGINEER on previous CONTRACTOR submittals.

6.29 ENGINEER's review and approval of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents, unless CONTRACTOR has in writing called ENGINEER's specific attention to each such variation at the time of submission as required by paragraph 6.27.2, and ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for CONTRACTOR's errors or omissions in the Shop Drawings, or from responsibility for having complied with the provisions of paragraph 6.27.1.

6.30 Where a Shop Drawing or sample is required by the Specifications, any related Work performed prior to ENGINEER'S review and approval of the pertinent submission will be at the sole risk, and non-reimbursable expense and responsibility of CONTRACTOR.

Continuing the Work:

6.31 CONTRACTOR shall carry on the Work and adhere to the Progress Schedule during any and all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as OWNER may otherwise agree to in writing.

INDEMNIFICATION:

6.32 CONTRACTOR AGREES TO AND SHALL INDEMNIFY AND HOLD HARMLESS THE CITY OF BROWNSVILLE AND THE BROWNSVILLE PUBLIC UTILITIES BOARD, INCLUDING THEIR RESPECTIVE COMMISSIONERS, BOARD MEMBERS, OFFICERS, AND EMPLOYEES (INDEMNITEES) FROM AND AGAINST ANY AND ALL CLAIMS, LOSSES, DAMAGES, CAUSES OF ACTION, SUITS, AND LIABILITY OF EVERY KIND, INCLUDING ALL EXPENSES OF LITIGATION, COURT COSTS, AND ATTORNEY'S FEES, FOR INJURY TO OR DEATH OF ANY PERSON, OR FOR DAMAGE TO ANY PROPERTY, ARISING OUT OR IN CONNECTION WITH THE NEGLIGENT PERFORMANCE OF THE WORK, PROVIDED THAT SUCH CLAIM, DAMAGE, LOSS, LIABILITY OR EXPENSE: (A) IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE OR DEATH OR TO INJURY OR DESTRUCTION OF TANGIBLE PROPERTY, INCLUDING THE LOSS OF USE RESULTING THEREFROM; AND (B) IS CAUSED IN WHOLE OR IN PART BY ANY CONDITION OF THE WORK OR MATERIALS, OR BY ANY NEGLIGENT ACT OR OMISSION OF CONTRACTOR, ANY SUBTIER SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY CONTRACTOR OR ANY SUBCONTRACTOR OR ANYONE FOR WHOSE ACTS CONTRACTOR OR ANY SUBCONTRACTOR MAY BE LIABLE UNDER THIS CONTRACT.

SUCH INDEMNITY SHALL APPLY WHERE THE CLAIMS, LOSSES, DAMAGES, CAUSES OF ACTION, SUITS, OR LIABILITY ARISE IN PART FROM THE CONCURRENT NEGLIGENCE OF INDEMNITEES.

IT IS THE EXPRESSED INTENTION OF THE PARTIES HERETO, BOTH CONTRACTOR AND INDEMNITEES THAT THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH IS INDEMNITY BY THE CONTRACTOR, TO INDEMNIFY AND PROTECT INDEMNITEES FROM THE CONSEQUENCES OF INDEMNITEE'S OWN NEGLIGENCE, WHERE THAT NEGLIGENCE IS A CONCURRING CAUSE OF THE INJURY, DEATH OR DAMAGE. FURTHERMORE, HOWEVER, THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH SHALL HAVE NO APPLICATION TO ANY CLAIM, LOSS, DAMAGE, CAUSE OF ACTION, SUIT, AND LIABILITY WHERE THE INJURY OR DEATH OR DAMAGE RESULTS FROM THE SOLE NEGLIGENCE OF THE INDEMNITEES, INDEPENDENT OF THE FAULT OF ANY OTHER PERSON OR ENTITY.

6.33 IN ANY AND ALL CLAIMS AGAINST INDEMNITEES OR ANY OF THEIR CONSULTANTS, AGENTS OR EMPLOYEES BY ANY EMPLOYEE OF CONTRACTOR, ANY SUBCONTRACTOR, ANY PERSON OR ORGANIZATION DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM TO PERFORM OR FURNISH ANY OF THE WORK, OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE, THE INDEMNIFICATION OBLIGATION UNDER PARAGRAPH 6.32 SHALL NOT BE LIMITED IN ANY WAY BY ANY LIMITATION ON THE AMOUNT OR TYPE OF DAMAGES, COMPENSATION OR BENEFITS PAYABLE BY

OR FOR CONTRACTOR, OR ANY SUCH SUBCONTRACTOR, OR OTHER PERSON OR ORGANIZATION UNDER WORKERS' OR WORKMEN'S COMPENSATION ACTS, DISABILITY BENEFIT ACTS OR OTHER EMPLOYEE BENEFIT ACTS.

6.34 THE OBLIGATIONS OF CONTRACTOR UNDER PARAGRAPH 6.32 SHALL NOT EXTEND TO ANY LIABILITY OF ENGINEER ARISING OUT OF THE PREPARATION OR APPROVAL OF PROJECT MAPS, DRAWINGS, DESIGNS, PLANS, SPECIFICATIONS, OPINIONS, CALCULATIONS, REPORTS, AND SURVEYS.,

6.35 CONTRACTOR shall perform all phases of Work, other than general clean-up, through the duration of the Contract, as defined in these General and any Supplementary Conditions. If CONTRACTOR desires to perform Work, other than general clean-up, during weekends or holidays, prior proper arrangements must be made in writing with OWNER, or any other regulatory agency regarding such Work.

6.35.1 General. This Contract shall be based upon payment by CONTRACTOR and his Subcontractors of wage rates not less than the General Prevailing Wage Rate of per diem wages for work of a similar character in Cameron County, Texas, for each type of laborer, workman or mechanic needed to implement the Contract at the Project Site, and not less than the general prevailing rate of per diem wages for legal holiday and overtime Work. The Schedule of General Prevailing Wage Rates specifically adopted by the OWNER for this Project, and other important Wage and Labor Standard Provisions are included in these Contract Documents in the Supplementary Conditions. Pursuant to local OWNER labor policy, no Project worker shall be paid less than \$8.00 per hour, regardless of the adopted wage listings in the attached U. S. Department of Labor General Wage Decision for Cameron County, Texas.

CONTRACTOR shall at minimum comply with all requirements of the prevailing wage law of the State of Texas, Texas Revised Civil Statutes, Texas Government Code (TGC) Section 2259.001 et seq., including the latest amendments thereto, and those special local wage provisions adopted by OWNER. When in conflict, the more stringent requirements apply to CONTRACTOR.

6.35.2 Records. CONTRACTOR and each Subcontractor shall keep an accurate record showing the names and occupations of all classifications of laborers, workmen, and mechanics employed, together with the actual wages paid to each worker. At all reasonable working hours, such CONTRACTOR records shall be open to inspection by the representatives of the OWNER. With each monthly application for payment, CONTRACTOR shall provide to ENGINEER a certified copy of such payroll records as necessary to substantiate compliance with this provision during the period of time for which the application for payment pertains. OWNER shall take cognizance of any and all employee complaints regarding any violations of the requirements of TGC Section 2259.001 et seq.

6.35.3 Penalty. In case CONTRACTOR and any Subcontractor fail to comply with the prevailing wage law, by statutory authority, CONTRACTOR shall forfeit to the OWNER \$60.00 per calendar day, or portion thereof, for each laborer, workman, or mechanic who is paid

less than the specified local rate for any Work done under the Contract.

6.35.4 Hours of Labor. CONTRACTOR shall comply with all requirements of the hours of work on public works in accordance with the laws of the State of Texas, Texas Revised Civil Statutes, Articles 5165.1 to 5165.3, including the latest amendments thereto.

No CONTRACTOR or Subcontractor contracting for any part of the Contract Work which may require or involve the employment of laborers, workers or mechanics at the Project Site, shall require or permit any laborer, workman or mechanic in any work week in which he is employed on such Work, to work in excess of forty (40) hours in such work week, unless such laborer, workman or mechanic receives compensation at a rate not less than one and one-half times his basic rate of pay, for all hours in excess of forty (40) hours in such work week.

6.35.5 Equal Employment Opportunities. The CONTRACTOR shall not discriminate against any employee or applicant for employment because of race, religion, gender, sexual preference, national origin, age, physically challenged condition, or a political belief or affiliation, and will comply with all State and federal statutes applicable to CONTRACTOR which relate to employment discrimination.

6.35.6 Veterans Preference. Pursuant to Texas Revised Civil Statutes, Article 4413(31), including the latest amendments thereto, CONTRACTOR shall give preference in employment to honorably discharged veterans who were engaged in the military services of the United States in time of war or conflict and who are, and have been, citizens of Texas for not less than five (5) years.

ARTICLE 7. OTHER WORK

Related Work at Site:

7.1 OWNER may perform other separate work related to the Project at the site by OWNER's own forces, have other work performed by utility owners, or award other direct construction contracts therefor, which shall contain General Conditions similar to these. If the fact that such other work is to be performed was not originally noted in these Contract Documents, advance written notice thereof will be given to CONTRACTOR prior to OWNER authorizing any such other work; and, if CONTRACTOR believes that such other work performance will involve additional expense to CONTRACTOR, or requires additional time, and the Parties hereto are unable to agree as to the extent thereof, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. All increases or decreases in the Contract Price shall be governed by all State and local laws, statutes, codes, ordinances, rules and regulations governing public competitive bidding and Change Orders.

7.2 CONTRACTOR shall afford each utility owner and other contractor who is a party to a separate direct contract with OWNER (or OWNER, if OWNER itself is performing the additional work with OWNER's employees) proper and safe access to the Project site and a reasonable opportunity for the introduction and storage of materials and equipment, and the execution of such separate work, and shall properly connect and coordinate the Work with their

separate work. CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any separate work of others by cutting, excavating or otherwise altering their work, and will only cut or alter their work with the written consent of ENGINEER and the consent of other contractor(s), persons whose separate work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors, to the extent that there are comparable provisions for the benefit of CONTRACTOR in said separate direct contracts between OWNER and such other utility owners and other contractors.

7.3 If any part of CONTRACTOR's Work depends upon the separate work of any such other contractor or utility owner (or OWNER) for proper execution or results, CONTRACTOR shall inspect and promptly report to ENGINEER in writing any delays, defects or deficiencies in such other work that renders it unavailable or unsuitable for such integration, proper execution and results of CONTRACTOR'S Work. CONTRACTOR's failure to so report will constitute an acceptance of the other separate work as fit and proper for integration with CONTRACTOR's Work, except for latent or non-apparent defects and deficiencies in the other work.

Coordination:

7.4 If OWNER contracts with others for the performance of other separate work on the Project at the Project site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified by OWNER in the Supplementary Conditions, or OWNER'S WORK DIRECTIVE CHANGE, and the specific matters to be covered by such authority and responsibility will be itemized, and the extent of such authority and responsibilities will be provided, in the Supplementary Conditions or OWNER'S WORK DIRECTIVE CHANGE.

ARTICLE 8. OWNER'S RESPONSIBILITIES

8.1 OWNER shall issue all written and oral communications to CONTRACTOR through OWNER's Field Representative and/or ENGINEER.

8.2 In case of termination of the employment of ENGINEER, OWNER shall appoint a replacement Engineer whose status under the Contract Documents shall be that of the former ENGINEER.

8.3 OWNER shall furnish the data required of OWNER under the Contract Documents promptly, and shall make eligible payments to CONTRACTOR within the time periods allowed by the Contract Documents and State prompt pay statutes, after payments are due as provided in Article 14.

8.4 OWNER's duties in respect to providing lands and easements and providing any recent existing available engineering surveys to establish CONTRACTOR construction reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER's identifying and making available to CONTRACTOR copies of any existing and available reports of explorations

and tests of subsurface pre-existing conditions at the Project site which are not part of the Contract Documents, but which have been utilized by ENGINEER in generally preparing the Drawings and Specifications.

8.5 OWNER is obligated to consider and may execute Change Orders as indicated in paragraph 10.4.

8.6 OWNER's responsibility in respect to certain inspections, tests and approvals is set forth in paragraphs 13.3 through 13.5.

8.7 In connection with OWNER's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 outlines OWNER's right to terminate services of CONTRACTOR under certain circumstances.

ARTICLE 9. ENGINEER'S STATUS DURING CONSTRUCTION

Owner's Representative:

9.1 OWNER's private consulting ENGINEER (generally through its Resident Project Representative) will be OWNER's primary representative during the construction period. OWNER's Field Representative will be the secondary representative during the construction period.

Visits to Site:

9.2 ENGINEER, routinely through the Resident Project Representative will make periodic visits to the site at intervals appropriate to the various stages of construction to observe the progress and general quality of the executed Work and to determine, in general, for the benefit of OWNER only, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site observations to check the quality or quantity of the Work, because CONTRACTOR is solely responsible for same. ENGINEER's efforts will be directed toward providing for OWNER only, a greater degree of confidence that the CONTRACTOR's completed Work will conform to the Contract Documents. On the basis of such limited visits and on-site observations as an experienced and qualified design professional, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to advise OWNER of any obvious defects and deficiencies in the Work.

On-Site Project Representation:

9.3 OWNER will generally furnish a Project Field Representative to assist ENGINEER in observing the daily performance of the Work for the sole benefit of the OWNER. This is an option available to OWNER that need not be exercised, nor may it be relied upon by the CONTRACTOR in any way to satisfy CONTRACTOR's quality control responsibility. The secondary duties, responsibilities and limitations of authority of any such OWNER Field Representative and any assistants will be determined by the OWNER.

Clarifications and Interpretations:

9.4 ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If CONTRACTOR believes that a written clarification or interpretation by ENGINEER justifies an increase in the Contract Price or an extension of the Contract Time, and the OWNER and CONTRACTOR are unable to agree to the basis, amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Article 11 or Article 12. Any increases or decreases in the Contract Price shall be governed by all State and local laws, statutes, codes, ordinances, rules and regulations governing public competitive bidding and Change Orders.

Authorized Variations in Work:

9.5 ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Time, and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER, and also on CONTRACTOR who shall promptly perform the Work involved. If CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time, CONTRACTOR may make a claim therefore as provided in Article 11 or 12. Any increases or decreases in the Contract Price shall be governed by all State and local laws, statutes, codes, ordinances, rules and regulations governing public competitive bidding and Change Orders.

Rejecting Defective Work:

9.6 ENGINEER will have the authority to disapprove or reject Work which ENGINEER believes to be defective, and will also have authority to require special inspection or testing of the Work as provided in paragraph 13.9, whether or not the Work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.7 In connection with ENGINEER's responsibility for Shop Drawings and samples, see paragraphs 6.25 through 6.30 inclusive.

9.8 In connection with ENGINEER's responsibilities as to Change Orders, see Articles 10, 11 and 12.

9.9 In connection with ENGINEER's responsibilities in respect to Applications for Payment, etc., see Article 14.

Determinations for Unit Prices:

9.10 ENGINEER will determine the final actual quantities and classifications of any Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR, 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 decisions thereon will be final and binding upon OWNER and CONTRACTOR.

Decisions on Disputes:

9.11 ENGINEER will be the interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work, and claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Time, will be referred initially to ENGINEER in writing, with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter will be delivered by the claimant (OWNER or CONTRACTOR) to ENGINEER and opposing Party no later than thirty (30) calendar days after the occurrence of the event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other Party within sixty (60) calendar days after such occurrence, unless ENGINEER allows claimant an additional period of time in writing to ascertain more accurate data in support of the claim.

9.12 When functioning as interpreter and judge under paragraphs 9.10 and 9.11, it is hereby mutually agreed between OWNER and CONTRACTOR that ENGINEER will not be personally liable in connection with any non-negligent interpretation or decision rendered in good faith in such official and professional engineering capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 and 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.13) will be a condition precedent to any exercise by CONTRACTOR and/or OWNER of such rights or remedies they may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

Limitations on ENGINEER's Responsibilities:

9.13 Neither ENGINEER's authority to act under this Article 9, or elsewhere in the Contract Documents, nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority, shall give rise to any personal or corporate duty or responsibility of ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

9.14 Whenever in the Contract Documents the terms: "as ordered"; "as directed"; "as required"; "as allowed"; "as approved"; or terms of like effect or import are used, or the adjectives: "reasonable"; "suitable"; "acceptable"; "proper"; or "satisfactory"; or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for general compliance with the Contract Documents (unless there is a specific statement

indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty to supervise or direct the furnishing, performance, or quality control of the CONTRACTOR's Work or any duty or authority to undertake responsibility of the CONTRACTOR contrary to the provisions of paragraph 9.15 or 9.16.

9.15 ENGINEER will not be responsible for CONTRACTOR's means, methods, techniques, quality control, sequences or procedures of construction, or the safety precautions and programs incident thereto, for which CONTRACTOR shall be solely responsible. ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.16 ENGINEER will not be responsible for the acts and/or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

ARTICLE 10. CHANGES IN THE WORK

10.1 Without invalidating the Agreement and without notice to any surety, OWNER may, at any time, or from time to time, order additions, deletions or revisions in the Work that are in compliance with State public competitive bidding statutes and laws governing Change Orders; these will be authorized by a Written Amendment, a Change Order, or a Work Directive Change. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved, which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

10.2 If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price, or an extension or shortening of the Contract Time that should be allowed as a result of a Work Directive Change, a claim may be made therefore as provided in Article 11 or Article 12. All increases or decreases in the Contract Price shall be governed by all State and local laws, statutes, codes, ordinances, rules and regulations governing public competitive bidding and Change Orders.

10.3 CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.4 and 3.5, except in the case of an emergency as provided in paragraph 6.24, and except in the case of uncovering Work as provided in paragraph 13.9.

10.4 OWNER and CONTRACTOR may execute appropriate Change Orders (or Written Amendments) covering:

10.4.1 changes in the Work which are ordered by OWNER pursuant to paragraph 10.1; are required because of willing and informed acceptance of defective Work by OWNER under paragraph 13.13; or OWNER correcting defective Work under paragraph 13.14; or are otherwise agreed to by the Parties;

10.4.2 changes in the Contract Price or Contract Time which are agreed to by the Parties; and

10.4.3 changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the Progress Schedule as provided in paragraph 6.31.

10.5 If notice 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 Time) is required by the provisions of any Bond to be given to a surety by CONTRACTOR, the giving of any such notice will be CONTRACTOR'S sole responsibility, and the amount of each applicable Bond may be adjusted accordingly.

ARTICLE 11. CHANGE OF CONTRACT PRICE

11.1 The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for properly performing the Work. All original duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the original Contract Price.

11.2 The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an increase or decrease in the Contract Price shall be based on initial written notice delivered promptly by the CONTRACTOR or OWNER to the other Party, and to ENGINEER promptly (but in no event later than thirty (30) calendar days after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall follow and be delivered within sixty (60) calendar days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim)), and shall be accompanied by claimant's written statement that the amount claimed covers all known amounts (direct, indirect and consequential) to which the claimant believes he is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11, if OWNER and CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid, and will be deemed legally waived under this Contract, if not submitted in accordance with this paragraph 11.2.

11.3 The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

11.3.1 Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the actual quantities of the Work items involved (subject to the provisions of paragraphs 11.9.1. through 11.9.3. inclusive).

11.3.2 By mutual acceptance of a lump sum (which may include an allowance for

overhead and profit not necessarily in accordance with paragraph 11.6.2.1).

11.3.3 On the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5), plus a CONTRACTOR's Fee for overhead and profit (determined as provided in paragraphs 11.6 and 11.7).

Cost of the Work:

11.4 The term “Cost of the Work” means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the Cameron County, Texas area and shall include only the following items, and shall not include any of the costs itemized in paragraph 11.5:

11.4.1 Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under Schedules of Job Classifications as set forth by OWNER in the Supplementary Conditions of the Contract Documents. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of any fringe benefits, if any, which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday, as may be applicable thereto. Such employees shall include superintendents and foremen at the Project site. The expenses of performing Work after regular daily working hours on Saturday, Sunday or on legal holidays shall be included in the above, to the extent authorized in an advanced written approval notice by OWNER.

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

11.4.3 Payments made by CONTRACTOR to the Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to CONTRACTOR, and shall deliver such bids to OWNER who will then determine which bid will be accepted. If a 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 shall be determined in the same manner as CONTRACTOR's Cost of the Work. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable. CONTRACTOR shall accomplish the applicability of the Contract Documents to Subcontractor agreements by using either “flow down” provisions or appropriate recitations in the subcontract agreements of parts of these Contract Documents.

11.4.4 Costs of special consultants (including but not limited to engineers,

architects, testing laboratories, surveyors, attorneys and accountants) employed for services specifically related to the Work.

11.4.5 Supplemental costs actually incurred including the following:

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

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

11.4.5.3 Rentals of all construction equipment and machinery and the parts thereof, whether rented from CONTRACTOR or others, in accordance with written rental agreements produced to OWNER as requested, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof (all in accordance with terms of said rental agreements). The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

11.4.5.4 Any sales, consumer, use or similar taxes actually paid as related to the Work that OWNER is not exempt from paying, and for which CONTRACTOR is liable, as imposed by Laws and Regulations.

11.4.5.5 Deposits forfeited 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 any royalty payments and fees for permits and licenses.

11.4.5.6 Losses and damages (and related expenses), not compensated to CONTRACTOR by insurance or otherwise, to the Work, or otherwise sustained by CONTRACTOR in connection with the proper performance and furnishing of the Work, provided they have resulted from causes other than the intentional and/or negligent acts and/or omissions of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them, or for whose acts and/or omissions any of them may be liable. Such losses shall include settlements made with the advanced written consent and approval of OWNER. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's Fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for reconstruction services, only at a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7 The cost of utilities, fuel and sanitary facilities at the Project site.

11.4.5.8 Minor expenses such as telefaxes, long distance telephone calls, telephone service at the Project site, express mailings and similar petty cash items in connection with the Work.

11.4.5.9 Cost of premiums for any additional Bond and insurance coverages required because of any additive Change Orders to the Work.

11.5 The term “Cost of the Work” shall not include any of the following:

11.5.1 Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the Project site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon Schedule of Job Classifications referred to in paragraph 11.4.1, or specifically covered by paragraph 11.4.4, all of which are to be considered administrative costs covered by the CONTRACTOR's Fee.

11.5.2 Expenses of CONTRACTOR's principal and branch offices, other than any CONTRACTOR's office at the Project site.

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

11.5.4 Cost of premiums for all Bonds and for all insurance, whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the types of coverage and amounts thereof (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5 Costs resulting from the intentional and/or negligent acts and/or omissions of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them, or for whose acts and/or omissions any of them may be liable, including but not limited to, the correction of defective Work, salvaging or disposal of materials or equipment wrongly supplied, and repairing any damage to real or personal property.

11.5.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

CONTRACTOR's Fee:

11.6 The CONTRACTOR's Fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1 a mutually acceptable fixed fee; or if none can be agreed upon,

11.6.2 a fee based on the following percentages of the various portions of the Cost of the Work:

11.6.2.1 for costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR's Fee shall be fifteen (15%) percent;

11.6.2.2 for costs incurred under paragraph 11.4.3, the CONTRACTOR's Fee shall be five (5%) percent; and if a subcontract is on the basis of Cost of the Work Plus a Fee, the maximum allowable to CONTRACTOR on account of overhead and profit of all Subcontractors shall be fifteen (15%) percent;

11.6.2.3 no fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, 11.4.5 and 11.5;

11.6.2.4 the amount of credit to be allowed by CONTRACTOR to OWNER for any such Contract change which results in a net decrease in cost will be the amount of the actual net decrease, plus a deduction in CONTRACTOR's Fee by an amount equal to ten (10%) percent of the net decrease; and

11.6.2.5 when both additions and credits are involved in any one Contract change, the adjustment in CONTRACTOR'S Fee shall be computed on the basis of the net change in accordance with paragraphs 11.6.2.1 through 11.6.2.4, inclusive.

11.7 Whenever the cost of any Work is to be determined pursuant to paragraph 11.4 or 11.5, CONTRACTOR will timely submit in a written form acceptable to ENGINEER, an itemized cost breakdown together with supporting data.

Cash Allowances:

11.8 It is understood that CONTRACTOR has included in the Contract Price any and all allowances so named in the Contract Documents and shall cause the Work so covered thereby to be done by such Subcontractors or Suppliers, and for such sums within the limit of the allowances as may be acceptable to ENGINEER. CONTRACTOR agrees that:

11.8.1 Any allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Project site, and all applicable non-exempt taxes; and

11.8.2 CONTRACTOR's costs for managing on the Project site, labor, materials and equipment installation costs, overhead, profit and other expenses already contemplated for determining the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any of such costs will be valid.

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

Unit Price Work:

11.9

11.9.1 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 established unit prices for each separately identified item of Unit Price Work, multiplied by the estimated quantity of each item as indicated in the Agreement. The ENGINEER'S estimated quantities of items of Unit Price Work are not guaranteed by the OWNER to be actually performed and are solely for the purpose of comparison of bids and determining an initial Contract Price. Determinations of the actual final quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with Paragraph 9.10.

11.9.2 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.

11.9.3 Where the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the ENGINEER's estimated quantity of such item indicated in the Contract Documents (generally plus or minus fifteen percent (15%), and there is no corresponding and offsetting adjustment(s) with respect to any other Unit Price item(s) of Work, and if CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof, CONTRACTOR may make a timely claim for an increase in the Contract Price in accordance with Article 11 and any applicable State law, if the Parties are unable to otherwise agree as to the amount of any such increase. OWNER is also able to file a similar timely claim with ENGINEER if OWNER believes that the quantity of Unit Price Work items has significantly increased to the point that OWNER believes it is owed a credit from CONTRACTOR for any volume discount pricing that CONTRACTOR should have received by purchasing such additional quantities.

ARTICLE 12 -- CHANGE OF CONTRACT TIME

12.1 The Contract Time may only be changed by a Change Order or a Written Amendment. Any claim for an extension or shortening of the Contract Time shall be based on initial written notice delivered by the CONTRACTOR or OWNER to the ENGINEER and to the other Party (but in no event later than thirty (30) calendar days) after the occurrence of the event giving rise to the claim, and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall follow and be delivered within sixty (60) calendar days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the time adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by ENGINEER in accordance with paragraph 9.11, if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time will be valid and will be

deemed legally waived under this Contract, if not submitted in accordance with the requirements of this paragraph 12.1.

12.2 The Contract Time will be extended in an amount equal to time lost due to delays beyond the reasonable control of CONTRACTOR, so long as CONTRACTOR has made good faith efforts to mitigate delaying impacts and if a claim is made therefore as provided in paragraph 12.1. Such delays shall include, but not be limited to, acts, omissions, or neglect by OWNER or others performing additional separate work as contemplated by Article 7, or to fires, floods exceeding the 100 year frequency in Cameron County, labor disputes, epidemics, extremely abnormal weather for Cameron County, Texas, as may be described further in these Contract Documents, or Acts of God.

12.3 **ALL TIME LIMITS STATED IN THE CONTRACT DOCUMENTS ARE MUTUALLY AGREED TO BE OF THE ESSENCE OF THE AGREEMENT.** The provisions of this Article 12 shall not exclude recovery for damages (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court costs) for delay by either Party.

ARTICLE 13 -- WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

Warranty and Guarantee:

13.1 CONTRACTOR warrants and guarantees to OWNER that all Work will be in accordance with the Contract Documents and will not be defective. Prompt notice of any obvious patent Work defects discovered by OWNER or ENGINEER shall be promptly given to CONTRACTOR in writing. All defective Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 13. In case of dispute as to the cause of improper functioning of all or any part of the Work, the burden of proof that CONTRACTOR has complied with the Contract Documents rests with CONTRACTOR for this Work. He shall submit in writing to ENGINEER his opinion and basis of proof for the adequacy of his Work. OWNER may have those tests made, which OWNER deems advisable, by an independent testing laboratory of OWNER's choice. If any test so made indicates a defect in material or workmanship, or that one or more manufactured components of the Work are performing below the standard set by the manufacturer's public data and specifications, or the Specifications of these Contract Documents, the entire cost of all such tests shall be paid for by CONTRACTOR, and he shall also pay for retesting of the corrected Work, until in the ENGINEER's opinion, it functions satisfactorily. The Work shall be guaranteed to be free from defects due to faulty workmanship or material for a period of one (1) year from the date of OWNER issue of the Certificate of Acceptance. Work found to be improper or imperfect shall be replaced or redone without cost to OWNER within the one year guarantee period. Neither the Certificate of Acceptance, final payment, or any other provision of the Contract Documents shall relieve CONTRACTOR from his workmanship guarantee. Failure of CONTRACTOR to repair or replace faulty Work entitles OWNER to repair or replace the same and recover the costs from CONTRACTOR and/or his Surety. CONTRACTOR shall be the sole guarantor of the Work installed under this Contract and no third party guarantees/warranties by Subcontractors or suppliers of various components or materials will

be acceptable; nor shall agreements with Subcontractors or material or component suppliers by CONTRACTOR reduce CONTRACTOR's sole responsibility to OWNER under this Agreement. All equipment shall be warrantied and/or guaranteed by either CONTRACTOR or its supplier/manufacturer by assignment to OWNER, for at least one (1) year from the date of OWNER acceptance of the entire Project. It is anticipated by OWNER and acknowledged by CONTRACTOR that many equipment and material warranties from suppliers/manufacturers shall extend well beyond the initial one (1) year post acceptance period. The CONTRACTOR shall transfer by assignment to the OWNER any and all third party supplier and manufacturer warranties and/or guaranties that remain in effect beyond the one (1) year workmanship guarantee/warranty period. At the option of the OWNER, all materials/equipment are also warrantied or guaranteed to OWNER for one (1) year from the date of any early partial acceptance of Work, and beneficial use of a completed system component of Work prior to full integration with the entire completed Project.

Access to Work:

13.2. ENGINEER AND ENGINEER's representatives, other representatives of OWNER, testing agencies and governmental agencies with jurisdictional interests, will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall promptly provide proper and safe conditions for such authorized and identified reasonable access in accordance with any Occupational Safety and Health Administration (OSHA) and CONTRACTOR's safety program and insurance requirements.

It is agreed by CONTRACTOR that OWNER shall be and is hereby authorized to appoint from time to time, OWNER's subordinate supervisors, observers, and/or inspectors, as the OWNER may deem proper to inspect the material furnished and observe the Work performed under this Agreement, and to see that the material is furnished and Work is generally performed in accordance with the Specifications. This OWNER function, for OWNER's sole benefit, does not excuse the CONTRACTOR from his own quality control assurance, which is solely his responsibility. CONTRACTOR shall furnish all reasonable aid and assistance required by the ENGINEER, and OWNER's subordinate supervisors, observers and/or inspectors to perform observation, inspection and examination of the Work and all parts of the Work. CONTRACTOR shall regard and obey the directions and instructions of the ENGINEER and any OWNER subordinate supervisors, observers and/or inspector so appointed, when such directions are consistent with the obligations of the Contact Documents and included Specifications, provided, however, that should CONTRACTOR object to any order by any OWNER subordinate supervisor or inspector, CONTRACTOR may within ten (10) calendar days submit written notice to ENGINEER for his decision. Except as herein before provided, the authority of OWNER's subordinate supervisors or inspectors shall be limited to the rejection of unsatisfactory Work and materials and to the potential short-term suspension of the Work, until the questions of Work acceptability can be referred to ENGINEER.

13.2.1. CONTRACTOR shall cooperate with any OWNER-provided testing laboratory for the purpose of allowing services of the laboratory to be timely and properly performed. CONTRACTOR shall provide OWNER's representative and testing laboratory a minimum of twenty-four (24) hours notice of readiness for all testing as required by the

Specifications or customary construction industry standards. OWNER shall bear the cost of density and concrete testing, for the first test only. Testing of equipment, lines and valves shall be the responsibility of CONTRACTOR and he shall notify ENGINEER and OWNER'S Field Representative of his scheduled time for such tests, so that the test can be witnessed by ENGINEER and OWNER'S Field Representative. If initial tests show failure, the CONTRACTOR shall incur the non-reimbursable costs of retesting the areas that failed after CONTRACTOR'S corrective action has been taken, including the per diem personnel and equipment costs incurred by OWNER in said retesting. The per diem costs shall be determined based on the hourly wage plus reasonable overhead of ENGINEER's and OWNER'S personnel needed to be present at the Project site during retesting, and by the locally prevailing rental rate for the vehicles and equipment utilized in retesting. These retesting costs shall be paid by CONTRACTOR prior to OWNER's interim conditional acceptance of the Work improvements.

Tests and Inspections:

13.3. CONTRACTOR shall give ENGINEER and /or OWNER's Field Representative timely notice of readiness of the Work for all required inspections, tests or approvals.

13.4. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) to specifically be inspected, tested or approved, CONTRACTOR shall assume full responsibility therefore, pay all costs as included in the Contract Price in connection therewith, and furnish ENGINEER the required final certificates of inspection, testing or approval. CONTRACTOR shall also be responsible for and shall pay all non-reimbursable costs in connection with any special inspection or testing required in connection with OWNER'S or ENGINEER'S approval and acceptance of an alternative Supplier of "or equal" proposed substitutions of materials or equipment proposed by CONTRACTOR to be incorporated in the Work, or of alternative materials or equipment submitted for approval prior to CONTRACTOR's purchase thereof, for incorporation in the Work. The cost of all routine inspections, tests and approvals, other than any of those special inspections which may be required by the Contract Documents to be paid by CONTRACTOR, shall be paid by OWNER (unless otherwise specified).

13.5 All inspections, tests or approvals, other than those required by Laws or Regulations of any public body having jurisdiction, shall be performed by organizations acceptable to OWNER (or by ENGINEER, if so specified).

13.6 If any Work (including the work of others) that is to be inspected, tested or approved is backfilled or otherwise built-in or concealed by CONTRACTOR without written concurrence of ENGINEER, it must, if requested in writing by ENGINEER, be uncovered and revealed for ENGINEER'S Resident Project Representative and OWNER Field Representative observation. Such uncovering shall be at CONTRACTOR's non-reimbursable expense, unless CONTRACTOR has given ENGINEER timely written notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness (not to exceed three (3) days) in written response to such CONTRACTOR notice.

13.7 Neither observations by ENGINEER nor inspections, tests or approvals by others shall relieve CONTRACTOR from CONTRACTOR's sole obligations to perform the Work and

constantly employ quality control in accordance with the Contract Documents.

Uncovering Work:

13.8 If any Work is backfilled contrary to the advanced written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's non-reimbursable expense.

13.9 If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's written request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question shall be uncovered by CONTRACTOR by furnishing all necessary labor, material and equipment to uncover same. If it is found that such Work is defective, CONTRACTOR shall bear all direct, indirect and consequential non-reimbursable costs of such uncovering, exposure, observation, inspection and testing, and of the satisfactory repair, replacement and reconstruction, (including but not limited to fees and charges of ENGINEER, architects, attorneys and other professionals), and OWNER shall be entitled to an appropriate decrease in the Contract Price for that portion of these costs that CONTRACTOR does not otherwise reimburse to OWNER; and if the Parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. If, however, such Work is not found to be defective, CONTRACTOR may be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, repair, replacement and reconstruction; and, if the Parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. All increases or decreases in the Contract Price shall be governed by all State and local laws, statutes, codes, ordinances, rules and regulations governing public competitive bidding and Change Orders.

Owner May Stop the Work:

13.10 If the Work is defective in the opinion of the ENGINEER and OWNER, or CONTRACTOR fails to supply sufficient skilled workers, Subcontractors, or suitable materials or equipment, or otherwise fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may issue a written order for CONTRACTOR to stop the Work, or any portion thereof, until the cause for such stop Work order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR, or any other entity.

Correction or Removal of Defective Work:

13.11 If required by ENGINEER, CONTRACTOR shall promptly, as directed in writing, either correct all defective Work, whether or not fabricated, installed or completed, if the Work has been rejected by ENGINEER, and remove it from the Project site and replace it with non-defective Work. CONTRACTOR shall bear all direct, indirect and consequential non-reimbursable costs of such correction or removal (including but not limited to fees and charges of ENGINEER, architects, attorneys and other professionals) made necessary thereby.

One Year Workmanship Correction Period:

13.12 If within one (1) year after the date of OWNER issuance of the Certificate of Acceptance, or such longer period of time as may be prescribed by Laws or Regulations, or by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents, any Work is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions, either correct such defective Work, or, if it has been rejected by OWNER, remove it from the Project site and replace it with non-defective Work. If CONTRACTOR does not promptly comply with the terms of such OWNER instructions, or in an emergency where CONTRACTOR delay would cause serious risk of loss or damage to OWNER's facilities, OWNER may have the defective Work corrected, or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of ENGINEER, architects, attorneys and other professionals) will be charged to and paid by CONTRACTOR. In special circumstances, where a particular item of equipment is placed in continuous service by OWNER before acceptance of all the Work, the minimum one (1) year workmanship guarantee and/or equipment warranty correction periods for that item may start to run from an earlier date, if so provided in the Specifications or by Written Contract Amendment.

Acceptance of Defective Work:

13.13 If instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER's recommendation of final Project payment), prefers to accept it "as is," OWNER may do so in writing. CONTRACTOR shall bear all reasonable direct, indirect and consequential non-reimbursable costs attributable to OWNER's evaluation of, and determination to accept such defective Work (such OWNER costs to be approved by ENGINEER as to reasonableness and may include but not be limited to fees and charges of ENGINEER and any OWNER's, architects, attorneys and other professionals). If any such OWNER acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions to the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the Parties are unable to agree as to the amount thereof, OWNER or CONTRACTOR may make a written claim therefore as provided in Article 11. If the acceptance occurs after such final Project payment, an appropriate amount as determined by OWNER will be charged to and paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work:

13.14 If CONTRACTOR fails within seven (7) calendar days after written notice by ENGINEER to proceed to correct, and to actually correct defective Work; or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.11; or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents; or if CONTRACTOR fails to comply with any other provision of the Contract Documents; OWNER may, after the pre-requisite seven (7) calendar days written notice to CONTRACTOR, correct and remedy any such CONTRACTOR deficiency. In exercising the rights and remedies under this

paragraph, OWNER shall proceed with reasonable expediency. To the extent necessary to complete corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the Work and Project site; take possession of all or part of the Work; and temporarily suspend CONTRACTOR's Work related thereto; take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the Project site; and incorporate in the Work all Project materials, and CONTRACTOR shall allow OWNER and ENGINEER, representatives and employees such access to the Project site as may be necessary to enable OWNER to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of OWNER in exercising such rights and remedies will be charged against CONTRACTOR, in an amount approved as to reasonableness by ENGINEER, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the Parties are unable to agree as to the amount thereof, OWNER or CONTRACTOR may make a claim therefore as provided in Article 11. Such direct, indirect and consequential OWNER costs will include, but not be limited to: fees and charges of ENGINEER; OWNER's architects; attorneys; and other professionals; all court costs; and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's defective Work. CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies under this paragraph 13.4.

ARTICLE 14 -- PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

14.1 The Schedule of Values established as provided in paragraph 2.9 will serve as the basis for monthly progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units actually completed, multiplied by the per unit price. CONTRACTOR, ENGINEER and OWNER shall also mutually address in the Schedule of Values any periodic CONTRACTOR reimbursements or direct OWNER payments to third-party vendors producing any specially fabricated goods and equipment with longer lead times prior to delivery to the Project site.

Application for Progress Payment:

14.2 At least twenty (20) calendar days before each progress payment is scheduled (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review, an Application for Payment accurately completed and signed by CONTRACTOR, covering the Work completed as of the date of the Application, and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work, but delivered and suitably stored at the Site, or at another bonded and insured secure location off the nearby Project site as agreed to in an advanced writing signed by CONTRACTOR and OWNER, the Application for Payment shall also be accompanied by a bill of sale, invoice, affidavit of bill(s) paid, or other documentation warranting that OWNER has actually received the title ownership of Project materials and equipment still within the care,

custody and control of CONTRACTOR for Project Work purposes and free and clear of any attempted liens, charges, security interests and encumbrances (which are hereinafter in these General Conditions referred to as “Encumbrances”), and evidence that the materials and equipment are covered by appropriate property insurance and other security arrangements to protect OWNER’s legal interest therein, all of which will be satisfactory to OWNER. The amount of OWNER retainage with respect to progress payments, five percent (5%), is stipulated in the Agreement.

CONTRACTOR's Warranty of Title:

14.3 CONTRACTOR warrants and guarantees that title to any Work equipment and materials itemized in any Application for Payment, whether incorporated in the Project, or delivered and stored at or nearby the Project site, will pass to OWNER no later than the time of any progress payment, free and clear of any and all Encumbrances.

Review of Applications for Progress Payment:

14.4 ENGINEER will, within twenty (20) calendar days after receipt of each Application for Payment from CONTRACTOR, either indicate in writing a recommendation for OWNER payment and process the Application, or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR will make the necessary corrections and promptly resubmit the Application. Twenty (20) calendar days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the payment amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due, and when due will be promptly paid by OWNER to CONTRACTOR, preferably by electronic transfer.

14.5 ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based upon ENGINEER's limited periodic on-site observations of the Work in progress as an experienced and qualified design professional; and on ENGINEER's review of the Application for Payment and the accompanying data and Schedules; that the Work has progressed to the estimated percentage completion point indicated, that, to the best of ENGINEER's knowledge, information and belief, the status of the Work is in apparent general accordance with the Contract Documents (subject to: a later evaluation of the Work as a functioning whole; prior to or upon Substantial Completion; and subject to the results of any subsequent tests called for in the Contract Documents; and subject to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10; and subject to any other qualifications stated in the ENGINEER’s recommendation to OWNER); and that CONTRACTOR is entitled to payment of the amount recommended. However, by recommending any such payment, ENGINEER will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been made to check the CONTRACTOR’s quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents, or that there may not be other matters or issues between the Parties that might entitle CONTRACTOR to be paid additionally by OWNER, or OWNER to withhold payment to CONTRACTOR.

14.6 ENGINEER's recommendation of final Project payment will constitute an additional representation by ENGINEER to OWNER that to the best of ENGINEER's knowledge, the conditions precedent to CONTRACTOR's being entitled to final Project payment, as set forth in paragraph 14.13, have been fulfilled.

14.7 ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's professional opinion, it would be incorrect to make such representations to OWNER. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence, or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion, to protect OWNER from Project loss because:

14.7.1 the Work is defective, or completed Work has been damaged requiring CONTRACTOR correction or replacement.

14.7.2 the Contract Price has been reduced by Written Amendment or Change Order.

14.7.3 OWNER has been required to correct defective Work or complete Work in accordance with paragraph 13.14, or

14.7.4 because of ENGINEER's actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.9 inclusive.

OWNER may for its own benefit and protection and not for the direct benefit of any third parties, refuse to make CONTRACTOR payment in whole or in part of the amount recommended by ENGINEER, because claims have been made against OWNER on account of CONTRACTOR's improper performance of the Work; or payment bond claims and inquiries have been filed with OWNER or surety by third-parties in connection with the Work and OWNER may wish to consult with CONTRACTOR and/or CONTRACTOR's surety about the status of CONTRACTOR sub-tier payments, or there are other items entitling OWNER to a set-off against the payment amount recommended, but OWNER must give CONTRACTOR written notice stating the reasons for any non-payment to CONTRACTOR.

Substantial Completion:

14.8 When CONTRACTOR considers the entire Work ready for OWNER's intended purpose and use, CONTRACTOR shall notify ENGINEER in writing that the entire Work is Substantially Complete (except for minor items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, ENGINEER and CONTRACTOR shall make a joint inspection of the Work to determine the status of Project completion. If ENGINEER does not consider the Work Substantially Complete, ENGINEER will promptly notify CONTRACTOR in writing giving the reasons therefore. If ENGINEER considers the Work Substantially Complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a

tentative list of pending Work items to be completed or corrected by CONTRACTOR before final payment (“punch-list”). OWNER shall have ten (10) calendar days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not Substantially Complete, ENGINEER will within twenty (20) calendar days after submission of the tentative certificate to OWNER, notify CONTRACTOR in writing, stating the reasons for no accomplishment of Substantial Completion. If, after consideration of OWNER’s written objections regarding non-issuance of a Substantial Completion certificate, ENGINEER considers the Work Substantially Complete, ENGINEER will within said twenty (20) calendar days execute and deliver to OWNER and CONTRACTOR, a definitive certificate of Substantial Completion (with a final punch list of items to be completed or corrected) reflecting such changes from the tentative list as ENGINEER believes justified, after consideration of any objections from OWNER. At the time of delivery of the definitive certificate of Substantial Completion, ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to the division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to any Project security, operation, safety, maintenance, HVAC, utilities, insurance, warranties, and guarantees. OWNER and CONTRACTOR shall agree in writing regarding the final division of responsibilities, and so inform ENGINEER.

14.9 OWNER shall have the right to exclude CONTRACTOR from portions of the Project site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to portions of the Work to complete or correct items on the final punch list.

Partial Utilization:

14.10 Use by OWNER of any finished part of the Work, which has specifically been identified in the Contract Documents, or which OWNER, ENGINEER and CONTRACTOR subsequently agree constitutes a separately functioning and useable part of the Work that can be utilized by OWNER without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work, subject to the following:

14.10.1 OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for OWNER’s intended use and purpose and Substantially Complete. If CONTRACTOR agrees, CONTRACTOR will certify in writing to OWNER and ENGINEER that said part of the Work is Substantially Complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Additionally, CONTRACTOR at any time may notify OWNER and ENGINEER in writing, that CONTRACTOR considers any such part of the Work ready for OWNER’s intended use and purpose, and substantially complete, and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after such CONTRACTOR request, OWNER, ENGINEER and CONTRACTOR shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER considers that part of the Work to be Substantially Complete, the provisions of paragraphs 14.8 and 14.9 will apply with respect to issuance of any certification of Substantial Completion for that part of the Work, and finalizing the division of responsibilities and access thereto.

14.10.2 OWNER may at any time request CONTRACTOR in writing to permit OWNER to take over operation of any such part of the Work, although it is not Substantially Complete. A copy of such request will be sent to ENGINEER and within a reasonable time thereafter, OWNER, ENGINEER and CONTRACTOR shall make an inspection of that part of the Work to determine its status of completion and will prepare a punch-list of the items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to OWNER and ENGINEER within seven (7) calendar days that such part of the Work is not ready for separate operation by OWNER, ENGINEER will finalize the list of items to be completed or corrected and will deliver such list to OWNER and CONTRACTOR, together with a written statement as to the division of responsibilities pending final payment between OWNER and CONTRACTOR, with respect to security, operation, safety, maintenance, HVAC, utilities, insurance, warranties and guarantees for that part of the Work, which will become binding upon OWNER and CONTRACTOR at the time when OWNER takes over such operation (unless they shall have otherwise agreed in writing and so informed ENGINEER). During such OWNER operation and prior to Substantial Completion of such part of the Work, OWNER shall allow CONTRACTOR reasonable access to complete or correct items on any punch list, and to complete other related Work.

14.10.3 No OWNER use, occupancy or separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.9 in respect of CONTRACTOR's property insurance notice and endorsement.

Final Inspection:

14.11 Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars (a revised short-list) in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such corrective measures as are necessary to remedy such remaining deficiencies.

A qualified person(s) representing CONTRACTOR shall be present at this final inspection. Prior to this inspection, all Work shall have been completed, tested, adjusted and in final operating condition, if required by the Project Specifications.

Final Application for Payment:

14.12 After CONTRACTOR has completed all such final Work corrections to the satisfaction of ENGINEER and delivered certificates of inspection, marked-up record documents, if any, depicting as-built conditions (as provided in paragraph 6.21) and other important documents--all as required by the Contract Documents; and after ENGINEER has indicated that the Work is acceptable (subject to the provisions of paragraph 14.16), CONTRACTOR may make application for final payment following the procedure for monthly progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to

OWNER) of all third-party claims arising out of, or filed in connection with the Work. In lieu thereof and as approved by OWNER, CONTRACTOR may furnish third-party receipts or releases in full; a sworn affidavit of CONTRACTOR that the releases and receipts include prior CONTRACTOR payments for all labor, services, material and equipment for which a timely Payment Bond claim could be filed, and that all payrolls, material and equipment bills, and other CONTRACTOR indebtedness connected with the Work, for which OWNER or OWNER's property might in any way be encumbered, have been paid or otherwise satisfied; and a written consent of the Surety to OWNER's final payment, if any is required by CONTRACTOR's Surety. **IF ANY SUBCONTRACTOR OR SUPPLIER FAILS TO FURNISH CONTRACTOR A RELEASE OR RECEIPT IN FULL, CONTRACTOR MAY FURNISH A SPECIAL INDEMNITY BOND, OR OTHER COLLATERAL SATISFACTORY TO OWNER, TO INDEMNIFY, HOLD HARMLESS, AND FULLY PROTECT OWNER AGAINST ANY POTENTIAL THIRD-PARTY CLAIM.**

Final Payment and Acceptance:

14.13 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 (all as required by the Contract Documents), ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within twenty (20) calendar days after receipt of the final Application for Payment, indicate in writing, ENGINEER's recommendation to OWNER for payment and process the Application for Payment. Thereupon ENGINEER will give written notice to OWNER and CONTRACTOR that the Work is acceptable, subject to the provisions of paragraph 14.16. Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall promptly make the necessary corrections and resubmit the Application. Thirty (30) calendar days after presentation to OWNER of the final Application for Payment and accompanying documentation, in appropriate final form and substance, and with ENGINEER's recommendation and notice of acceptability, the final amount recommended by ENGINEER will become due and will be paid by OWNER to CONTRACTOR.

CONTRACTOR shall submit satisfactory evidence to the OWNER and ENGINEER that all payrolls, and other CONTRACTOR indebtedness connected with the Work have been paid, before a Final Certificate of Acceptance is issued.

14.14 If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the partial payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such Payment. Such partial payment shall be made under the terms and conditions governing final payment, except that it shall not

constitute a final waiver of claims by OWNER.

Contractor's Continuing Obligation:

14.15 CONTRACTOR'S obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by ENGINEER; nor the issuance of a Certificate of Substantial Completion or Final Acceptance; nor any payment by OWNER to CONTRACTOR under the Contract Documents; nor any use or occupancy of the Work or any part thereof by OWNER; nor any act of Work acceptance by OWNER; nor any failure to do so; nor the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13; nor any correction of defective Work by OWNER, will constitute an acceptance of Work not in accordance with the Contract Documents, or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents (except as provided in paragraph 14.16).

Waiver of Claims:

14.16 The making and acceptance of final payment will constitute:

14.16.1 a waiver of all claims by OWNER against CONTRACTOR, except any timely filed third party claims arising from unsettled payment bond claims; from latently defective Work appearing after final inspection pursuant to paragraph 14.11; or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it will not constitute a waiver by OWNER of any rights regarding CONTRACTOR's continuing obligations under the Contract Documents; and

14.16.2 a waiver of all claims by CONTRACTOR against OWNER, other than those previously, properly, and timely made in writing and still unsettled.

ARTICLE 15 -- SUSPENSION OF WORK AND TERMINATION

Owner May Suspend Work:

15.1 OWNER may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety (90) cumulative (not necessarily consecutive) calendar days by notice in writing to CONTRACTOR and ENGINEER, which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR may be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension, if CONTRACTOR demonstrates an approved claim therefore as provided in Articles 11 and 12. Any increase or decrease in the Contract Price shall be governed by all State and local laws, statutes, codes, ordinances, rules and regulations governing public competitive bidding and Change Orders.

Owner May Terminate:

15.2 Upon the occurrence of any one or more of the following events:

15.2.1 if CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise, under any other federal or Texas law in effect at such time, relating to the bankruptcy or insolvency;

15.2.2 if a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or Texas law in effect at the time relating to bankruptcy or insolvency;

15.2.3 if CONTRACTOR makes a general assignment for the benefit of creditors;

15.2.4 if a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of the property of CONTRACTOR is for the purpose of enforcing a lien against such CONTRACTOR property, or for the purpose of general administration of such CONTRACTOR property, for the benefit of CONTRACTOR's creditors;

15.2.5 if CONTRACTOR admits in writing an inability to pay its debts generally as they become due;

15.2.6 if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents (including but not limited to, failure to supply sufficient skilled workers or equipment, or failure to adhere to the Progress Schedule established under paragraph 2.9, as revised from time to time);

15.2.7 if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.8 if CONTRACTOR disregards the rights of OWNER; or

15.2.9 if CONTRACTOR otherwise violates in any substantial and material way, any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR and the surety seven (7) calendar days written notice, and to the extent permitted by Laws and Regulations: terminate the services of CONTRACTOR; exclude CONTRACTOR from the Project site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the Project site; and use the same to the full extent they could be used by CONTRACTOR (without OWNER liability to CONTRACTOR for trespass or conversion), and finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the OWNER's direct, indirect and consequential costs of completing the Work (including but not limited to fees and charges of ENGINEER, other engineers, architects, attorneys and other professionals and court costs), such excess will be paid to CONTRACTOR or surety. If such OWNER costs exceed such

unpaid balance of the Contract Price, CONTRACTOR or surety shall pay the difference to OWNER. Such costs incurred by OWNER will be approved as to reasonableness by ENGINEER and incorporated in a Change Order, but when exercising any rights or remedies under this paragraph, OWNER shall not be required to obtain the lowest price for the Work performed.

15.3 Where CONTRACTOR's services have been so terminated by OWNER, that termination will not affect any rights or remedies of OWNER under this continuing Agreement against CONTRACTOR then existing, or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from ongoing liability under this Agreement.

15.4 Upon seven (7) calendar days written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement for OWNER's convenience. In such case, CONTRACTOR shall mitigate demobilization costs as best as possible and be paid for all Work properly executed and expenses sustained, plus reasonable termination expenses, which will include, but not be limited to, direct, indirect and consequential costs (including, but not limited to, fees and charges of CONTRACTOR's engineers, architects, attorneys and other professionals).

ARTICLE 16 -- TIME FOR SUBSTANTIAL COMPLETION AND LIQUIDATED DAMAGES.

16.1. IT IS HEREBY UNDERSTOOD AND MUTUALLY AGREED, BY AND BETWEEN THE PARTIES HERETO, THAT THE DATE OF BEGINNING, RATE OF PROGRESS AND THE TIME FOR SUBSTANTIAL COMPLETION OF THE WORK TO BE PERFORMED HEREUNDER ARE ESSENTIAL CONDITIONS OF THIS CONTRACT; and it is further mutually understood and agreed, by and between the Parties hereto, that the time to perform the Work embraced in this Contract shall be commenced on a date to be specified in the Notice to Proceed.

16.2 CONTRACTOR hereby agrees that said Work shall be prosecuted regularly, diligently, and uninterrupted at such rate of progress as will insure Substantial Completion thereof within the time specified. It is expressly understood and mutually agreed, by and between the Parties hereto, that the time for the Substantial Completion of the Work described herein in calendar days is a reasonable time for Substantial Completion of same, taking into consideration the average climatic range and weather conditions the CONTRACTOR must reasonably anticipate is already included in the calculation of the performance time specified herein, and CONTRACTOR has assessed the usual industrial and labor conditions prevailing in the Cameron County area.

16.3 If CONTRACTOR shall neglect, fail or refuse to Substantially Complete the Work within the mutually agreed to time herein specified, then CONTRACTOR does hereby agree, as a part of the consideration for the awarding of this Contract, to pay the OWNER the mutually agreed to amount specified in the Construction Agreement, not as a penalty, but as liquidated damages for such breach of Contract for each and every calendar day that CONTRACTOR shall be in default, after the time stipulated in the Contract Documents for Substantially Completing the

Work.

16.4 The damage to OWNER by reason of this Work not being Substantially Completed as of the mutually agreed to performance time period are incapable of definite ascertainment by either Party, and therefore the Parties hereto have mutually fixed and limited such damages to the sum stipulated in the Construction Agreement for each calendar day the Project runs beyond such Substantial Completion date, and the mutual agreement for such damages constitutes a part of the consideration for entering the Agreement. It is further mutually agreed that **TIME IS OF THE ESSENCE** for each and every portion of this Agreement and of the Specifications, wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract, any additional time is allowed for the Substantial Completion of any Work, the new time fixed by such extension shall also be **OF THE ESSENCE** for this Agreement. Provided that CONTRACTOR shall not be assessed with the mutually agreed to liquidated damages or any excess cost when the delay in the Substantial Completion of Work is due:

16.4.1 To any preference, priority or allocation order duly issued by the United States Federal Government.

16.4.2 To unforeseeable causes beyond the control and without the fault or negligence of CONTRACTOR, including, but not restricted to: Acts of God; or of the public enemy; acts of the OWNER; acts of another contractor in the performance of a separate contract with the OWNER; fires; floods exceeding the 100 year frequency in Cameron County, Texas; epidemics; quarantine restrictions; strikes; freight embargoes and unusually severe weather not customary for the Cameron County, Texas area and not already included in the calculation of the performance time specified herein.

16.4.3 To any delays of Subcontractors and/or CONTRACTOR's equipment/material suppliers occasioned by any of the causes specified in 16.4.1 or 16.4.2.

16.4.4 Provided further, that CONTRACTOR shall immediately attempt to mitigate the impacts of the delay, and within seven (7) calendar days from the beginning of such delay, notify OWNER, in writing, of the causes for the delay. ENGINEER and OWNER shall then ascertain the facts and extent of the delay and OWNER will notify CONTRACTOR within a reasonable time of OWNER's decision in the matter regarding any adjustment to the Contract Time and a mutually acceptable Project Schedule recovery plan.

ARTICLE 17 -- MISCELLANEOUS

Giving Notice:

17.1 Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly performed if delivered in person to the CONTRACTOR's Project Superintendent or mailed to an officer of the corporation in the case of the CONTRACTOR; or to the General Manager and CEO of the BPUB in the case of the OWNER; or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the provider of the notice. **PROVIDING TIMELY NOTICE AS REQUIRED BY**

THE NUMEROUS PARAGRAPHS HEREIN IS A MUTUALLY AGREED TO ESSENTIAL TERM OF THIS CONTRACT FOR BOTH PARTIES, AND FAILURE TO PROVIDE SAME CONSTITUTES A MATERIAL BREACH OF THE CONTRACT AND A WAIVER OF CERTAIN REMEDIES THAT OTHERWISE WOULD HAVE BEEN AVAILABLE TO A PARTY HEREUNDER HAD PROPER TIMELY NOTICE BEEN PROVIDED.

Computation of Calendar Day Time:

17.2 When any period of time is referred to in the Contract Documents by "days", and the OWNER'S format for scheduling the performance time on the Project is by utilizing calendar days in lieu of "working days," it will be computed as calendar days, to exclude the first and include the last calendar day of such measured period. If the last calendar day of any such period falls on a calendar day listed as a local BPUB holiday by the Contract Documents, such calendar day will be omitted from the computation.

17.2.1 A calendar day consists of twenty-four (24) hours and is measured from midnight on one day, to the next midnight, and shall constitute a single calendar day.

General:

17.3 Should OWNER suffer injury or damage to person or property because of any error, omission or negligent act of the CONTRACTOR, or of any of the CONTRACTOR'S, Subcontractor's, employees or agents, or others for whose negligent acts and/or omissions CONTRACTOR is legally liable, OWNER's claim will be made in writing to the CONTRACTOR within a reasonable time of the first occurrence or observation of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for, or a waiver of, the legal provisions of any applicable statute of limitations or repose.

17.4 The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the Parties hereto, and, in particular but without limitation, the conditions, warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.32, 13.1, 13.12, 13.14, 14.3 and 15.2, and all of the rights and remedies available to OWNER thereunder; are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to OWNER which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this paragraph 17.4 will be as effective as if repeated specifically in all the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. All representations, conditions, warranties and guarantees made in the Contract Documents will survive the execution, final payment and termination or completion of the Agreement. All CONTRACTOR recitations contained in any document required by OWNER, whether delivered at the time of the execution of the Construction Agreement, or at a later date, shall constitute legal and binding representations, warranties and guarantees by CONTRACTOR herein.

17.5 CONTRACTOR shall comply with the "anti-kickback" provisions of the Copeland

Act now codified at 18 U. S. C. A. §874, and all amendments or modifications of the original Act of June 13, 1934.

SUPPLEMENTARY CONDITIONS

SECTION 1 - WAGE AND LABOR STANDARD PROVISIONS - 100% NON - FEDERALLY FUNDED CONSTRUCTION

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1. GENERAL STATEMENT

This is a 100% Non-Federally funded and competitively bid Public Works Contract and Article 5159a, Revised Civil Statutes of Texas, as amended, requires that not less than the general prevailing wage rates (minimum hourly base pay and minimum hourly fringe benefit contribution) for work of similar character be paid to Contractor and Subcontractor employees. These local prevailing and adopted wage rates are derived from the most current applicable federal prevailing wage rates for Cameron County, Texas as published by the United States Department of Labor, (DOL) Dallas, Texas. Copies of the wage rates applicable to the Project at the time of bidding are contained at the end of this Supplementary Conditions Section 1, and are included instruments of this Contract and full compliance with same shall be required.

Any deviation from Wage and Labor Standard Provisions compliance may be cause for OWNER's withholding either interim or final payment to the CONTRACTOR until such deviations are properly corrected.

2. OWNER'S FINANCE DEPARTMENT WAGE & HOUR OFFICE, PROJECT RESPONSIBILITIES

The OWNER's FINANCE DEPARTMENT is primarily responsible for all Wage and Labor Standard Provisions investigation and enforcement and will monitor CONTRACTOR/Subcontractor practices to assure the OWNER that:

- a. Appropriate weekly compliance statements and payroll records are submitted to the OWNER by the CONTRACTOR/Subcontractors and that such are reviewed for compliance with Wage and Labor Standard Provisions.
- b. Apprentices/trainees working on the Project are properly identified by CONTRACTOR/Subcontractor on payroll records and documented as being included in programs currently sanctioned by appropriate federal or Texas regulatory agencies.
- c. Applicable Wage Determination Decisions, including any applicable modifications, and related statements are posted at the Project Work site by the CONTRACTOR and that proper job classifications and commensurate minimum hourly base and any applicable fringe wage rates are paid.
- d. Employees are periodically interviewed (at random) on each Project as required.
- e. That no person employed by CONTRACTOR/Subcontractor is induced against his will, by any means, to give up any part of the compensation to which he is otherwise entitled.
- f. That any and all periodic administrative directives to the Wage & Hour Monitor (TITLE) from the OWNER's Finance Department and Board of Trustees are being implemented.

3. **CLAIMS & DISPUTES PERTAINING TO WAGE RATES**

Claims and disputes not promptly and routinely settled by the CONTRACTOR/Subcontractor and employees pertaining to wage rates, or to job classifications of labor employed upon the Work covered by this Contract, shall be reported by the employee in writing, within sixty (60) Calendar Days of employee's receipt of any allegedly incorrect classification, wage or benefit report, to the Wage & Hour Monitor for further investigation. Claims and disputes not reported by the employee to the Wage & Hour Monitor in writing within the sixty (60) Calendar Day period shall be deemed waived by the employee for the purposes of the OWNER administering and enforcing the OWNER's Contract rights against the CONTRACTOR on behalf of the employee. Waiver by the employee of this OWNER intervention shall not constitute waiver by the OWNER or employee to independently pursue contractual rights it has against the CONTRACTOR/Subcontractor for breach of Contract and other sanctions available to enforce the Wage and Labor Standard Provisions.

4. **BREACH OF WAGE AND LABOR STANDARD PROVISIONS**

The OWNER reserves the right to terminate this Contract for cause if the CONTRACTOR/Subcontractors shall knowingly and continuously breach, without timely restitution or cure, any of these governing Wage and Labor Standard Provisions. A knowing and unremedied proven violation of these Wage and Labor Standard Provisions may also be grounds for a "non-responsibility" determination by OWNER thereby jeopardizing CONTRACTOR/Subcontractor from future OWNER contracts for lack of responsibility to perform future work, as determined by the OWNER. Recurrent violations, whether remedied or not, will be considered by the OWNER when assessing the responsibility history of a potential contractor/subcontractor prior to competitive award of future OWNER Public Works projects. The general OWNER remedies stated in this paragraph 4. above, are not exhaustive and not cumulative, for the OWNER reserves legal and contractual rights to other specific remedies outlined herein below and in other parts of this Contract and as are allowed by applicable OWNER resolutions, Texas and federal statutes.

5. **EMPLOYMENT OF LABORERS/MECHANICS NOT LISTED IN WAGE DETERMINATION DECISION**

In the event the CONTRACTOR/Subcontractor discovers that construction of a particular Work element requires a certain employee classification and skill that is not listed in the wage determination decision contained in the original Contract Documents, CONTRACTOR/Subcontractors will make prompt inquiry (at least twenty-one (21) Calendar Days before bidding, if possible) to the OWNER identifying that class of laborers/mechanics not listed in the current pre-bid wage determination decision who are intended to be employed, or who are being employed, under the Contract. Using his best judgment and information resources available to him at the time, and any similar, prior OWNER or Federal Department of Labor decisions, the Wage & Hour Monitor, shall

classify said laborers/mechanics by issuing a special local wage determination decision to the bidders or CONTRACTOR/Subcontractor, which shall be enforced by the OWNER.

6. MINIMUM WAGE

All laborers/mechanics employed to construct the Work governed by this Contract shall be paid not less than weekly the full amount of wages due (minimum hourly base pay and any applicable minimum hourly fringe benefit contribution for all hours worked, including overtime) for the immediately preceding pay period, computed at wage and fringe rates not less than those contained in the wage determination decision included in this Contract. Only payroll deductions as are mandated by Texas or federal law, and those legal deductions previously approved in writing by the employee, or as are otherwise permitted by Texas or federal law, may be withheld by the CONTRACTOR/Subcontractor.

Should the CONTRACTOR/Subcontractor subscribe to fringe benefit programs for employees, such programs shall be fully approved by the OWNER in adopting a previous U.S. Department of Labor decision on such fringe benefit programs or by applying DOL criteria, in rendering a local decision on the adequacy of the fringe benefit programs. The approved programs shall be in place at the time of OWNER's Contract execution and the provisions thereof shall be disclosed to the CONTRACTOR, for legal review prior to Project commencement, if a written request for same is submitted by CONTRACTOR/Subcontractor prior to CONTRACTOR's execution of the Construction Agreement.

Regular CONTRACTOR/Subcontractor contributions made to, or costs incurred for, approved fringe benefit plans, funds or other benefit programs that cover periods of time greater than the one week payroll period (e.g. monthly or quarterly, etc.) shall be prorated by the CONTRACTOR/Subcontractor on weekly CONTRACTOR payroll records to reflect the equivalent value of the hourly and weekly summary of fringe benefits per employee.

7. OVERTIME COMPENSATION ON NON-FEDERALLY FUNDED PROJECTS

No CONTRACTOR/Subcontractor contracting for any part of the federally funded Contract Work (except for Project site related security guard services), which may require or involve the employment of laborers/mechanics, shall require or permit any laborer/mechanic in any seven (7) Calendar Day Work period in which he, she is employed on such Work, to Work in excess of forty (40) hours in such Work period, unless said laborer/mechanic receives compensation at a rate not less than one and one-half (1 ½) times the basic hourly rate of pay for all hours worked in excess of forty (40) hours in a seven (7) Calendar Day Work period. Any applicable fringe benefits must be paid for straight time and overtime; however, fringe benefits are not included when computing the overtime rate. Salaried employees performing labor or mechanic work on this contract may NOT be exempted from overtime.

8. PAYMENT OF CASH EQUIVALENT FRINGE BENEFITS

The CONTRACTOR/Subcontractor is allowed to pay a minimum hourly cash equivalent of any applicable minimum hourly fringe benefits listed in the wage determination decision, in lieu of the contribution of benefits to a permissible fringe benefit plan, for all hours worked, including overtime, as described in paragraphs 6. and 7. above. An employee is not allowed to receive less than the minimum hourly basic rate of pay specified in the applicable wage determination decision.

9. WORK CONDUCTED ON HOLIDAYS-

If a laborer/mechanic is employed in the normal course and scope of his or her Work on the jobsite on New Year's Day, Martin Luther King Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas Day, or any additional local OWNER holidays specified by the OWNER in the Contract Documents or the Calendar Days observed as such in any given year, Work shall be paid for at no less than one and one-half (1 1/2) times the regular minimum hourly base pay regardless of the total number of hours the laborer/mechanic has accumulated during the pay period.

10. UNDERPAYMENT OF WAGES OR SALARIES

- a. When a "full investigation" (as called for in and as construed under Article 5159a, Sec. 2 and as may be further generally described in any administrative directive to the Wage & Hour Monitor from the OWNER), evidences underpayment of wages by CONTRACTOR/Subcontractor to laborers/mechanics employed upon the Work covered by this Contract, the OWNER, in addition to such other rights as may be afforded it under Texas and/or federal law and/or this Contract, shall withhold from the CONTRACTOR, out of any payments (interim progress and/or final) due the CONTRACTOR, so much thereof as the OWNER may consider necessary to secure ultimate payment by the appropriate entity to such laborers/mechanics, of full wages required by this Contract, plus possible penalty (See b. below). The amount so withheld, excluding any possible penalty to be retained by the OWNER, may be disbursed at an appropriate time after "full investigation" by the Wage & Hour Monitor, for and on behalf of the CONTRACTOR/Subcontractor (as may be appropriate), to the respective laborers/mechanics to whom the same is due, or on their behalf to fringe benefit plans, funds, or programs for any type of minimum fringe benefits prescribed in the applicable wage determination decision.
- b. Article 5159a, Revised Civil Statutes of Texas, as amended, states that the CONTRACTOR shall forfeit as a penalty to the OWNER the sum of sixty dollars (\$60.00) for each Calendar Day, or portion thereof, for each laborer, workman, or mechanic, who is paid less than the said stipulated rate for any Work done under this Contract, whether by the CONTRACTOR himself, or by any Subcontractor working under him. Pursuant to and supplemental to this statutory authority, the OWNER and the CONTRACTOR/Subcontractor contractually acknowledge and agree that said sixty dollar (\$60.00) statutory penalty shall apply to any violations

of paragraphs 6,7, or 9 herein, resulting from CONTRACTOR/Subcontractor underpayment violations.

- c. If unpaid or underpaid workers cannot be located by the CONTRACTOR/Subcontractor or the OWNER after diligent efforts to accomplish same, unpaid or underpaid wages shall be reserved by the OWNER in a special "unfound worker's account" established by the OWNER, for such CONTRACTOR/Subcontractor employees. If after one (1) year from the final acceptance of the Project by the OWNER, workers still cannot be located, in order that the OWNER can make effective interim re-use of the penalty money, such wages and any associated statutory penalties may be used to defray actual costs incurred by the OWNER in attempting to locate said workers, and any remaining monies may then revert back to the OWNER's original funding source for the Project. However, unpaid or underpaid workers for which money was originally reserved are eligible to claim recovery from the OWNER for a period of not-to-exceed three (3) years from the final acceptance of the Project by the OWNER. Claimant recovery after expiration of the three (3) year period is prohibited.

11. DISPLAYING WAGE DETERMINATION DECISIONS/AND NOTICE TO LABORERS/MECHANICS STATEMENT

The applicable wage determination decision(s) as described at the end of this Supplementary Conditions Section 1 (and as specifically included in each project contract), outlining the various worker classifications and mandatory minimum wages and minimum hourly fringe benefit deductions, if any, of laborers/mechanics employed and to be employed upon the Work covered by this CONTRACT, shall be displayed by the CONTRACTOR/Subcontractor at the site of Work in a conspicuous and prominent public place, readily and routinely accessible to workers for the duration of the Project. In addition, the CONTRACTOR/Subcontractor agrees with the contents of the following statement, and shall display same, in English and Spanish, near the display of the wage determination decision at the Project site of Work:

NOTICE TO LABORERS/MECHANICS

Both the Brownsville Public Utilities Board and the CONTRACTOR/Subcontractor agree that you must be compensated with not less than the minimum hourly base pay and any required minimum hourly fringe benefit contribution in accordance with the wage rates publicly posted at this jobsite, and as are applicable to the classification of Work you perform.

Additionally, you must be paid not less than one and one-half times (1 ½) your basic hourly rate of pay for any hours worked over 40 in any seven (7) Calendar Day Work period, and for any Work conducted on New Year's Day, Martin Luther King Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day and other possible locally observed holiday(s), or the Calendar Days observed as such in any given year.

Apprentice and trainee hourly wage rates and ratios apply only to apprentices and trainees recognized under approved Federal, or State, apprenticeship training programs registered with the Bureau of Apprenticeship and Training, U.S. Dept. of Labor.

If you believe that your employer is not paying the posted minimum wage for the type of Work you do, you must make direct inquiry to your employer and also inquire in writing, within sixty (60) Calendar Days of your receipt of any allegedly incorrect wage or benefit check or report, to the BPUB Wage & Hour Monitor. It is mandatory that you promptly file written inquiry of any allegedly incorrect wage or benefit checks or reports with the BPUB's Wage & Hour Monitor within the sixty (60) Calendar Day period, so that you do not waive your potential right of recovery under the provisions of the BPUB's construction Contract that governs this Project.

Both the BPUB and the CONTRACTOR/Subcontractor agree that no laborer/mechanic who files a complaint or inquiry concerning alleged underpayment of wages or benefits, shall be discharged by the employer, or in any other manner be discriminated against by the employer, for filing such complaint or inquiry.

12. PAYROLLS & BASIC PAYROLL RECORDS

- a. The CONTRACTOR and each Subcontractor shall prepare payroll reports in accordance with the "General Guideline" instructions furnished by the OWNER of the Project. Such payroll submittals shall contain the name and address of each such employee, his correct labor classification, rate of pay, daily and weekly number of hours worked, any deductions made, and actual basic hourly and fringe benefits paid. The CONTRACTOR shall submit payroll records each week, and no later than seven (7) working days following completion of the workweek being processed, to the OWNER. These payroll records shall include certified copies of all payrolls of the CONTRACTOR and of his Subcontractors, it being understood that the CONTRACTOR shall be responsible for the submission and general mathematical accuracy of payrolls from all of his Subcontractors. Each such payroll submittal shall be on forms deemed satisfactory to the Wage & Hour Monitor and shall contain a "Weekly Statement of Compliance", as called for by the Contract Documents. Such payrolls will be forwarded to the Wage & Hour Monitor.
- b. Copies of payroll submittals and basic supporting payroll records of the CONTRACTOR/Subcontractors accounting for all laborers/mechanics employed under the Work covered by this Contract, shall be maintained by CONTRACTOR/Subcontractor during the course of the Work, and preserved for a period of three (3) years after completion of the Project. The CONTRACTORS/Subcontractors shall maintain records which demonstrate: any contractor commitment to provide fringe benefits to employees as may be mandated by the applicable wage determination decision; that the plan or program is adjudged financially responsible by the appropriate approving authority, (i.e. U.S. Department of Labor, U.S. Department of Treasury, etc.); and that the provisions, policies, certificates, and description of benefits of the plan or program as may be periodically amended, have been clearly communicated in a timely manner and in writing, to the laborers/mechanics affected, prior to their performing Work on the Project.

- c. The CONTRACTOR/Subcontractor shall make the above records available for inspection, copying, or transcribing by the Wage & Hour Monitor of the OWNER at reasonable times and locations for purposes of monitoring compliance with this Contract.

13. LABOR DISPUTES

The CONTRACTOR/Subcontractor shall immediately notify the Wage & Hour Monitor or his designated representative of any actual or impending CONTRACTOR/Subcontractor labor dispute which may affect, or is affecting, the Project Performance Schedule of the CONTRACTOR's or any Subcontractor's Work. In addition, the CONTRACTOR/Subcontractor shall consider all appropriate measures to eliminate or minimize the effect of such labor disputes on the Project Progress Schedule, including but not limited to such measures as: promptly seeking injunctive relief if appropriate; seeking appropriate legal or equitable actions or remedies; taking such measures as establishing a reserved gate, as appropriate; if reasonably feasible, seeking other sources of supply or service; and any other measures that may be appropriately utilized to mitigate or eliminate the adverse Project jobsite and scheduling effects of the labor dispute.

14. COMPLAINTS, PROCEEDINGS, OR TESTIMONY BY EMPLOYEES

No laborers/mechanics to whom the wage, salary, or other labor standard provisions of this Contract are applicable shall be discharged, or in any other manner discriminated against by the CONTRACTOR/Subcontractors, because such employee has filed any formal inquiry or complaint, or instituted or caused to be instituted, any legal or equitable proceeding, or has testified, or is about to testify, in any such proceeding under or relating to the wage and labor standards applicable under this Contract.

15. EMPLOYEE INTERVIEWS TO ASSURE WAGE AND LABOR STANDARD COMPLIANCE

CONTRACTOR/Subcontractors shall allow expeditious jobsite entry of the Wage & Hour Monitor displaying and presenting proper OWNER identification credentials to the jobsite superintendent or his representative. While on the jobsite, the Wage & Hour Monitor shall observe all CONTRACTOR jobsite rules and regulations concerning safety, internal security and fire prevention. CONTRACTOR/Subcontractors shall allow Project employees to be separately and confidentially interviewed at random for a reasonable duration of time by the Wage & Hour Monitor to facilitate compliance determinations regarding adherence by the CONTRACTOR/Subcontractor to these Wage and Labor Standard Provisions.

16. "ANTI-KICKBACK" PROVISION

No person employed in the construction or repair of any OWNER public works Project shall be induced, by any means, to give up to any CONTRACTOR/Subcontractor or public

official or employee, any part of the hourly and/or fringe benefit compensation to which he or she is otherwise entitled.

17. "FALSE OR DECEPTIVE INFORMATION" PROVISION

Any person employed by the CONTRACTOR/Subcontractor in the construction or repair of any OWNER public works Project, who is proven to have knowingly and willfully falsified, concealed or covered up by any deceptive trick, scheme, or device a material fact, or made any false, fictitious or fraudulent statement or representation, or made or used any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be permanently removed from the Project jobsite by the CONTRACTOR/Subcontractor. The OWNER reserves the right to terminate this Contract for cause as a result of serious and uncured violations of this provision.

18. EMPLOYMENT OF APPRENTICES/TRAINEES

- a. Apprentices will be permitted to work at less than the predetermined rate for the Work they perform when they are employed and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship & Training, or with a Texas Apprenticeship Agency recognized by the Bureau, or if a person is employed in his first ninety (90) Calendar 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. The allowable ratio of apprentices to journeymen in any craft classification shall not be greater than the ratio under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not a trainee as defined in (b) below, or is not registered or otherwise employed as stated above, shall be paid the wage rate for the classification of Work he actually performs. The CONTRACTOR/Subcontractor is required to furnish to the Wage & Hour Monitor of the OWNER, a copy of the certification, along with the payroll record that the employee is first listed on. The wage rate paid apprentices shall be not less than the specified rate in the registered program for the apprentice's level of progress expressed as the appropriate percentage of the journeyman's rate contained in the applicable wage determination decision.
- b. Trainees will be permitted to work at less than the predetermined rate for the Work performed when they are employed pursuant to an individually registered program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen shall not be greater than that permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress. Any employee listed on the payroll at a trainee wage rate, who is not registered and participating in a training plan approved by the Employment and Training Administration, shall be paid not less than the wage rate determined by the classification of Work he actually performs. The

CONTRACTOR/Subcontractor is required to furnish a copy of the trainee program certification, registration of employee-trainees, ratios and wage rates prescribed in the program, along with the payroll record that the employee is first listed on, to the Wage & Hour Monitor of the OWNER. In the event the Employment and Training Administration withdraws approval of a training program, the CONTRACTOR/Subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the Work performed until an acceptable program is approved by the Employment and Training Administration.

- c. Paragraphs 18.a. and b. above shall not operate to exclude training programs approved by the OFCCP, United States Department of Labor and as adopted by the Associated General Contractors (AGC) of Texas, Highway, Heavy, Utilities and Industrial Branch. Guidelines for these training programs shall be the same as those established for federally funded projects. This sub-paragraph 15.c. shall not apply to those portions of a project deemed to be building construction.

d. **RATIOS, APPRENTICE TO JOURNEYMAN:**

The Ratio of Apprentice to Journeyman for this Project shall be the same as the Ratio permitted under the plan approved by the Employment and Training Administration, Bureau of Apprenticeship and Training, U.S. Department of Labor, by craft. A copy of the allowable Ratios is included with the applicable Wage Determination Decision at the end of this Supplementary Conditions Section 1.

When a "full investigation" (as called for in, and as construed under Article 5159a, Sec. 2), evidences a violation of the Apprentice or Trainee to Journeyman ratios effective for CONTRACTOR/Subcontractor employees working on this Contract, the OWNER, in addition to such other rights as may be afforded it under Texas and/or federal law and/or other sections of this Contract (especially paragraph 10 Underpayment of Wages), shall withhold from the CONTRACTOR, out of any payments (interim progress and/or final) due the CONTRACTOR, the liquidated damages (not a penalty) sum of seventy-five dollars (\$75.00) for each Calendar Day, or portion thereof, for each certified Apprentice or Trainee employee assigned to a Journeyman that exceeds the maximum allowable Apprentice/Trainee to Journeyman ratio stipulated for any Work done under this Contract, whether by the CONTRACTOR himself, or by any Subcontractor working under him.

19. JOBSITE CONDITIONS

CONTRACTORS/Subcontractors will not allow any person employed for the Project to work in surroundings or under construction conditions which are unsanitary, unhealthy, hazardous, or dangerous as governed by industry standards and appropriate local, Texas and federal statutes, ordinances, and regulatory guidelines.

20. EMPLOYMENT OF CERTAIN PERSONS PROHIBITED

- a. The CONTRACTOR/Subcontractor shall knowingly only employ persons of appropriate ages commensurate with the degree of required skill, strength, maturity and judgment associated with the activity to be engaged in, but not less than the age of fourteen (14) years, as governed by Chapter 51 "Employment of Children", Texas Labor Code, (Vernon's Texas Codes Annotated) (as may be amended), and Texas Department of Labor and Standards rulings and interpretations associated with that statute. It is hereby noted that in some circumstances generally governed by this paragraph, a federal statute (see: Fair Labor Standards Act, 29 USCS Section 212; Volume 6A of the Bureau of National Affairs Wage Hour Manual at Paragraph 96:1; "Child Labor Requirements in Nonagricultural Occupations" WH Publication 1330, July 1978 as may be amended), could pre-empt the Texas Statute and therefore be the controlling law on this subject. The CONTRACTOR/Subcontractor should seek clarification from Texas and federal agencies and legal counsel when hiring adolescent employees for particular job classifications.
- b. Prohibited persons not to be employed are also those persons who, at the time of employment for this Contract, are serving sentence in a penal or correctional institution, except that prior approval by the Wage & Hour Monitor is required to employ any person participating in a supervised work release or furlough program that is sanctioned by appropriate Texas or federal correctional agencies.
- c. The CONTRACTOR/Subcontractors shall be responsible for compliance with the provisions of the "Immigration Reform and Control Act of 1986" Public Law 99-603, and any related Texas enabling or implementing statutes, especially as they apply in combination to the unlawful employment of aliens and unfair immigration-related employment practices affecting this Contract.

21. PROVISIONS TO BE INCLUDED IN SUBCONTRACTS

The CONTRACTOR shall cause these Wage and Labor Standard Provisions, or reasonably similar contextual adaptations hereof, and any other appropriate Texas and federal labor provisions, to be inserted (or referenced by "flow down" provisions) in all subcontracts relative to the Work to bind Subcontractors (and any sub-tier subcontractors) to the same Wage and Labor Standards as contained in these Supplementary Conditions and other Contract Documents insofar as applicable to the Work of Subcontractors or sub-tier subcontractors, and to give the CONTRACTOR similar, if not greater, general contractual authority over the Subcontractor, or sub-tier subcontractors, as the OWNER may exercise over the CONTRACTOR.

<INSERT APPLICABLE DAVIS BACON WAGE RATES>

PART II – TECHNICAL SPECIFICATIONS

Special Conditions

- SC-1 Pre-Bid Site Visit:** Prior to submitting a bid, the CONTRACTOR shall conduct a site visit to verify construction spacing limitations and proximity to buildings. The CONTRACTOR is responsible for acquiring the appropriate equipment to protect existing buildings, overhead utilities, and nearby structures not specifically called out to be replaced in the plans.
- SC-2 Existing Subsurface Conditions and Above-ground Utilities:** Existing subsurface conditions shall be confirmed by the CONTRACTOR. All existing underground utilities shown on the plans are approximate and based on available information. It shall be the CONTRACTOR'S responsibility to determine the exact location and elevation and, in some cases expose all existing utilities shown or not shown on plans prior to construction and notify ENGINEER and OWNER of any conflicts with proposed work.
- The CONTRACTOR is responsible for maintaining, supporting, and protecting the integrity of underground utilities during construction. It shall be the CONTRACTOR'S responsibility to excavate over, under and around such utilities and, if necessary, provide temporary bridging during construction so as to maintain continuous service while constructing the proposed facilities. It will be the CONTRACTOR's responsibility to backfill around existing utilities and to complete construction in a manner such as to leave the existing utilities securely bedded in their original position. All this work will be at no additional cost to BPUB.
- If damages occur to existing facilities due to the CONTRACTOR's actions, it will be the CONTRACTOR's full responsibility to repair, replace, or pay for the repair or replacement of any damaged items at no additional cost to BPUB.
- SC-3 Communication Protocol:** All communication from the OWNER's Construction Inspector to the CONTRACTOR shall be through the CONTRACTOR's Project Manager and/or Superintendent. Communication to/from the CONTRACTOR's subcontractors shall be routed to the OWNER's Construction Inspector through the CONTRACTOR. Contact information for the OWNER's Construction Inspector and the CONTRACTOR will be provided at the pre-construction conference.
- SC-4 Contaminated Soil and Groundwater:** The CONTRACTOR shall be aware of potential for hazardous materials in the area. If encountered, the CONTRACTOR shall notify the owner and engineer of record and have the contaminated soil and ground water sampled and lab tested. Contaminated water and/or soils shall be handled and disposed of in accordance to specification 01 35 13.43.
- SC-5 Antiquities Code:** The project is located in a historic area and potentially contains historic archaeological deposits. Construction monitoring by an archaeologist is required during excavation. An on-site monitor, acquired by the OWNER, shall be on site to review any potential archaeological deposits. The CONTRACTOR shall coordinate with the OWNER on times of planned excavation throughout the duration of the project.
- SC-6 Geotechnical Investigation:** A Geotechnical Data Report (GDR) is available in the Appendix for CONTRACTORS informational purposes only. The CONTRACTOR shall review the available information to determine the appropriate equipment needed for the varying project area soil conditions and groundwater.

SC-7 Shore Protection: CONTRACTOR is advised that existing soils in the area will likely warrant special shoring requirements including but not limited to hydraulic shoring, step shoring, etc. Please refer to Geotechnical Report for additional information. No additional pay will be allowed for shore protection other than bid items included in Contract.

SC-8 Groundwater Control: CONTRACTOR is advised that groundwater was observed during geotechnical borings. Line items have been included in the Bid Proposal.

SC-9 Potential Fiber Optic Conflicts: At the time of bid, broadband fiber is being installed in the project area. The proposed fiber was installed after the project survey and is not shown on the plans. **Appendix B** shows the proposed locations of the new fiber conduits. The CONTRACTOR shall coordinate the location of the fiber optic lines prior to construction and excavation.

END OF SECTION

SECTION 01 01 50

SEQUENCE OF CONSTRUCTION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The construction of this project will occur while the wastewater collection system remains operable to meet customer needs and requirements. The operations necessary to meet these requirements are of higher priority than construction activities. Schedules of by-pass pumping, connections, renovations and modifications shall be submitted to the OWNER for approval, and all such items shall be coordinated throughout the entire construction period.
- B. CONTRACTOR shall prepare and submit a project schedule, schedule of values and safety plan within 10 days of Notice to Proceed.
- C. CONTRACTOR shall notify the OWNER in writing at least 14 days in advance and again three (3) days prior to beginning work on a particular area, and coordinate with the OWNER the specific items to be isolated and duration for each. Obtain written approval from the OWNER prior to each shutdown. Drought conditions, scheduling of improvements and shut-downs at other sites or equipment outages may require the re-scheduling of an approved shutdown. Any cost associated with rescheduling will be considered as incidental to the CONTRACTOR's cost of the project.
- D. Prior to beginning work, CONTRACTOR shall have on-site all materials, equipment, and personnel necessary to complete the work in the time scheduled. CONTRACTOR shall also perform all preparatory tasks to the most complete state possible.
- E. Failure of the CONTRACTOR to properly plan and perform the work in the prescribed manner may result in inadequate pumping of wastewater. In this case, CONTRACTOR may be liable for payment of fines, fees or other charges imposed upon the OWNER by state or federal regulatory agencies, and all other costs associated with the discharge. The OWNER may recover monetary sums by retention.
- F. CONTRACTOR shall be required to maintain the existing roads utilized during construction in a reasonably clean condition.
- G. CONTRACTOR shall be required to perform yard maintenance services throughout the duration of the construction project, per Section 01 0 10 – Summary of Work and Section 01 50 00 – Temporary Facilities and Controls.

1.02 RELATED WORK

- A. Bid Proposal
- B. Section 01 33 00 – Submittal Procedures

1.03 SUBMITTALS

- A. Project submittal specifications are detailed in Section 01 33 00 – Submittal Procedures.

- B. The Drawings indicate the general location and arrangement of existing conditions. Prior to developing any construction drawings and/or Work Plans, it is mandatory that the Bidder visit the site to determine the complexity of the work and the existing conditions. Conditions which are obvious/visible, noted in the plans or which should be reasonably anticipated by the Bidder on inspection will not be considered as a “differing site conditions” clause of this Contract.
- C. CONTRACTOR shall submit a plan to be reviewed and accepted by the OWNER for the sequence of construction and placement of the wastewater utilities into operation in accordance with this section. The plan shall be submitted to the OWNER and accepted by the OWNER at least 30 days prior to initial startup of the utility. The plan shall include the specific items indicated in Part 3 of this section. CONTRACTOR may request modifications to the items in Part 3 which shall be subject to acceptance by the OWNER. The plan shall include the following:
1. Organization charts detailing the Construction/Home Office organizational structure.
 2. A detailed staffing plan/curve for both field craft and staff.
 3. A proposed schedule for performance of the Work in the project-scheduling tool, Microsoft Project© or Primavera P3, with submittals of the original file and Adobe PDF.
 4. Names, resumes, professional registrations and certifications, schedule for assignment and signature authorities of Key Personnel. Provide guarantees that personnel named will in fact be those utilized in execution of the Work.
 5. A description of CONTRACTOR’s proposed execution approach, addressing project management, interfacing with the sequence of work, equipment and materials salvage and staging, equipment required for bypass pumping, demolition, and construction activities.
 6. Demonstrate experience with small diameter wastewater construction and urban construction and coordination.
 7. A detailed description of how the CONTRACTOR will install and maintain the sanitary sewer bypass while constructing the improvements to the existing system. Where feasible, the CONTRACTOR shall keep the existing gravity and force main system in service during construction.
 8. Demonstrate a firm understanding of the execution requirements.
 9. CONTRACTOR’s plans for the removal and disposal of debris, trash, and waste. Plans shall include removal and disposal of potential contaminated soil and groundwater
 10. A detailed list of activities that will be performed by SUBCONTRACTORS (to be included in detailed schedule).

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. CONTRACTOR shall coordinate and schedule each task necessary to complete all work within the time allowed for the Project. These phases are general in nature and not intended to prescribe the CONTRACTOR's Work Plan. Work items from various phases may be done simultaneously or separately unless otherwise specified.

- B. Each phase may require the CONTRACTOR to perform work such as installing temporary bypass pumping, traffic control, SWPPP, and safety protection. The specifics related to flow diversion and temporary plugging means and methods are the responsibility of the CONTRACTOR; however, the CONTRACTOR's plans and schedules shall be submitted to the OWNER for review and approval.

3.02 SEQUENCE OF CONSTRUCTION

- A. Perform work in the suggested sequence listed below to accommodate OWNER's occupancy during the construction period and to ensure completion of the work in the Contract Time. CONTRACTOR is encouraged to review this sequence and develop a detailed sequence for discussion with OWNER prior to beginning construction. CONTRACTOR can submit an alternate construction sequence for OWNER's review and acceptance. Some construction activities may be conducted concurrently. Completion dates of the various stages shall be in accordance with the accepted construction schedule submitted by the CONTRACTOR.

- B. Required CONTRACTOR Completion Dates:

1. The Work specified herein and any other Contract Work required by the OWNER which may interrupt the normal operations of the wastewater utility shall be accomplished at such times that will be convenient to the OWNER. The CONTRACTOR shall plan to Work overtime if needed to complete construction of the various Project improvements and shall make no claims for extra compensation for overtime Work required to conform to these requirements. The CONTRACTOR shall coordinate with the OWNER in accordance with Paragraph 1.01.C of this Section prior to performing Work.

2. Construction Sequencing:

- a. Contractor shall furnish and install all tools and material required to abandon/remove existing infrastructure and install the new wastewater pipeline in accordance with the plans and specifications.

END OF SECTION

SECTION 01 10 00

SUMMARY OF WORK

PART 1 GENERAL

1.01 SCOPE SUMMARY

- A. Furnish all labor, materials, equipment, and incidentals required to rehabilitate or reconstruct approximately 5,500 LF of wastewater gravity mains and associated sitework as shown on the drawings, and as specified herein.

1.02 LOCATION OF WORK

- A. The Downtown Water and Wastewater Project 1 is located along various roadways inside the City of Brownsville.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work includes but is not limited to the following:
 - 1. Segment A:
 - a. Rehabilitation or reconstruction of approximately 2,300 LF of 10-inch wastewater gravity mains with 12-inch wastewater gravity mains and seven (7) manholes. Segment A runs within an alleyway located between E. Elizabeth St. and E. Levee St. from E. 7th St. to International Blvd.
 - 2. Segment B:
 - a. Rehabilitation or reconstruction of approximately 1,050 LF of 8-inch wastewater gravity mains with 12-inch wastewater gravity mains and four (4) manholes. Segment B runs within an alleyway located between E. Levee St. and E. St. Charles St. from E. 7th St. to E. 10th St.
 - 3. Segment C:
 - a. Rehabilitation or reconstruction of approximately 1,350 LF of 8-inch wastewater gravity mains with 12-inch wastewater gravity mains and five (5) manholes. Segment C runs within an alleyway located between E. St. Francis St. and E. St. Charles St. from E. 8th St. to E. 11th St., as well as a section that runs down E. 8th St
 - 4. Segment D:
 - a. Rehabilitation or reconstruction of approximately 300 LF of 8-inch wastewater gravity mains with 12-inch wastewater gravity mains and two (2) manholes. Segment D runs along E. 11th St. near E. St. Charles St.
- B. Any damage to the existing equipment, structures or items to remain during construction shall be fully repaired at CONTRACTOR's expense to OWNER's satisfaction and at no additional cost to the OWNER.
- C. All work done under this contract shall conform to all local ordinances. The CONTRACTOR shall arrange and pay all cost of permits and inspection fees not already obtained by the OWNER and shall confine his operation to the limits set by law.
- D. It is the intent of the OWNER to award this project to one contractor.

1.04 WORK OF OTHER CONTRACTS

- A. During the Work of this Contract, it is not anticipated that construction by other contractors for separate but related work will be in progress within the project limits. Should any additional Work be done within the project limits, the CONTRACTOR should coordinate any additional work by others necessary at no additional cost to the OWNER.

1.05 EXISTING CONDITIONS

- A. Locate and protect all existing utilities impacted by this project. Those affected by this project may include, but are not necessarily limited to:
 1. Brownsville Public Utilities Board
 2. Texas Gas Service
 3. AEP Energy
 4. AT&T
 5. Charter, Spectrum, TWC
 6. MCI, Sprint
 7. 1-800-DIG-TESS (utility locate services)
 8. Texas One-Call (utility locate services)
 9. Lonestar One-Call (utility locate services)
 10. Valley Telephone Coop
 11. FiberLight
 12. Smartcom Telephone

1.06 WORK SEQUENCE

- A. The CONTRACTOR shall furnish, install, and place into operation the wastewater gravity main system within 52 weeks (365 calendar days) from Notice to Proceed on the project.
- B. Construct work in stages to provide proper coordination with work by Others. Coordinate the construction schedule and operations with the OWNER's representative. Refer to General Conditions and Section 01 01 50 – Sequence of Construction for milestone completion requirements.
- C. Traffic Control plan conforming to the requirements of the Texas Manual on Uniform Traffic Control Devices shall be provided by the CONTRACTOR to the governing R.O.W. agency and the OWNER when the proposed construction affects, or is located within the limits, or R.O.W. of a local, state or federal maintained R.O.W. The CONTRACTOR shall not begin construction of the Project or close any streets until the traffic control plan has been approved by the governing R.O.W. agency and the OWNER, and all traffic control devices are properly installed and maintained at the job site in accordance with the Texas Manual on Uniform Traffic Control Devices. The CONTRACTOR shall notify the governing R.O.W. agency and the OWNER forty-eight (48) hours in advance of closing any street to through traffic. CONTRACTOR shall provide for the access of residents and businesses within all phases of work. This may include, but shall not be limited to, providing steel plates as temporary trench crossings at entrances to businesses or residences. Flagmen to control traffic at these crossings shall be used as necessary.

- D. The CONTRACTOR shall prepare and submit a construction schedule that accomplishes the Work within the allotted time and adheres to the overall schedule and Project-specific constraints listed herein.

1.07 PROJECT REQUIREMENTS

- A. "Or-Equal" products will be allowed if approved by the OWNER and ENGINEER. Refer to General Conditions for requirements.
- B. Preparation For Shipment. All materials shall be suitably packaged to facilitate handling and protect against damage during transit and storage. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. All painted surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of the OWNER.
- C. Each item, package, or bundle of material shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packaging lists and bills of materials shall be included with each shipment.
- D. Notices To OWNERS And Authorities. CONTRACTOR shall, as provided in the General Conditions, notify owners of adjacent property and utilities when prosecution of the Work may affect them.
 - 1. When it is necessary to temporarily deny access to property, or when any utility service connection must be interrupted, CONTRACTOR shall give written notices sufficiently in advance to enable the affected persons to provide for their needs. Notices shall conform to any applicable local ordinance and shall include appropriate information concerning the interruption and instructions on how to limit inconvenience caused thereby.
 - 2. Utilities and other concerned agencies shall be notified at least seventy-two (72) hours prior to cutting or closing streets or other traffic areas or excavating near underground utilities or pole lines.
- E. Lines And Grades. All Work shall be done to the lines, grades, and elevations indicated on the Drawings.
 - 1. CONTRACTOR shall provide an experienced instrument person, competent assistants, and such instruments, tools, stakes, and other materials required to complete the survey, layout, and measurement work. In addition, CONTRACTOR shall furnish, without charge, competent persons and such tools, stakes, and other materials as OWNER may require in establishing or designating control points or in checking survey, layout, and measurement work performed by CONTRACTOR.
 - 2. CONTRACTOR shall keep OWNER informed, a reasonable time in advance, of the times and places at which the CONTRACTOR wished to do Work, so that horizontal and vertical control points may be established and any checking deemed necessary by OWNER so that it may be done with minimum inconvenience to OWNER and minimum delay to CONTRACTOR.
 - 3. CONTRACTOR shall remove and reconstruct work which is improperly located.
- F. Connections to Existing Utilities. Unless otherwise specified or indicated, CONTRACTOR shall make all necessary connections to existing facilities, including structures, drain lines, and utilities such as water, sewer, gas, telephone, and electric. In each case, CONTRACTOR shall receive permission from OWNER or the owning utility prior to undertaking connections. CONTRACTOR shall protect facilities against

deleterious substances and damage. CONTRACTOR shall provide a minimum of seventy-two (72) hours notice prior to making interconnection.

- G. Unfavorable Construction Conditions. During unfavorable weather, wet ground, or other unsuitable construction conditions, CONTRACTOR shall confine its operations to work which will not be affected adversely by such conditions. No portion of the Work shall be constructed under conditions which would affect adversely the quality or efficiency thereof, unless special means or precautions are taken by CONTRACTOR to perform the Work in a proper and satisfactory manner.
- H. Cleaning Up. CONTRACTOR shall keep the premises free at all times from accumulations of waste materials and rubbish. CONTRACTOR shall provide adequate trash receptacles about the site and shall promptly empty the containers when filled.
 - 1. Construction materials, such as concrete forms and scaffolding, shall be neatly stacked by CONTRACTOR when not in use. CONTRACTOR shall promptly remove splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from surfaces to prevent marring or other damage.
 - 2. Volatile wastes shall be properly stored in covered metal containers and removed daily.
 - 3. Wastes shall not be buried or burned on the site or disposed of into storm drains, sanitary sewers, streams, or waterways. All wastes shall be removed from the site and disposed of in a manner complying with local ordinances and antipollution laws.
 - 4. Adequate cleanup will be a condition for recommendation of progress payment applications.
- I. Applicable Codes. Reference in the Contract Documents to local codes mean the following:
 - 1. Other standard codes which apply to the Work are designated in the Specifications.
- J. Reference Standards. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, or laws or regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provision of any referenced standard, specification, manual, or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR, CONSULTANT, or ENGINEER, or any of their Consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to ENGINEER, or any of ENGINEER's Consultants, agents, or employees, any duty or authority to supervise or direct the furnishing or performance of the Work.
- K. Site Administration. CONTRACTOR shall be responsible for all areas of the site used by it and by all Subcontractors in the performance of the Work. CONTRACTOR will exert full control over the actions of all employees and other persons with respect to the use and preservation of property and existing facilities, except such controls as may be specifically reserved to OWNER or others. CONTRACTOR has the right to exclude from the site all persons who have no purpose related to the Work or its

inspection and may require all persons on the site (except OWNER's employees) to observe the same regulations as CONTRACTOR requires of its employees.

1.08 SECURITY

- A. The CONTRACTOR shall initiate a security program to protect the Work, CONTRACTOR's construction equipment and OWNER's facilities from theft, vandalism, and unauthorized entry for the duration of the construction period. Program shall be initiated at mobilization and shall be maintained throughout the construction duration until final OWNER acceptance of the complete project. Refer to Section 01 50 00 –Temporary Facilities and Controls for security requirements.

END OF SECTION

SECTION 01 10 10

MOBILIZATION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This item shall govern the mobilization of personnel, equipment, and supplies at the project site in preparation for beginning work on other contract items that will be performed by the Contractor. Mobilization shall include, but is not limited to, the movement of equipment, personnel, material, supplies, etc. to the project site, application fees, permit fees for all necessary permits and the establishment of the Contractor's office and other facilities prior to beginning the work. The cost of required insurance and bonds shall be include in this item.

1.02 MEASUREMENT AND PAYMENT

- A. Measurement of the item "Mobilization and Demobilization" shall be by the lump sum as the work progresses. "Mobilization and Demobilization" lump sum bid shall be limited to a maximum of 10% of the adjusted contract amount bid. Adjusted contract amount excludes allowances and Preparation of Right of Way.
- B. Payment shall be compensation for all work including the furnishing of all materials, equipment, tools, labor, and incidentals necessary to complete the work. Payment earned for this line item will be withheld, until said documents are submitted and approved by Owner: all material submittals. Partial payments of the "Lump Sum" bid for mobilization will be as follows: (The adjusted contract amount for construction items, as used below, is defined as the total contract amount, less the lump sum bid for Mobilization and Preparing Right-Of-Way).
1. When 1% of the adjusted contract amount for construction items is earned, 50% of the "Lump Sum" bid or 5% of the total contract amount, whichever is less, will be paid.
 2. When 5% of the adjusted contract amount for construction items is earned, 75% of the "remainder of the Lump Sum" bid or 10% of the total contract amount, whichever is less, will be deducted from the above amount.
 3. When 10% of the adjusted contract amount for construction items is earned, 90% of the "remainder of the Lump Sum" bid or 15% of the total contract amount, whichever is less, will be paid. Previous payments under this item will be deducted from the above amount.
 4. Upon completion of all work under this contract, payment for the remainder of the "Lump Sum" bid for Mobilization will be made on the final pay estimate.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 15 00

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section defines the method that will be used to determine the quantities of Work performed or materials supplied and establish the basis upon which payment will be made.

1.02 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 Specification Section shall govern.

1.03 BID PROPOSAL

- A. Required items of Work and incidentals necessary for the satisfactory completion of the Project shall be considered incidental to the specified Work required under this contract and shall be considered as included in the unit bids for the various bid items. The CONTRACTOR shall prepare his bid accordingly to allow for such items:

1. Not specifically listed in the bid proposal form.
2. Not specified in this section to be measured or to be included in one of the items listed in the bid proposal form.
3. To include CONTRACTOR overhead and profit.

- B. Work includes the furnishing of all labor, materials, equipment, tools, and related items for performing all operations required to complete the Project satisfactorily in place, as specified by the contract documents.

1.04 ADMINISTRATIVE SUBMITTALS

- A. Schedule of Values: Submit schedule on CONTRACTOR standard form.

- B. Schedule of Estimated Progress Payments:

1. Submit with initially acceptable schedule of values.
2. Submit adjustments thereto with Application for Payment.

- C. Application for Payment.

- D. Final Application for Payment.

1.05 SCHEDULE OF VALUES

- A. Prepare a separate schedule of values for each schedule of Work under the Agreement.

- B. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.
- C. An unbalanced or front-end loaded schedule will not be acceptable.
- D. Summation of the complete schedule of values representing all Work shall equal the Contract Price.

1.06 SCHEDULE OF ESTIMATED PROGRESS PAYMENTS

- A. Show estimated payment requests throughout Contract Times aggregating initial Contract Price.
- B. Base estimated progress payments on initially acceptable progress schedule. Adjust to reflect subsequent adjustments in progress schedule and Contract Price as reflected by modifications to the Contract Documents.

1.07 MEASUREMENT – GENERAL

- A. Lump sum bids shall cover the costs of all the work shown and/or specified in the plans and specifications and be required to complete that particular portion of the work. Payment of the full lump sum price shall be paid for the work.
- B. Unit price bids shall cover all costs associated in providing a single unit (linear foot, each, cubic yard, square foot, etc.) as called for on the plans and/or specifications and as required to provide a complete unit. Payment shall only be made for the actual quantity of units provided as determined by the ENGINEER.
- C. Payment shall constitute full compensation to the Contractor for furnishing all labor, equipment, tools, and materials, and for performing all operations required to furnish.
- D. Weighing, measuring, and metering devices used to measure quantity of materials for Work shall be suitable for purpose intended and conform to tolerances and specifications as specified in National Institute of Standards and Technology, Handbook 44.
- E. Whenever pay quantities of material are determined by weight, the material shall be weighed on scales furnished by CONTRACTOR and certified accurate by the state agency responsible. A weight or load slip shall be obtained from the weigher and delivered to the OWNER's representative at the point of delivery of the material.
- F. If material is shipped by rail, the car weights will be accepted provided that actual weight of material only will be paid for and not minimum car weight used for assessing freight tariff, and provided further that car weights will not be acceptable for material to be passed through mixing plants.
- G. Vehicles used to haul material being paid for by weight shall be weighed empty daily and at such additional times as required by OWNER. Each vehicle shall bear a plainly legible identification mark.
- H. All materials which are specified for measurement by the cubic yard measured in the vehicle shall be hauled in vehicles of such type and size that the actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each

vehicle must bear a plainly legible identification mark indicating its water level capacity. All vehicles shall be loaded to at least their water level capacity. Loads hauled in vehicles not meeting the above requirements or loads of a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.

- I. Quantities will be based on ground profiles shown. Field surveys will not be made to confirm accuracy of elevations shown.
- J. Where measurement of quantities depends on elevation of existing ground, elevations obtained during construction will be compared with those shown on Drawings.
- K. Units of measure shown on the Bid Form shall be as follows unless specified otherwise.

Item	Method of Measurement
AC	Acre—Field Measure by BPUB Inspector
CY	Cubic Yard—Field Measure by BPUB Inspector within the limits specified or shown
CY-VM	Cubic Yard—Measured in the Vehicle by Volume
EA	Each—Field Count by BPUB Inspector
GAL	Gallon—Field Measure by BPUB Inspector
HR	Hour
LB	Pound(s)—Weight Measure by Scale
LF	Linear Foot—Field Measure by BPUB Inspector
VF	Vertical Foot—Field Measure by BPUB Inspector
LS	Lump Sum—Unit is one; no measurement will be made
SF	Square Foot
SY	Square Yard
TON	Ton—Weight Measure by Scale (2,000 pounds)

1.08 RELATED WORK

- A. Section 01 33 00 – Submittal Procedures

1.09 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

- A. Payment shall not be made for the following:
 1. Loading, hauling and disposing of rejected material.
 2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
 3. Rejected loads of material, including material rejected after it has been placed by reason of failure of CONTRACTOR to conform to provisions of Contract Documents.
 4. Material not unloaded from transporting vehicle.
 5. Defective Work not accepted by OWNER.

6. Material remaining on hand after completion of Work.

1.10 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

- A. Partial Payment: No partial payments shall be made for materials and equipment delivered or stored unless Shop Drawings or preliminary operation and maintenance manuals are acceptable to OWNER.
- B. Final Payment: Shall be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to MANUFACTURER unless otherwise agreed, and partial payments made for those items shall be deducted from final payment.

PART 2 BASE BID ITEMS

2.01 ITEM NO. 60 - POWER POLE BRACING

- A. Description – The Contractor shall coordinate with utility company and provide all labor, supervision, tools, equipment, and materials necessary to brace and /or relocate power poles as required to complete work. No contract days will be added due to delays.
- B. Payment – Payment for this item will be made under the allowance included in the bid

2.02 ITEM NO. 61 - RELOCATION AND REPAIR OF EXISTING WATER MAIN

- A. Description – Waterline crossings are expected throughout this project. The CONTRACTOR is responsible for protecting existing waterlines during construction. Should the existing waterline require relocation or repair for the construction of the proposed sanitary sewer line, the CONTRACTOR shall coordinate with BPUB and provide all labor, supervision, tools, equipment, and materials necessary to relocate water lines as required to complete work. No contract days will be added due to delays
- B. Payment – Payment – Payment for this item will be made under the allowance included in the bid.

2.03 ITEM NO. 62 - RELOCATION AND REPAIR OF EXISTING FIBER OPTIC

- A. Description – Telecommunication crossings are expected throughout this project. The CONTRACTOR is responsible for protecting existing utilities during construction. Should the existing line require relocation or repair for the construction of the proposed sanitary sewer line, the CONTRACTOR shall coordinate with the appropriate utility owner and provide all labor, supervision, tools, equipment, and materials necessary to relocate the utility as required to complete work. No contract days will be added due to delays
- B. Payment – Payment – Payment for this item will be made under the allowance included in the bid.

2.04 ITEM NO. 63 - RELOCATION AND REPAIR OF EXISTING GAS

- A. Description – Gasline crossings are expected throughout this project. The CONTRACTOR is responsible for protecting existing utilities during construction. Should the existing line require relocation or repair for the construction of the proposed sanitary sewer line, the CONTRACTOR shall coordinate with the appropriate utility owner and provide all labor, supervision, tools, equipment, and materials necessary to relocate the utility as required to complete work. No contract days will be added due to delays
- B. Payment – Payment – Payment for this item will be made under the allowance included in the bid.

PART 3 PRODUCTS (NOT USED)

PART 4 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Proposed product list.
- D. Product data.
- E. Use of electronic CAD files of Project Drawings.
- F. Shop Drawings.
- G. Samples.
- H. Other submittals.
- I. Design data.
- J. Test reports.
- K. Certificates.
- L. Manufacturer's instructions.
- M. Manufacturer's field reports.
- N. Erection Drawings.
- O. Construction photographs.
- P. Contractor review.
- Q. Engineer review.

1.02 SUBMITTAL PROCEDURES

- A. All submittals shall use English units and shall be written in English.
- B. Transmit each submittal with Engineer-accepted form.
- C. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
- D. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.

- E. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.
 - F. Schedule submittals to expedite Project, and post electronic submittals as PDF electronic files to Project website per project communications procedures. Coordinate submission of related items.
 - G. For each submittal for review, allow 15 days excluding delivery time to and from Contractor.
 - H. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.
 - I. Allow space on submittals for Contractor and Engineer review stamps.
 - J. When revised for resubmission, identify changes made since previous submission.
 - K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
 - L. Submittals not requested will not be recognized nor processed.
 - M. Incomplete Submittals: Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Engineer.
- 1.03 CONSTRUCTION PROGRESS SCHEDULES (NOT USED)
- 1.04 PROPOSED PRODUCT LIST
- A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.
- 1.05 PRODUCT DATA
- A. Product Data: Submit to Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.
 - B. Post electronic submittals as PDF electronic files to Project website.
 - C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
 - D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

- E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.
- 1.06 ELECTRONIC CAD FILES OF PROJECT DRAWINGS (NOT USED)
- 1.07 SHOP DRAWINGS
- A. Shop Drawings: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.
 - B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 - C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.
 - 1. Include signed and sealed calculations to support design.
 - 2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 - 3. Make revisions and provide additional information when required by authorities having jurisdiction.
 - D. Post electronic submittals as PDF electronic files to Project website.
 - E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 – Execution and Closeout Requirements.
- 1.08 SAMPLES
- A. Samples: Submit to Owner for assessing conformance with information given and design concept expressed in Contract Documents.
 - B. Samples for Selection as Specified in Product Sections:
 - 1. Submit to Owner for aesthetic, color, and finish selection.
 - 2. Submit Samples of finishes, textures, and patterns for Owner selection.
 - C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.
 - D. Include identification on each Sample, with full Project information.
 - E. Submit number of Samples specified in individual Specification Sections; Owner will retain one Sample.
 - F. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.

- G. Samples will not be used for testing purposes unless specifically stated in Specification Section.
 - H. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 – Execution and Closeout Requirements.
- 1.09 OTHER SUBMITTALS
- A. Closeout Submittals: Comply with Section 01 70 00 – Execution and Closeout Requirements.
- 1.10 DESIGN DATA
- A. Submit data for Engineer's knowledge as Contract administrator or for Owner.
 - B. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.
- 1.11 TEST REPORTS
- A. Submit reports for Engineer's knowledge as Contract administrator or for Owner.
 - B. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.
- 1.12 CERTIFICATES
- A. Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Engineer, in quantities specified for Product Data.
 - B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - C. Certificates may be recent or previous test results on material or product but must be acceptable to Engineer.
- 1.13 MANUFACTURER'S INSTRUCTIONS
- A. Submit manufacturer's installation instructions for Engineer's knowledge as Contract administrator or for Owner.
 - B. Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to Engineer in quantities specified for Product Data.
 - C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- 1.14 MANUFACTURER'S FIELD REPORTS
- A. Submit reports for Engineer's knowledge as Contract administrator or for Owner.

- B. Submit report within 5 days of observation to Engineer for information.
- C. Submit reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.15 ERECTION DRAWINGS

- A. Submit Drawings for Engineer's knowledge as Contract administrator or for Owner.
- B. Submit Drawings for information assessing conformance with information given and design concept expressed in Contract Documents.
- C. Data indicating inappropriate or unacceptable Work may be subject to action by ENGINEER or OWNER.

1.16 CONSTRUCTION PHOTOGRAPHS

- A. Provide photographs of construction throughout progress of Work produced by an experienced photographer acceptable to Engineer.
- B. Each month submit photographs with Application for Payment.
- C. Photographs: Digital images shall be submitted with the information listed below.
- D. Take **two** Site photographs from different directions and **five** interior photographs of indicating relative progress of the Work.
- E. Take site photographs as evidence of existing project conditions, nearby buildings, and overhead utilities and structures.
- F. Identify each print with name of Project, Contract number, phase, station or location, orientation of view, date and time of view, name and address of photographer, and photographer's numbered identification of exposure.
- G. Digital Images: Deliver complete set of digital image electronic files to Owner with Project record documents. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as sensor, uncropped.
 - 1. Digital Images: Uncompressed TIFF format, produced by digital camera with minimum sensor size of 4.0 megapixels, and image resolution of not less than 1024 by 768 pixels.
 - 2. Date and Time: Include date and time in filename for each image.

1.17 CONTRACTOR REVIEW

- A. Review for compliance with Contract Documents and approve submittals before transmitting to Engineer.
- B. CONTRACTOR: Responsible for:
 - 1. Determination and verification of materials including manufacturer's catalog numbers.

2. Determination and verification of field measurements and field construction criteria.
 3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
 4. Determination of accuracy and completeness of dimensions and quantities.
 5. Confirmation and coordination of dimensions and field conditions at Site.
 6. Construction means, techniques, sequences, and procedures.
 7. Safety precautions.
 8. Coordination and performance of Work of all trades.
- C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.
- D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Engineer.

1.18 ENGINEER REVIEW

- A. Do not make "mass submittals" to Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 20 or more submittals or items in one week. If "mass submittals" are received, Engineer's review time stated above will be extended as necessary to perform proper review. Engineer will review "mass submittals" based on priority determined by Engineer after consultation with Owner and Contractor.
- B. Informational submittals and other similar data are for Engineer's information, do not require Engineer's responsive action, and will not be reviewed or returned with comment.
- C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.
- D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order.
- E. OWNER may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 35 13.43

SPECIAL PROCEDURES FOR CONTAMINATED SITES

PART 1 GENERAL

1.01 SCOPE

- A. This specification covers the excavation, handling, loading, temporary storage, transportation and disposal of contaminated soils and water encountered during the installation of the planned wastewater improvements. A Geotechnical Investigation Report indicated that solid waste or contaminated soils and groundwater may be present at depths less than the proposed depth of the excavation. Based on this assessment, if the CONTRACTOR encounters, during excavation and/or earth moving for the work, soil or groundwater that is contaminated, discolored, has a noticeable odor or is otherwise out of the ordinary, the CONTRACTOR shall immediately notify the OWNER and follow the procedures set forth in this Section.

1.02 REGULATORY REQUIREMENTS

- A. Work covered under this specification shall be performed in accordance with all applicable local, state, and federal regulations, statues, codes, rules, ordinances and policies. In the event of a conflict, the more stringent standards shall apply. Applicable regulations and laws include, but are not limited to:
1. Code of Federal Regulations, Title 29, Part 1910.120 Hazardous Waste Operations and Emergency Response (29 CFR § 1910.120). U.S. Government Printing Office, Washington, DC.
 2. RG-022 – Texas Natural Resource Conservation Commission. Classifying and Coding of Industrial and Hazardous Waste. Austin, TX.
 3. SW-846 - U.S. Environmental Protection Agency. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Vol. I. Washington, DC.
 4. Texas Administrative Code, Title 30, Chapter 335 (30 TAC § 335). Office of the Secretary of State, Austin, TX.
 5. Texas Administrative Code, Title 30, Chapter 350 (37 TAC § 350). Office of the Secretary of State, Austin, TX.
 6. Texas Administrative Code, Title 37, Chapter 16 (37 TAC § 16). Office of the Secretary of State, Austin, TX.

1.03 HEALTH AND SAFETY

- A. The CONTRACTOR shall be responsible for developing, implementing, and maintaining a health and safety program for their personnel including

subcontractors. Prior to commencement of work, the CONTRACTOR shall submit a site-specific Health and Safety Plan (HASP) to the OWNER for review. The HASP shall be prepared and signed by a certified safety professional (CSP) or a certified industrial hygienist (CIH). The resume of the CSP or CIH shall be submitted as an attachment to the HASP and shall document their qualifications and applicable experience. In addition to the health and safety requirements as described in the sewer construction specifications, the HASP shall address exposure of workers to contaminated soil and groundwater, temporary storage, and transportation and disposal of contaminated materials. The HASP shall be prepared in accordance with the requirements of 29 CFR 1910.120 and shall contain, at minimum, the following sections:

1. Project Description
2. Site Description
3. Summary of Field Activities
4. Listing of Field Staff including Project Manager, On-site Manager, and Health and Safety Officer
5. Emergency Contact Information
6. Site Control Measures
7. Identification of Environmental Hazards
8. Protective Equipment
9. Exposure Limits for Chemicals of Concern
10. Monitoring Requirements and Action Levels
11. Decontamination Procedures
12. Disposal Procedures
13. Employee Training Records
14. Resume of CSP or CIH

1.04 RECORD KEEPING

A. When performing work within the scope of this specification, the CONTRACTOR shall be responsible for maintaining a Project record on-site that includes:

1. A copy of the CONTRACTOR's HASP;

2. A daily sign in sheet including the signatures of all personnel, regardless of affiliation, who enter the site acknowledging that they;
 - i. Have read and understood the CONTRACTOR'S Site Specific HASP;
 - ii. Meet the training requirements described in the CONTRACTOR HASP; and
 - iii. Have been made aware of potential site hazards including environmental hazards.
3. A copy of all waste manifests or load tickets generated during the transport of contaminated soils or water in accordance with Section 3.07 of this Specification.
4. A copy of all waste manifests or scale tickets generated during the disposal of contaminated soils or water in accordance with Section 3.08 of this Specification.

PART 2 PRODUCTS

2.01 PLASTIC SHEETING

- A. The CONTRACTOR shall use plastic sheeting at least 6 mil thick for lining of all trucks, transport vehicles, soil stockpiles, and roll-off boxes.
- B. Plastic sheeting shall be used and or applied in a manner to prevent migration of soils and contaminants from soils. Soil stockpiles must be placed on, and covered by, plastic sheeting. Under no circumstances will leakage of fluids from soil stockpiles, roll-off boxes or transport trucks be allowed.

PART 3 EXECUTION

3.01 EXCAVATION

- A. During excavation of soils as required by the work, the CONTRACTOR shall place all excavated soils into soil stockpiles or lined roll-off containers in the designated staging area. For areas beyond the originally identified location, the CONTRACTOR shall notify the OWNER if soil or groundwater is encountered that is contaminated, discolored, has a noticeable odor or is otherwise out of the ordinary. This notification shall be made immediately upon encountering contaminated soil and groundwater beyond the limits initially identified.
- B. If the excavation fills with water such that the CONTRACTOR cannot perform construction activities in accordance with the construction specifications, the OWNER shall determine if the water is potentially contaminated in accordance with Section 3.03 of this specification. The CONTRACTOR shall collect water that is found to be potentially contaminated in a clean temporary storage tank.

3.02 MONITORING

- A. During excavation activities, the CONTRACTOR shall be responsible for monitoring the excavation for potentially hazardous vapor concentrations and preventing exposure of workers to contaminated media in accordance with their health and safety plan.
- B. If contaminated soils or groundwater, (soil or groundwater that is discolored, has a noticeable odor or is otherwise out of the ordinary) are encountered in areas beyond the originally identified location, CONTRACTOR shall immediately notify the OWNER or OWNER'S REPRESENTATIVE, who will screen excavated soils. The CONTRACTOR shall abide by the directions of the OWNER'S REPRESENTATIVE and shall provide the OWNER'S REPRESENTATIVE the opportunity to screen soils in accordance with the following procedure:
 - 1. The OWNER'S REPRESENTATIVE will screen excavated soil with a photoionization detector (PID). If OWNER or OWNER'S REPRESENTATIVE determines that readings are above pre-determined action levels, the CONTRACTOR shall stage soils in soil stockpiles or roll-offs separate from other fill materials.
 - 2. If the OWNER'S REPRESENTATIVE determines that soils are contaminated by visual inspection or odor, the CONTRACTOR shall stage soils in soil stockpiles or roll-offs separate from the other fill materials.

3.03 COLLECTION OF SAMPLES

- A. The OWNER or OWNER'S REPRESENTATIVE will collect soil samples from stockpiled soil that is suspected to be contaminated, confirmation samples from clean soil stockpiles, and samples of potentially contaminated groundwater based on the procedures defined in Section 3.02 of this specification. The OWNER shall pay for any testing undertaken for soil that is suspected of contamination due to existing conditions. The OWNER or OWNER'S REPRESENTATIVE will perform waste characterization (testing) of the soil and water, and the CONTRACTOR shall abide by the waste characterization decisions of the OWNER. Depending on the type of contamination discovered, testing duration may be up to three (3) weeks. Testing may need to be conducted on an ongoing basis as additional contaminated soil is discovered. Soils that are thought to be contaminated must remain in the staging area and protected from rainfall and contact by the CONTRACTOR until the OWNER determines how the soil is to be disposed in accordance with Section 3.07 of this Specification.

3.04 TEMPORARY STORAGE

- A. Soils that are determined by the OWNER or OWNER'S REPRESENTATIVE to be potentially contaminated by shall be staged in soil stockpiles or roll-off containers separately from soils that are to be used as fill. Soil stockpiles shall be placed on, and covered by, plastic sheeting. Roll-off containers shall be covered to prevent

- accumulation of water in the container. The roll-off containers shall be located so that they do not block surface drainage pathways, or prevent access to storm sewer inlets or manholes. The CONTRACTOR must ensure that roll-off containers and soil stockpiles are completely sealed and covered. The CONTRACTOR will be responsible for replacing or repairing any roll-off box found to be leaking or in poor condition.
- B. Water that is determined by the OWNER or OWNER'S REPRESENTATIVE to be contaminated shall be collected as required to allow work. Such water shall be collected and temporarily stored in clean, sealed tank(s) by CONTRACTOR. The CONTRACTOR shall place tank(s) such that they do not block surface drainage pathways, storm sewer inlets or manholes. The CONTRACTOR shall be responsible for repairing or replacing any tanks that are found to be leaking or in poor condition.
 - C. During storage, contaminated soil and groundwater containers shall be placed within designated or approved areas. The limits of these areas shall be indicated via barricades, flagging, and/or fencing and access to storage areas shall be restricted.

3.05 CLASSIFICATION OF SOILS AND WATER

- A. The OWNER or OWNER'S REPRESENTATIVE will determine the waste classification of soils and groundwater for the purpose of proper disposal.
- B. Confirmation samples collected from clean soil must have Total Petroleum Hydrocarbon (TPH) concentrations, as measured by Method TX 1005, less than 60 mg/kg per Texas Risk Reduction Program Tier 1 Protective Concentration Levels. Soils with TPH concentrations greater than 60 mg/kg but less than 1500 mg/kg are classified as Class 2 industrial non-hazardous waste and must be disposed in accordance with Section 3.07 at a permitted Class 2 industrial waste landfill.
- C. Soils with TPH concentration greater than or equal to 1500 mg/kg are classified as Class I industrial non-hazardous wastes and must be disposed at a permitted Class I landfill.
- D. Groundwater with TPH concentrations less than 0.73 mg/L is unregulated and can be disposed of by the contractor in accordance with city stormwater disposal regulations. Groundwater with TPH concentrations greater than 0.73 mg/L but less than 1500 mg/l TPH concentration is classified as Class 2 industrial, non-hazardous waste. Groundwater with TPH concentration greater than or equal to 1500 mg/l must be classified as Class I industrial non-hazardous waste.

3.06 TRANSPORTATION

- A. The CONTRACTOR shall perform transport operations in a manner that precludes the spread of contamination. The CONTRACTOR shall remediate waste spillage in transport in accordance with applicable requirements of 30 TAC 335.93, 330.34, and other applicable Federal, State, and local regulations at no additional cost to the OWNER.

- B. Open waste transport vehicles shall be covered by the CONTRACTOR prior to leaving the project site. Covers shall be constructed from water-resistant material with sufficient strength to withstand wind loads during transit. Covers shall effectively prevent release of dust from the transport vehicle. Covers shall have tie-downs or other restraint mechanisms necessary to securely fasten them to the transport vehicle.
- C. Waste transport vehicles shall not leave the project site until the OWNER or OWNER'S REPRESENTATIVE signs the waste manifest as generator of the waste. The CONTRACTOR shall not sign any waste manifest or shipping papers as generator. Payment will not be made for any waste shipment that leaves the site without signatory approval of OWNER or OWNER's REPRESENTATIVE.
- D. The CONTRACTOR shall line all trucks transporting potentially contaminated or known contaminated soils with plastic liner as described in Section 2.01 of this specification. The liner shall be secured in such a manner as to prevent the leaking of liquid materials from the truck bed. The CONTRACTOR shall be responsible for ensuring that trucks leaving the site are NOT leaking liquid materials, and shall be responsible for sealing or re-lining any trucks that are leaking liquids. The CONTRACTOR shall also be responsible for clean-up of any releases.
- E. The CONTRACTOR shall retain a copy of all waste manifests and load tickets for each waste shipment prior to off-site transportation, for record purposes. The CONTRACTOR shall submit a copy of all waste manifests and load tickets to the OWNER within THREE (3) business days of transport. The CONTRACTOR shall notify the OWNER whenever a waste shipment does not arrive at the approved disposal site in a timely manner.
- F. The CONTRACTOR will inspect vehicles before they enter or exit the Project site to verify compliance with decontamination criteria provided in Part A of this Section. The CONTRACTOR shall be responsible to remedy deficiencies identified by OWNER or OWNER REPRESENTATIVES.
- G. All transport vehicles shall be properly licensed, labeled and placarded in a manner consistent with TCEQ and DOT regulations for material being transported.

3.07 DISPOSAL

- A. The CONTRACTOR shall submit contact information for off-site hazardous and non-hazardous waste transfer, storage, processing, and disposal facilities prior to the commencement of work to the OWNER for approval. The OWNER or appointed representative must review and approve of all off-site disposal facilities prior to commencement of work. In the event that the CONTRACTOR does not receive approval from the OWNER or the appointed representatives for the selected off-site disposal facility prior to starting work, the CONTRACTOR will be responsible for all costs incurred in identifying an alternative off-site disposal facility and the cost of staging any contaminated material until a facility acceptable to the OWNER is identified.

- B. The CONTRACTOR shall retain a copy of all waste manifests, certificates of disposal, and load or weight tickets from disposal facility on-site for the duration of the project and submit copies of the waste manifests, certificates of disposal, and load or weight tickets with the corresponding Application for Progress Payment.

3.08 DECONTAMINATION

- A. The CONTRACTOR shall be responsible for preventing the spread of contaminated material beyond the excavation and temporary storage areas. To accomplish this, the CONTRACTOR shall include, as part of the health and safety plan, written procedures for decontamination of personnel and equipment, including transport vehicles that come in contact with potentially contaminated material.
- B. The CONTRACTOR shall establish exclusion and contamination reduction zones around the excavation when potentially contaminated soils and/or water are encountered. The exclusion zone is the zone around the excavation and the temporary storage piles and/or tanks. All personnel and equipment entering or exiting the exclusion zone must do so through the contamination reduction zone. The contamination reduction zone includes all of the equipment and materials necessary to clean workers and equipment, and to collect all decontamination materials and water for proper disposal.
- A. The CONTRACTOR shall be responsible for all fines, penalties, or citations resulting from non-conformance with these specification

PART 4 MEASUREMENT AND PAYMENT

4.01 WORK INCLUDES

- A. Provide all labor, equipment, and materials to excavate, handle, load, place in temporary storage, transport, and dispose of contaminated soils and groundwater in accordance with this specification.

4.02 MEASUREMENT

- A. Soils- Measurement of soils will be based in cubic yard of waste received and disposed at the approved off-site facility as weighed on a certified scale at the disposal facility. Submittal of certificates of disposal and weight tickets will be required for all nonhazardous solid wastes prior to the OWNER's recommendation for payment. Submittal of final waste manifests will be required for Class I industrial nonhazardous solid wastes prior to the OWNER's recommendation of payment. Soils transported and disposed of off-site shall contain no free liquids.
- B. Water - Measurement of bulk liquid nonhazardous wastes will be based on gallons of wastewater received and disposed at the approved facility/location as measured at the disposal facility/location by a means accepted by the OWNER. Measurement of nonhazardous liquid wastes in drums, barrels or other containers will be based on the number of waste containers received and disposed at the off-site facility.

Submittal of certificates of disposal and load tickets will be required for all nonhazardous liquid wastes prior to the OWNER's recommendation of payment. Submittal of final waste manifests will be required for Class I industrial nonhazardous wastes prior to the OWNER's recommendation of payment.

4.03 PAYMENT

- A. Payment for soil and water disposal under shall be made under the allowance included in the bid. This item shall be all inclusive of all costs associated with disposal of this material, including but not limited to fees, temporary storage, loading and unloading storage containers, decontamination of equipment if required, and any and all other costs associated with disposal of this material.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Reference Standards
- B. Temporary facilities under Construction Management Agreement.
- C. Temporary Utilities:
 - 1. Temporary electricity.
 - 2. Temporary lighting for construction purposes.
 - 3. Temporary water service.
 - 4. Temporary sanitary facilities.
- D. Construction Facilities:
 - 1. Vehicular access.
 - 2. Parking.
 - 3. Progress cleaning and waste removal.
 - 4. Project identification.
 - 5. Fire-prevention facilities.
- E. Temporary Controls:
 - 1. Barriers.
 - 2. Enclosures and fencing.
 - 3. Security.
 - 4. Dust control.
 - 5. Erosion and sediment control.
 - 6. Pest and rodent control.
 - 7. Pollution control.
- F. Removal of utilities, facilities, and controls.

1.02 REFERENCE STANDARDS

- A. ASTM International:
 - 1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 3. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.03 TEMPORARY FACILITIES UNDER CONSTRUCTION MANAGEMENT AGREEMENT

- A. Temporary Provisions Provided by Construction Manager:
 - 1. Temporary barriers, barricades, covered walkways, fencing, exterior closures, and interior closures.
 - 2. Cleaning during construction.
 - 3. Access roads and approaches.
 - 4. Temporary sanitary facilities.
 - 5. Temporary electrical service and distribution system for power and lighting.
- B. Each CONTRACTOR: Coordinate provisions with Construction Manager and provide the following items as necessary for execution of the Work including associated costs:
 - 1. Construction aids.
 - 2. Temporary fire protection, dust control, erosion and sediment control, water control, noise control, and other necessary temporary controls.
 - 3. Temporary barriers, barricades, and similar devices as necessary for safety and protection of construction personnel and public.
 - 4. On Construction Manager's approval, may provide temporary field office including electrical service and temporary telephone.
 - 5. Temporary tree and plant protection.
 - 6. Temporary heating before building enclosure.
 - 7. Electrical service required in addition to temporary service and distribution provided by Construction Manager.
 - 8. Temporary provisions for protection of installed Work.

1.04 TEMPORARY ELECTRICITY

- A. Provide and pay for power service required from utility source as needed for construction operation.

1.05 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations.
- B. Provide and maintain lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide and maintain lighting to interior work areas after dark for security purposes.
- D. Maintain lighting and provide routine repairs.
- E. Permanent building lighting may be used during construction.

1.06 TEMPORARY WATER SERVICE

- A. Provide and pay for suitable quality water service as needed to maintain specified conditions for construction operations. Provide separate metering and reimburse Owner for cost of water used.

1.07 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.

1.08 VEHICULAR ACCESS

- A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load-bearing capacity to accommodate unimpeded traffic for construction purposes.
- B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
- C. Extend and relocate vehicular access as Work progress requires and provide detours as necessary for unimpeded traffic flow.
- D. Locate as indicated on Drawings or approved by Engineer/Owner.
- E. Provide unimpeded access for emergency vehicles. Maintain minimum 20 foot-wide driveways with turning space between and around combustible materials.
- F. Provide and maintain access to fire hydrants and control valves free of obstructions.
- G. Provide means of removing mud from vehicle wheels before entering streets.
- H. Use existing on-Site roads for construction traffic.

1.09 PARKING

- A. Provide temporary gravel surface parking areas to accommodate construction personnel if use of existing paved parking is not feasible/allowed.
- B. If Site space is not adequate, provide additional off-Site parking.
- C. Use of existing on-Site streets and driveways used for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.
- D. Do not allow heavy vehicles or construction equipment in parking areas.
- E. Permanent Pavements and Parking Facilities:
 - 1. Bases for permanent roads and parking areas may be used for construction traffic.
 - 2. Avoid traffic loading beyond paving design capacity. Tracked vehicles are not allowed.
 - 3. Use of permanent parking structures is not permitted.
- F. Maintenance:
 - 1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.

2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.

1.10 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.

1.11 PROJECT IDENTIFICATION

- A. Project Identification Sign:
 1. One painted sign of construction, design, and content shown on Drawings, location designated.
- B. Installation:
 1. Install Project identification sign within 15 days after date established by Notice to Proceed.
 2. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
 3. Install sign surface plumb and level, with butt joints. Anchor securely.
 4. Paint exposed surfaces of sign, supports, and framing.
- C. Maintenance: Maintain clean signs and supports; repair deterioration and damage.
- D. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.12 FIRE-PREVENTION FACILITIES

- A. Prohibit smoking. Designate area on Site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
- B. Establish fire watch for cutting, welding, and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.

1.13 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way and for public access to existing building.
- C. Tree and Plant Protection: Preserve and protect existing trees and plants designated to remain.
 1. Protect areas within drip lines from traffic, parking, storage, dumping, chemically injurious materials and liquids, ponding, and continuous running water.

2. Provide 6-foot-high barriers around drip line, or as indicated on the drawings, with access for maintenance.
 3. Replace trees and plants damaged by construction operations.
- D. Protect non-owned vehicular traffic, stored materials, Site, and structures from damage.

1.14 ENCLOSURES AND FENCING

A. Exterior Enclosures:

1. Provide temporary insulated weathertight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual Specification Sections, and to prevent entry of unauthorized persons.

1.15 SECURITY

A. Security Program:

1. Protect Work on existing premises from theft, vandalism, and unauthorized entry.
2. Initiate program at Project mobilization.
3. Maintain program throughout construction period until directed by Owner.

B. Entry Control:

1. Restrict entrance of persons and vehicles to Project Site.
2. Allow entrance only to authorized persons with proper identification.
3. Coordinate access of Owner's personnel to Site in coordination with Owner's security forces.

C. Personnel Identification:

1. Provide identification badge for each person authorized to enter premises.
2. Badge to Include: Personal photograph, name, and employer.
3. Maintain list of accredited persons and submit copy to Owner on request.
4. Require return of badges at expiration of employment on the Work.

1.16 DUST CONTROL

- A. Execute Work by methods that minimize raising dust from construction operations.
- B. Provide positive means to prevent airborne dust from dispersing into atmosphere.

1.17 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize surface area of bare soil exposed at one time.
- C. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.

- D. Construct fill and waste areas by selective placement to avoid erosive surface silts and clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.
- F. Comply with sediment and erosion control plan indicated in the Contract Documents and Local and State Requirements.

1.18 PEST AND RODENT CONTROL

- A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work.

1.19 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.
- B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.20 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, and materials before Final Application for Payment inspection.
- B. Clean and repair damage caused by installation or use of temporary Work.
- C. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 56 10

BARRICADES, SIGNS, AND TRAFFIC HANDLING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This item shall govern for providing, installing, moving, repairing, maintaining, cleaning and removing upon completion of work, all barricades, signs, cones, lights and other such type devices and of handling traffic as indicated on the plans or as directed by the ENGINEER.

1.02 SUBMITTALS

- A. CONTRACTOR to submit to Owner and Engineer detailed Traffic Control Plan prior to commencement of construction.

1.03 REFERENCE STANDARDS

- A. Texas Manual on Uniform Traffic Control Devices (TMUTCD)

1.04 MEASUREMENT AND PAYMENT

- A. This item will be measured per month as indicated on the plans and directed by the Engineer.
- B. This item will be paid for at the contract monthly price bid for "barricades, signs, and traffic handling". This price shall be full compensation for furnishing all labor, materials, supplies, equipment and incidentals necessary. To complete the work as specified. The lump sum price will be pro-rated based on the number of workdays in the project contract. Failure to complete the work within time allowed in the project contract due to approving designs, testing, material shortages, closed construction season, curing periods, and testing periods will not qualify for additional compensation. When additional work is added by an approved field alteration or when work is suspended for the convenience of the City, through no fault of the contractor, additional compensation may be paid to the Contractors.
 - 1. Barricades, Signs, and Traffic Handling – month

PART 2 PRODUCTS

2.01 GUIDELINES

- A. The barricade CONTRACTOR must locally maintain sufficient materials in stock to accommodate three or more construction phases per project. These will include all applicable traffic control sign types, trucks, trailers, arrow boards, and all other traffic control devices assigned to the Contractor's barricading operation.
- B. The Texas Manual on Uniform Traffic Control Devices (TMUTCD), Section 6A-6, requires the appropriate training for all personnel who are involved in the selection, placement, and maintenance of traffic control devices on construction projects.

- C. The CONTRACTOR shall have a minimum of one barricade supervisor and three persons who are responsible for construction work zone traffic control. These persons shall be based in the Brownsville area and their sole tasks shall be implementing and maintaining construction work zone traffic control devices.
- D. The CONTRACTOR shall have a commercial telephone answering service during non-working hours. The CONTRACTOR shall provide the City during working hours with an office telephone number, pager number, and cellular telephone number to contact the barricading supervisor. The CONTRACTOR must be able to respond to any call within two hours.
- E. The CONTRACTOR shall comply with all standards set forth in the plan barricade detail sheets. One noncompliance letter issued by the City to the Contractor in regard to construction work zone traffic control, and not corrected within 48 hours, will be cause for delay of payment for this item.
- F. The CONTRACTOR will be required to submit a traffic control plan (TCP) at least 72 hours in advance (excluding weekends and holidays) of starting work in each construction phase. Upon satisfactory evidence of competent barricading expertise, this requirement for a traffic control plan may be waived by the City Traffic Engineer.

2.02 EQUIPMENT

- A. Provide the machinery, tools and equipment necessary for proper prosecution of the work. All machinery, tools and equipment used shall be maintained in a satisfactory and workmanlike manner.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. All barricades, signs, and other types of devices listed above shall conform to the requirements of the TMUTCD. It is the CONTRACTOR's responsibility to see that all traffic control devices are properly installed and maintained at the job site. If it is determined by the Traffic Engineering Representative that the traffic control devices do not conform to the established standards, or are incorrectly placed to protect the general public, the Traffic Engineer shall have the option to stop the work, at no expense to the City, until the situation is corrected by the CONTRACTOR. If it is determined that additional temporary traffic control devices, special directional devices, and/or business name signs are required, they will be provided by the CONTRACTOR at no additional cost. As work progresses, the location of temporary traffic control devices will be adjusted and modified as necessary by the CONTRACTOR.
- B. All retroreflective traffic control devices such as barricades, vertical panels, signs, etc., shall be maintained by cleaning, replacing or a combination thereof such that during darkness and rain, the retroreflective characteristics shall equal or exceed the retroreflective characteristics of the standard reflective panels in the Inspector's possession.

- C. The CONTRACTOR shall contact the City of Brownsville prior to removing any traffic signs or traffic signals. Prior to completion of the contract and removal of barricades, all applicable permanent traffic signs and signals must be in place and functioning properly. All permanent signs or traffic control devices missing or damaged during construction shall be replaced at the contractor's expense. Permanent pavement marking shall be applied prior to the opening of any street to traffic. Temporary short-term expendable pavement markings may be provided prior to application of permanent markings.
- D. The CONTRACTOR must maintain all streets open to through traffic by repairing trenches, potholes, etc., at no direct payment. The CONTRACTOR shall provide reasonable access to residences and all businesses within all phases of the work, as well as providing suitable access accommodations for school children, pedestrians, garbage pick-up and mail delivery by the US Postal Service. Temporary pedestrian crossing will be determined in the field by the Police Department School Services Unit. Temporary pedestrian crossings shall be 4 feet wide by 4 inches thick asphalt treated base or asphaltic concrete and will be will not be paid for separately.
- E. When flagging is required by the plans or Traffic Control Plan, provide a Contractor representative who has been certified as a flagging instructor through courses offered by the Texas Engineering Extension Service, the American Traffic Safety Services Association, the National Safety Council, or other approved organizations. Provide the certificate indicating course completion when requested. This representative is responsible for training and assuring that all flaggers are qualified to perform flagging duties. A qualified flagger must be independently certified by one of the organizations listed above or trained by the Contractor's certified flagging instructor. Provide the Engineer with a current list of qualified flaggers before beginning flagging activities. Use only flaggers on the qualified list.
- F. Flaggers must be courteous and able to effectively communicate with the public. When directing traffic, flaggers must use standard attire, flags, signs, and signals and follow the flagging procedures set forth in the TMUTCD.

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Examination.
- B. Field engineering.
- C. Execution.
- D. Protecting installed construction.
- E. Testing, adjusting, and balancing.
- F. Closeout procedures.
- G. Project record documents.
- H. Final cleaning.

1.02 EXAMINATION

- A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual Specification Sections.
- D. Verify that utility services are available with correct characteristics and in correct locations.

1.03 FIELD ENGINEERING

- A. Employ land surveyor registered at Project location.
- B. Locate and protect survey controls and reference points. Promptly notify Engineer of discrepancies discovered.
- C. Control datum for survey is indicated on Drawings.
- D. Verify setbacks and easements; confirm Drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels using recognized engineering survey practices.
- F. Maintain complete and accurate log of control and survey Work as Work progresses.

- G. Protect survey control points prior to starting Site Work; preserve permanent reference points during construction.
- H. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- I. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

1.04 EXECUTION

- A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.
- B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.
- D. Allow for expansion of materials and movement.
- E. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

1.05 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual Specification Sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.
- C. Prohibit traffic from landscaped areas.

1.06 TESTING, ADJUSTING, AND BALANCING

- A. Owner will appoint, employ, and pay for services of independent firm to perform testing, adjusting, and balancing.
- B. Reports will be submitted by independent firm to Engineer indicating observations, test results, and compliance or noncompliance with requirements of Contract Documents.

1.07 CLOSEOUT PROCEDURES

- A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:

1. Submit maintenance manuals, Project record documents, digital images of construction photographs, video recordings, and other similar final record data in compliance with this Section.
2. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
3. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
4. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.
5. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
6. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:

1. When CONTRACTOR considers Work to be substantially complete, submit to Engineer/Owner:
 - a. Written certificate that Work, or designated portion, is substantially complete.
 - b. List of items to be completed or corrected (initial punch list).
2. Within seven days after receipt of request for Substantial Completion, ENGINEER/OWNER will make inspection to determine whether Work or designated portion is substantially complete.
3. Should ENGINEER/OWNER determine that Work is not substantially complete:
 - a. ENGINEER/OWNER will promptly notify Contractor in writing, stating reasons for its opinion.
 - b. CONTRACTOR shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer/Owner.
 - c. ENGINEER/OWNER will reinspect Work.
 - d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's/Owner's inspection.
4. When ENGINEER/OWNER finds that Work is substantially complete, ENGINEER/OWNER will:
 - a. Prepare Certificate of Substantial Completion on EJCDC C-625 - Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).
 - b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
5. After Work is substantially complete, Contractor shall:
 - a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.

- b. Complete Work listed for completion or correction within time period stipulated.
- C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.
 - 1. When CONTRACTOR considers Work to be complete, submit written certification that:
 - a. Contract Documents have been reviewed.
 - b. Work has been examined for compliance with Contract Documents.
 - c. Work has been completed according to Contract Documents.
 - d. Work is completed and ready for final inspection.
 - 2. Submittals: Submit following:
 - a. Final punch list indicating all items have been completed or corrected.
 - b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 - c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
 - d. Accounting statement for final changes to Contract Sum.
 - e. Contractor's affidavit of payment of debts and claims.
 - f. Contractor affidavit of release of liens.
 - g. Consent of surety to final payment
 - 3. Perform final cleaning for Contractor-soiled areas according to this Section.
- D. Final Completion Inspection:
 - 1. Within seven days after receipt of request for final inspection, OWNER will make inspection to determine whether Work or designated portion is complete.
 - 2. Should OWNER consider Work to be incomplete or defective:
 - a. OWNER will promptly notify Contractor in writing, listing incomplete or defective Work.
 - b. CONTRACTOR shall remedy stated deficiencies and send second written request to Owner that Work is complete.
 - c. OWNER will reinspect Work.
 - d. Redo and Inspection of Deficient Work: Repeated until Work passes Owner's inspection.

1.08 PROJECT RECORD DOCUMENTS

- A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, product data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.

- B. Ensure entries are complete and accurate, enabling future reference by Owner.
 - C. Store record documents separate from documents used for construction.
 - D. Record information concurrent with construction progress, not less than weekly.
 - E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates used.
 - 3. Changes made by Addenda, bulletin, Change Order, and modifications.
 - F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:
 - 1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
 - 2. Include locations of concealed elements of the Work.
 - 3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
 - 4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
 - 5. Identify and locate existing buried or concealed items encountered during Project.
 - 6. Measured depths of foundations in relation to finish first floor datum.
 - 7. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 9. Field changes of dimension and detail.
 - 10. Details not on original Drawings.
 - G. Submit marked-up paper copy documents to Engineer with claim for final Application for Payment.
 - H. Submit PDF electronic files of marked-up documents to Engineer with claim for final Application for Payment.
- 1.09 FINAL CLEANING
- A. Execute final cleaning prior to final Project assessment.
 - 1. Employ experienced personnel or professional cleaning firm.
 - B. Clean debris from roofs, gutters, downspouts, and drainage systems.
 - C. Clean Site; sweep paved areas, rake clean landscaped surfaces.
 - D. Remove waste and surplus materials, rubbish, and construction facilities from Site.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 02 32 00

GEOTECHNICAL INVESTIGATION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Soil investigations were accomplished on the site for use in the design of the proposed project.

1.02 RELATED WORK

- A. Section 31 23 33 – Trenching and Backfilling

PART 2 PRODUCTS

2.01 SOIL INVESTIGATION REPORTS

- A. The following geotechnical reports are available for review by the CONTRACTOR. See Appendix A

- **Geotechnical Engineering Study for Proposed Downtown Water and Wastewater Project 1**

- B. Subsurface information contained within the above report or indicated on the drawings was obtained by the Owner solely for use by the Owner's Representative in establishing design criteria for the project. The accuracy and completeness of the information is not guaranteed and it is not to be construed as part of the Project Specifications governing construction of the project. The CONTRACTOR shall perform additional geotechnical investigation as he deems necessary for his construction activities. There shall not be any additional payment or extension of contract time to the Contractor for additional geotechnical investigations and resulting additional work that may be required to complete the project.

2.02 CONTRACTOR'S RESPONSIBILITY

- A. The CONTRACTOR shall review the available geotechnical report and boring logs and any other available material prior to construction, and make his own determinations as to all subsurface conditions.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 02 41 00

DEMOLITION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section includes the removal of existing construction to the limits as indicated and specified.
- B. Demolition includes the complete or partial removal and turn over to Property Owner, salvage or disposal of equipment and materials as indicated or specified.
- C. Relocation of existing construction includes isolation, draining, cutting, joining, new piping, new fittings, new junction boxes, new conduit, new wiring, etc. as required to reinstall a fully functional system as indicated, as specified, or as required to accommodate the new Work.
- D. This section covers demolition. This section also includes complete or partial removal and disposal of existing structures, foundations, slabs, piping, mechanical, electrical, existing (to be abandoned or removed) buried piping and miscellaneous appurtenances encountered during construction.
- E. CONTRACTOR shall be responsible for all demolition cutting, core drilling, fitting and patching, including attendant excavation and backfill, required to complete the Work or to:
 - 1. Make its several parts fit together properly.
 - 2. Uncover portions of the Work to provide for installation of ill-timed work.
 - 3. Remove and replace defective Work.
 - 4. Remove and replace Work not conforming to requirements of contract documents.
 - 5. Remove samples of installed Work as specified for testing.
 - 6. Provide penetrations of structural and nonstructural surfaces for installation of piping and electrical conduit.
- F. Demolition includes:
 - 1. Complete demolition of existing structures which are encountered in the way of new work.
 - 2. Partial demolition as necessary below finished grade of all existing structures which are not in-service or required for construction.
 - 3. Demolition of existing structures, walls, foundations and slabs.
 - 4. Demolition of equipment, piping, appurtenances and associated electrical to the limits shown on the drawings.
 - 5. Removal and/or plugging of existing piping.
 - 6. Removal and replacement of existing chain link fence.
 - 7. Demolition partial removal and cutting of existing masonry or concrete as required for new construction.

1.02 RELATED WORK

- A. Section 01 33 00 – Submittal Procedures
- B. Section 01 50 00 – Temporary Facilities and Controls
- C. Section 31 23 33 – Trenching and Backfilling

1.03 SUBMITTALS

- A. Schedule: Submit proposed methods and operations of demolition, cutting and patching in accordance with Section 01 33 00 – Submittal Procedure
- B. The schedule shall include:
 - 1. Identification of the Project.
 - 2. Description of the affected Work.
 - 3. The necessity for cutting, alteration or excavation, when applicable.
 - 4. The effect on the Work of the Owner or any separate Contractor, or on the structural or weatherproof integrity of the Project.
 - 5. Coordination schedule for shut-off, capping and continuation of utility services as required.
 - 6. Description of the proposed Work shall include:
 - a. The scope and detailed sequence of cutting, patching, alteration, or excavation.
 - b. The trades who will execute the Work.
 - c. Products proposed to be used.
 - d. The extent of refinishing to be done.
 - e. Sequence and methods of removal and disposal of demolished materials.
 - f. Alternatives to cutting and patching, when applicable.
 - g. Written permission of any separate Contractor whose Work will be affected.
- C. Submit a written notice to Owner designating the date and the time the Work will begin.

1.04 PROTECTION

- A. Protect all reference points, benchmarks and monuments from dislocation or damage. Replace or repair immediately any points damaged, destroyed or dislocated. Protect and maintain all conduits, drains, inlets, sewers, pipes and wires that are to remain within the project limits.
- B. Provide, erect and maintain all lights, barricades, warning signs and guards as necessary for the protection of streets, sidewalks and all adjoining property.
- C. Take measures for safety of personnel as recommended in the Associated General Contractors Manual of Accident Prevention I Construction and as required by OSHA.

1.05 JOB CONDITIONS

- A. Explosives: Use of explosives will not be permitted.
- B. Traffic: Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other facilities without permission from permitting agency. Provide alternate routes around closed or obstructed traffic ways if required by permitting agency.
- C. Support System. The support system/shoring plan shall be designed by a licensed Professional Engineer in the state of Texas. Owner's Representative shall seal the plan and a copy of the plan shall remain on site at all-times. Contractor shall be responsible for retaining the services of a licensed Professional Engineer.
- D. Damages: CONTRACTOR shall be responsible for any damage to buildings, streets, curbs, or other property not specifically called for as an item to be demolished. Promptly repair damages caused to adjacent facilities by demolition operations at no cost to Owner.
- E. Utility Services: Maintain existing utilities required to remain, keep in service, and protect against damage during demolition operations.
 - 1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Utility Owner. Provide temporary services during interruptions to existing utilities, as acceptable to Utility Owner.
 - 2. When utility lines are encountered which are not indicated in the plans, the Owner's Representative shall be notified.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Comply with specifications and standards for each specific product involved.

PART 3 EXECUTION

3.01 DEMOLITION/PREPARATION

- A. Provide devices and methods to protect other portions of the Project from damage.
- B. Provide protection from the elements for that portion of the Project which may be exposed by demolition, cutting and patching Work, and maintain excavations free from water.

3.02 INSPECTION

- A. Inspect existing conditions of the Project, including elements subject to damage or to movement during demolition, cutting, patching, splicing or relocation.
- B. After uncovering Work, inspect the conditions affecting the installation of products or performance of the Work.

- C. Report unsatisfactory or questionable conditions to the Owner's Representative in writing; do not proceed with the Work until the Owner's Representative has provided further instructions.
- D. Conditions which are visible without uncovering Work shall be reported to the Owner's Representative in writing no later than two (2) weeks after site mobilization.

3.03 SAFETY REQUIREMENTS

- A. All work shall be performed in conformance with the rules and regulations pertaining to safety established by, but not limited to, OSHA and as specified elsewhere in these Specifications.

3.04 PERFORMANCE

- A. Pollution Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.
 - 1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
 - 2. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations, as directed by the OWNER or governing authorities. Return adjacent areas to condition existing prior to start of Work.
- B. Execute excavating and backfilling by methods which will prevent settlement or damage to other Work.
- C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
- D. Remove all buried piping encountered during excavation unless otherwise shown on the drawings or directed by the OWNER's Representative. Pipes indicated to be abandoned but not removed shall have open ends plugged with concrete. The OWNER's Representative will determine the location of where pipes shall be plugged. The OWNER's Representative shall be notified of any existing line, wire, pipelines, water lines, sewer lines, or other facility encountered in the demolition which was not shown on the plans.
- E. The CONTRACTOR shall backfill all demolition areas approximately to existing ground level or foundation level of new construction, as applicable, as shown on the Drawings. Backfill material shall meet the requirements for structural backfill, as applicable, and backfill compaction shall be in accordance with the applicable requirements of Section 31 23 33, Trenching and Backfilling. Building debris shall not be used as backfill material. In all areas not backfilled to ground level, the CONTRACTOR shall erect safety barriers around the excavation.

3.05 RESTORATION

- A. Restore all existing Work to a state equal to that which it was in prior to demolition. Restore new Work to the standards of these specifications.

3.06 SHORING

- A. Provide shoring, bracing and support as required to maintain structural integrity of Project and protect adjacent Work from damage during cutting and patching.

3.07 DISPOSAL OF DEMOLISHED MATERIALS

- A. The OWNER shall retain salvage rights to all material and equipment. All materials and equipment retained by the Owner shall be transported and delivered to an on-site location designated by the OWNER.
- B. Any material or equipment not retained by the Owner shall become the property of the Contractor and shall be removed from the site and disposed of by the CONTRACTOR in accordance with applicable regulations and laws.
- C. Any material or equipment not retained by the Owner shall be immediately removed from the site and disposed of by the CONTRACTOR in accordance with the applicable regulations and laws.
- D. Do not sell or store materials on site.
- E. Maintain a neat, clean appearance on the site at all times and avoid accumulation of debris.

END OF SECTION

SECTION 02 41 13.13

PAVING REMOVAL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Section Includes:

1. Removing concrete paving, asphalt paving and brick paving
2. Milling roadway paving
3. Pulverization of existing pavement
4. Disposal of removed materials

1.02 RELATED WORK

1. Division 1 - General Requirements
2. Section 32 11 26 – Asphaltic Base Courses

1.03 REFERENCE STANDARDS

A. ASTM International (ASTM):

1. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³))

1.04 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment

1. Measurement

- a. Remove Concrete Paving: measure by the square yard.
- b. Remove Asphalt Paving: measure by the square yard.
- c. Remove Brick Paving: measure by the square yard.
- d. Surface Milling: measure by the square yard for 2" thickness.
- e. Surface Milling: measure by the square yard for 3" thickness.

2. Payment

- a. Remove Concrete Paving: full compensation for saw cutting, removal, hauling, disposal, tools, equipment, labor and incidentals needed to execute work.
- b. Remove Asphalt Paving: full compensation for saw cutting, removal, hauling, disposal, tools, equipment, labor and incidentals needed to execute work.
- c. Remove Brick Paving: full compensation for saw cutting, removal, salvaging, cleaning, hauling, disposal, tools, equipment, labor and incidentals needed to execute work.
- d. Surface Milling: full compensation for all milling, hauling milled material to salvage stockpile or disposal, tools, labor, equipment and incidentals necessary to execute the work.

- e. No payment for saw cutting of pavement or curbs and gutters will be made under this section.
- f. No payment will be made for work outside maximum payment limits indicated on plans, or for pavements or structures removed for CONTRACTOR's convenience.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 DEMOLITION/ PREPARATION

A. General:

- 1. Mark paving removal limits for OWNER approval prior to beginning removal.
- 2. Identify known utilities below grade - Stake and flag locations.

3.02 PAVEMENT REMOVAL

A. General.

- 1. Exercise caution to minimize damage to underground utilities.
- 2. Minimize amount of earth removed.
- 3. Remove paving to neatly sawed joints.
- 4. Use care to prevent fracturing adjacent, existing pavement.

B. Sawing

- 1. Sawing Equipment.
 - a. Power-driven.
 - b. Manufactured for the purpose of sawing pavement.
 - c. In good operating condition.
 - d. Shall not spall or fracture the pavement structure adjacent to the removal area.
- 2. Sawcut perpendicular to the surface to full pavement depth, parallel and perpendicular to existing joint.
- 3. Sawcut parallel to the original sawcut in square or rectangular fashion.
- 4. If a sawcut falls within 5 feet of an existing dummy joint, construction joint, saw joint, cold joint, expansion joint, edge of paving or gutter lip, remove paving to that joint, edge or lip.
- 5. If a pavement edge of a cut is damaged subsequent to saw cutting, saw to a new, neat, straight line for the purpose of removing the damaged area.

C. Remove Concrete Paving

- 1. Sawcut: See 3.02.B.
- 2. Remove concrete to the nearest expansion joint or vertical saw cut.

D. Remove Asphalt Paving

- 1. Sawcut: See 3.02.B.
- 2. Remove pavement without disturbing the base material.

3. When shown on the plans or as directed, stockpile materials designated as salvageable at designated sites.
4. Prepare stockpile area by removing vegetation and trash and by providing for proper drainage.

E. Milling

1. General

- a. Mill surfaces to the depth shown in the plans or as directed.
- b. Do not damage or disfigure adjacent work or existing surface improvements.
- c. If milling exposes smooth underlying pavement surfaces, mill the smooth surface to make rough.
- d. Provide safe temporary transition where vehicles or pedestrians must pass over the milled edges.
- e. Remove excess material and clean milled surfaces.
- f. Stockpiling of planed material will not be permitted within the right of way unless approved by the City.
- g. If the existing base is brick and cannot be milled, remove a 5 foot width of the existing brick base.

2. Milling Equipment

- a. Power operated milling machine capable of removing, in one pass or two passes, the necessary pavement thickness in a five-foot minimum width.
- b. Self-propelled with sufficient power, traction and stability to maintain accurate depth of cut and slope.
- c. Equipped with an integral loading and reclaiming means to immediately remove material cut from the surface of the roadway and discharge the cuttings into a truck, all in one operation.
- d. Equipped with means to control dust created by the cutting action.
- e. Equipped with a manual system providing for uniformly varying the depth of cut while the machine is in motion making it possible to cut flush to all inlets, manholes, or other obstructions within the paved area.
- f. Variable Speed in order to leave the specified grid pattern.
- g. Equipped to minimize air pollution.

3. Surface Milling

- a. Surface Mill existing asphalt pavement to the depth specified in the plans.
- b. Provide a milled surface that provides a uniform surface free from gouges, ridges, oil film, and other imperfections of workmanship with a uniform textured appearance.
- c. In all situations where the existing H.M.A.C. surface contacts the curb face, the wedge milling includes the removal of the existing asphalt covering the gutter up to and along the face of curb.
- d. Perform surface milling operation in a continuous manner along both sides of the street or as directed.

F. Remove Brick Paving

1. Remove masonry paving units to the limits specified in the plans or as directed by the OWNER.
2. Salvage existing bricks for re-use, clean, palletize, and deliver to the OWNER. Stockpile as directed by OWNER.

END OF SECTION

SECTION 02 45 00

CONCRETE REMOVAL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish labor, materials, equipment, and incidentals necessary to perform all work associated with removal of existing concrete. Including but not limited to breaking up, removing, and satisfactorily disposing of existing concrete, as classified, at locations shown on the plans or as directed by the Engineer.

1.02 CLASSIFICATION

- A. Existing concrete to be removed under this item will be classified as follows:
 - 1. Concrete Curb. "Concrete Curb" will include curb, curb and gutter, and low curb at driveways, and combinations thereof. The removal of monolithic concrete curb or dowelled concrete curb will be included in the concrete pavement measurement.
 - 2. Concrete Traffic Barrier. "Concrete Traffic Barrier" will include permanent concrete barrier used for channeling or dividing traffic that is not considered salvageable.
 - 3. Sidewalks and Driveways. "Sidewalks and Driveways" will include concrete sidewalks and driveways.
 - 4. Miscellaneous Concrete. "Miscellaneous Concrete" will include all other items that are not noted above or covered by other items.

1.03 MEASUREMENT AND PAYMENT

- A. Measurement for this item will be conducted as follows:
 - 1. Remove Concrete Curb & Gutter. Concrete curb removed as prescribed above will be measured by the linear foot in its original position regardless of the thickness and reinforcing steel encountered.
 - 2. Remove Concrete Sidewalk and Driveway. Concrete sidewalks and driveways removed as prescribed above will be measured by the square yard in its original position regardless of the thickness of the concrete and reinforcing steel encountered.
- B. This item will be paid for at the contract unit price bid for "Remove Concrete Curb & Gutter," or "Remove Concrete Sidewalks and Driveways," which price shall be full compensation for all work herein specified, including the furnishing of all materials, equipment, tools, labor and incidentals necessary to complete the work.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Provide the machinery, tools and equipment necessary for proper prosecution of the work. All machinery, tools and equipment used shall be maintained in a satisfactory and workmanlike manner.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. General. The existing concrete shall be broken up, removed, and disposed of by the CONTRACTOR in accordance with federal, state, and local regulations.
- B. Remove sidewalks and curbs to the nearest existing dummy, expansion, or construction joint.
- C. Partial Removal of Concrete. When only a portion of the existing concrete is to be removed, care shall be exercised to avoid damage to that portion to remain in place. The existing concrete shall be cut to neat lines shown on the plans or as established by the ENGINEER, by sawing with an appropriate type circular concrete saw to a minimum depth of 1/2-inch. Any existing concrete which is damaged or destroyed beyond the neat lines so established shall be replaced at the CONTRACTOR's expense. Where reinforcement is encountered in the removed portions of the concrete, a minimum of 1-foot shall be cleaned of all old concrete and left in place to tie into the new concrete construction.

END OF SECTION

SECTION 03 30 10

CONCRETE JOINING COLLARS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This item shall govern the placement of concrete joining collars on either existing or proposed water/sewer mains, when specified in the contract documents, or as directed by the ENGINEER or Inspector.

1.02 SUBMITTALS

- A. Contractor shall submit manufacturer's product data, instructions recommendations, shop drawings, and certifications. All submittals shall be in accordance with Engineer's requirements and submittals shall be approved prior to delivery.
 - 1. Submit proposed mix design and test data for each type and strength of concrete in Work.
 - 2. Submit laboratory reports prepared by independent testing laboratory stating that materials used comply with requirements of this Section.
 - 3. Submit manufacturer's mill certificates for reinforcing steel. Provide specimens for testing when required by Engineer.
 - 4. Submit certification from concrete supplier that materials and equipment used to produce and deliver concrete comply with this Specification.
 - 5. When required on Drawing, submit shop drawings showing reinforcement type, quantity, size, length, location, spacing, bending, splicing, support, fabrication details, and other pertinent information.

1.03 REFERENCE STANDARDS

- A. Texas Commission of Environmental Quality (TCEQ)
 - 1. Chapter 217 Design Criteria for Domestic Wastewater Systems
- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM C 138. Standard Test Method for Unit Weight, Yield and Air Content (Gravimetric) of Concrete.
 - 2. ASTM C 144. Standard Specification for Aggregate for Masonry Mortar
 - 3. ASTM C 150. Standard Specification for Portland Cement.
 - 4. ASTM C 494. Standard Specification for Chemical Admixture for Concrete.
 - 5. ASTM C 618. Standard Specification for Coal Fly Ash and Raw or Calcinated Natural Pozzolan for use as Mineral Admixture in Portland Cement Concrete.
 - 6. ASTM C 869. Standard Specification for Foaming Agents Used in Making Preformed Foam for Cellular Concrete.
 - 7. ASTM C 937. Standard Specification for Grout Fluidifier for Pre-placed Aggregate Concrete.

8. ASTM C 942. Standard Test Method for Compressive Strength of Grout for Pre-placed Aggregate Concrete into Laboratory.
9. ASTM C 1017. Standard Specification for Chemical Admixture for Use in Producing Flowing Concrete.

1.04 MEASUREMENT AND PAYMENT

- A. Concrete Joining Collars will be measured by the per each of accepted work, complete in place.
 1. Reinforcing, if required by the ENGINEER or Inspector, shall not be measured for payment.
- B. Concrete Joining Collars will be paid for at the unit price bid per each, which price shall be full compensation for furnishing and placing all materials, rebar, manipulation, labor, tools, equipment and incidentals necessary to complete the work.
 1. Payment for concrete encasement shall consist of 6 inches of concrete around the pipe where required, minus manholes, structures, etc.
 2. No additional payment will be made for over excavation whichever is greater.

PART 2 PRODUCTS

2.01 MATERIALS

- A. The concrete shall be composed of Portland cement, mineral filler, if necessary, natural aggregates (fine and coarse), and water, proportioned and mixed as hereinafter provided in these specifications. Concrete shall meet all the requirements as set forth in the latest provision o ASTM C94 or the most applicable approved equal provision.
 1. The minimum cement content, maximum allowable water content and maximum slump pf the various classes of concrete shall conform to Table 1.

Table 1				
Class	Minimum compressive strength @ 28 day (Mpa)	Maximum water/cement ratio	Slump range, inches	Min.-max. sacks cement, cubic yard
A	4,000 (28)	4.5	2-4	5
B	2,500 (17)	8	2-5	4.5
C	2,000 (14)	9	1-4	4
D	1,000 (6)	11	1-4	2
G	(as specified in the contract documents)	5.5	2-3	6.0-8.0

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Concrete Collars: When shown in the contract documents or when directed by the ENGINEER or Inspector, concrete collars shall be constructed in accordance with details and sections shown in the plans.

END OF SECTION

SECTION 04 41 10

DRY-PLACED BRICKS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Specification includes all materials, labor, and work associated with the placement of brick pavers as shown on plans.

1.02 RELATED WORK

- A. Section 31 23 33 – Trenching and Backfilling
- B. Section 32 11 26 – Asphaltic Base Courses

1.03 MEASUREMENT AND PAYMENT

- A. Measurement for installation of brick pavers will be by the unit square yards. Measurement will include all materials, labor, incidentals and work associated with the installation of brick pavers, including subgrade preparation and surface restoration.
- B. Payment of brick pavers will be based upon the square yards place as shown in plans.
 - 1. Installation of Brick Pavers – per square yard

PART 2 PRODUCTS

2.01 MATERIALS

- A. New brick pavers are to match colors, size, and type of existing brick pavers. Pavers that have been salvaged and not damaged during construction activities may be utilized for installation of new surface. Condition of pavers will be determined by OWNER's inspector onsite.
- B. CONTRACTOR to match existing materials utilized for subgrade preparation and brick placement.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. CONTRACTOR to place brick pavers in a manner that matches slopes, patterns, and finish of existing brick pavers. Refer to plans for areas where brick pavers are present. Coordinate with OWNER inspector for use of salvaged brick pavers.

END OF SECTION

SECTION 31 00 00

EARTHWORK

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The following provisions define materials, methods, conditions, and Work in addition to requirements included in Division 31 - Earthwork sections and shall supplement all sections of Division 31 - Earthwork.

1.02 SUBMITTALS

1.03 REFERENCE STANDARDS

- A. The following references are some of the important references used in Division 2 – Existing Conditions. For a more specific reference, see the specification section in this division.
- B. American Association of State Highway and Transportation Officials (AASHTO)
- C. AASHTO M145 Soils Classification
 - 1. AASHTO M167-00 Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe Pipe-Arches and Arches
 - 2. AASHTO T180 Standard Specifications for Moisture-Density Relations of Soils
- D. American National Standards Institute Standards (ANSI)
 - 1. ANSI A21.5 Ductile Iron Pipe Centrifugally Cast-In-Metal Molds or Sand-Lined Molds, for Water or Other Liquids
 - 2. ANSI - A21.4-1971 See AWWA C 104-71
 - 3. ANSI - A21.10-1971 See AWWA C 110-71
 - 4. ANSI - A21.11-1972 See AWWA C 111-72
 - 5. ANSI A21.50-1971 See AWWA H 3-71
- E. American Society for Testing and Materials (ASTM)
 - 1. ASTM A36 Carbon Structural Steel
 - 2. ASTM A47 Ferritic Malleable Iron Castings
 - 3. ASTM A48 Gray Iron Castings
 - 4. ASTM A53 Specification for Pipe; Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
 - 5. ASTM A74 Cast Iron Soil Pipe and Fittings
 - 6. ASTM A121 Zinc-Coated (Galvanized) Steel Barbed Wire
 - 7. ASTM A123 Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products
 - 8. ASTM A283 Low and Intermediate Tensile Strength Carbon Steel Plates
 - 9. ASTM A392 Zinc-Coated Steel Chain-Link Fence Fabric
 - 10. ASTM A491 Aluminum-Coated Steel Chain-Link Fence Fabric

11. ASTM A663 Steel Bars, Carbon, Merchant Quality, Mechanical Properties
12. ASTM A885 Steel Sheet, Zinc and Aramid Fiber Composite Coated for Corrugated Steel Sewer, Culvert and Underdrain Pipe
13. ASTM B211 Aluminum and Aluminum-Alloy Bar, Rod and Wire
14. ASTM C5 Quicklime for Structural Purposes
15. ASTM C76 Reinforced Concrete Culvert, Storm Drain and Sewer Pipe
16. ASTM C150 Portland Cement
17. ASTM C478 Precast Reinforced Concrete Manhole Sections
18. ASTM C564 Rubber gaskets for Cast Iron Soil Pipe and Fittings
19. ASTM D698 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft.-lbs/ft.³)
20. ASTM D1556 Density and Unit Weight of Soil in Place by the Sand-Cone Method
21. ASTM D1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft.-lbf/ft.³)
22. ASTM D1784 Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
23. ASTM D2167 Density and Unit Weight of Soil in Place by the Rubber Balloon Method
24. ASTM D2216 Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
25. ASTM D2422 Standard Classification of Industrial Fluid Lubricants by Viscosity System
26. ASTM D2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
27. ASTM D2922 Density of Soil and Sand-Aggregate in Place by Nuclear Methods (Shallow Depth)
28. ASTM D3034 Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
29. ASTM D3282 Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
30. ASTM D4318 Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

F. Comply with the applicable American Water Works Association (AWWA) standards.

1. AWWA C104-71 Cement Mortar Lining for Ductile-Iron Pipe and Fittings for Water
2. AWWA C110-71 Ductile-Iron and Gray Iron and Fittings, 3 in. through 48 in. for Water and Other Liquids
3. AWWA C111-72 Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
4. AWWA C150-96 Thickness Design of Ductile-Iron Pipe
5. AWWA C301 Prestressed concrete pressure pipe, steel-cylinder type, for water and other liquids.
6. AWWA C304 Design of Prestressed Concrete Cylinder Pipe.
7. AWWA C500 Metal-Seated Gate Valves for Water Supply Service
8. AWWA C502 Standard for Dry Barrel Fire Hydrants
9. AWWA C504 Standard for Rubberseated Butterfly Valves
10. AWWA C600 Installation of Cast Iron Water Mains

- 11. AWWA C651 Disinfecting Water Mains
 - 12. AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 in. thru 12 in.
- G. Comply with the following applicable Federal specifications:
 - 1. WW-P406b Pipe, Steel (Seamless and Welded) (For Ordinary Use)
 - 2. WW-P521e Unions, Pipe Steel or Malleable Irons; Threaded Connection
 - 3. WW-V54c Valve Gate Bronze (125,150, and 200 pound) Screwed, Flanged, Solder-End, (For Land Use)
 - H. Comply with Texas Department of Transportation (TxDOT), formerly Texas Department of Highways and Public Transportation (TDHPT):
 - 1. Manual of Testing Procedures
 - 2. Standard Specifications for Construction of Highways, Streets and Bridges, 1993 (English), 1995 (Metric). In case of conflict between these two documents, the most stringent requirement will apply.
 - 3. Construction Bulletin C-11
 - 4. Construction Bulletin C-14
 - I. Safety, Codes and Standards: Perform the Work under Division 31 sections in compliance with applicable requirements of local codes and governing authorities having jurisdiction.
 - J. Soil Compaction Control: Qualified geotechnical technicians will be employed by the OWNER for the purpose of identifying soils, checking densities and classifying soil materials during construction. Charges for this service are to be paid for by the OWNER. The CONTRACTOR is responsible for Quality Control as per Division 1 - General Requirements.
 - K. All site construction shall be in strict compliance with the "Erosion Control Plan" for the Project as well as the project's specific "Erosion Control Plan" as prepared by the CONTRACTOR.

1.04 QUALITY ASSURANCE

1.05 DEFINITIONS OF SOILS

- A. Satisfactory Soil Materials: Satisfactory soil materials are defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) Designation M145, all soil classification groups.
- B. Unsatisfactory Soil Materials: Unsatisfactory soil materials are peat and other highly organic soils; and soil materials of any classification that have a moisture content at time of compaction beyond range of 2.5% below and 2.5% above optimum moisture content of soil material, as determined by moisture-density relations test.
- C. Cohesionless Soil Materials: Cohesionless soil materials include gravels, sand-gravel mixtures, sands and gravelly-sands. Moisture-density relations of cohesionless soils,

when plotted on graphs will show straight lines or reverse shaped moisture-density curves.

- D. Cohesive Soil Materials: Cohesive soil materials include clayey and silty gravels, sand-clay mixtures, clayey sands and silty clays, and clays. Moisture-density relations of compacted cohesive soils, when plotted on graphs, will show normal moisture-density curves.
- E. Rock: Rock includes detached pieces of stone and boulders one-half cubic yard or more in volume, all solid rock in ledges, bedded deposits and conglomerate deposits so firmly cemented as to present the characteristics of solid rock, which may be best loosened for removal by drilling and blasting. Materials that can be removed on a production basis using a D-9 tractor with a No. 9 ripper or equivalent are not included for measurement as rock.
- F. Muck: Materials unsuitable for foundation because of organic content, saturation to the extent that it is somewhat fluid and must be moved by dragline, dredge or other special equipment, are designated as muck. In addition, muck may refer to fluids/muck/tailings from sawing or pumping operations.
- G. Shale: Argillaceous sedimentary rock derived from clays or silts; typically thinly laminated and weak along planes.

1.06 PERFORMANCE CONDITIONS

- A. Soils Conditions: Site Topography and topographic maps, soil reports and other topographic or soil data shown on the Drawings or included in the Specifications are for information of the CONTRACTOR, and neither the ENGINEER nor the OWNER is responsible for their accuracy, completeness or usefulness and meaning. The CONTRACTOR shall make such additional investigations as required to acquaint himself adequately with site topography, and subsurface soil condition for preparation of his/her bid, and for successful execution of Work.
- B. Existing Conditions: The CONTRACTOR shall investigate the site to determine necessary data to bid project and to perform the Work required under the Contract or in the specification sections of Division 2 – Existing Conditions. Such investigation may include but not be limited to site visits, soil borings, chemical and physical tests and research of public and private records.
- C. Protection of Monuments, Landscape Features, Work and Structures:
 - 1. Monuments: The CONTRACTOR shall prevent destruction of all survey monuments, benchmarks, property corners and all other survey points. Where removal of such points is necessary for accomplishment of Work, the CONTRACTOR shall inform the Engineer in writing, prior to disturbance of any point. Do not disturb point until written permission to do so has been issued by the ENGINEER. Points whose removal is allowed shall be permanently referenced prior to their disturbance. Furnish clean notes and sketches of all reference points to the Engineer, all affected property owners, government bodies or utility companies.

2. Landscape: Protect trees, shrubs, grass or other growth designated to remain in place, or outside of limits of Work, during accomplishment of the Work. Do not damage in any manner. There will be no parking or storage of vehicles, equipment, or materials in around or under any tree. Such growth damaged by the CONTRACTOR shall be repaired as directed at no cost to the OWNER. Lawn surfaces, embankments, cut slopes, ditches, or other surfaces disturbed by CONTRACTOR shall be regraded to original shape, and grass or lawn surface replaced in kind, at no additional cost to the OWNER.
3. Structures: Protect structures outside of limits of the Work or designated to remain in place during progress of the Work. Any structure damaged in any manner shall be repaired or restored to its original condition, as directed by the ENGINEER at no cost to the OWNER. Replace sidewalks, curbs, concrete or asphalt pavement in kind, in accordance with applicable sections of the Specifications or as directed by the ENGINEER.
4. Protection of Work: The CONTRACTOR shall be solely responsible for the work of other contractors in area and protection of his/her work. Such grading as is necessary to prevent damage to work by water shall be solely the responsibility of the CONTRACTOR and shall be at no additional cost to the OWNER. The ENGINEER may direct the CONTRACTOR to perform necessary grading and drainage to prevent surface runoff from damaging the Work area.

D. Work Within Easements:

1. All Work on private or public property not owned by the OWNER shall be within limits of permanent or construction easements obtained by the OWNER. The CONTRACTOR shall coordinate with the OWNER as required to determine which easements have been acquired and shall ensure that all Work, materials and equipment do not encroach beyond limits of easements.
2. The CONTRACTOR shall remove from easements all construction debris, including, but not limited to, felled trees and brush, rock, trash and other objectionable material.

1.07 CLASSIFICATIONS OF EXCAVATIONS

- A. The following classifications of excavation will be made only when the ENGINEER authorizes additional earth excavation and when rock excavation is encountered in Work.

Do not perform such Work until material to be excavated has been cross-sectioned and classified by the ENGINEER.

1. Earth excavation consists of removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, material of any classification indicated in data on subsurface conditions, and all other materials encountered that are not classified as rock excavation or unauthorized excavation.
2. Rock excavation consists of removal and disposal of materials encountered that cannot be excavated without continuous and systematic drilling and blasting or continuous use of a ripper or other special equipment, except such materials that are classified as earth excavation. Typical of materials classified as rock are

boulders 1/2 cubic yard or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits.

- B. Unauthorized Excavation: Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations without specific direction of the ENGINEER. Replace unauthorized excavation as specified in Division 31 sections.
- C. Backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by the ENGINEER.
- D. Excavated Material: The Contractor is cautioned to follow directions specified in Division 31 sections regarding procedures for disposal of the asphalt and concrete pavement materials, excess soils, shale and contaminated materials.

1.08 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for items contained under this specification.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Choice of equipment to perform the Work shall be the responsibility of the CONTRACTOR. However, any equipment that results in damage to material, or inaccurate work or is otherwise objectionable shall be promptly replaced as directed by the ENGINEER.

2.02 FIELD DRAWINGS

- A. If changes to Contract Drawings are required due to field conditions and are approved by the ENGINEER, the CONTRACTOR shall record changes in accordance with Section 01 70 00 - Execution and Closeout Requirements. Field drawings shall show changes to size, location, and elevations.

2.03 SPECIAL SAFETY REQUIREMENTS

- A. Comply with all Federal, State and Local Safety Codes and Regulations, including all applicable Occupational Safety and Health Administration (OSHA) standards, at all times. The CONTRACTOR shall be responsible for educating his/her supervisors and employees of safety requirements and practices to be followed during course of the Work.
 1. Barricades: Barricade any open excavation and install adequate warning lights. Provide temporary bridges to maintain traffic and accessibility of facilities in area of Work during excavation operations. Provide a flagman, as required to maintain traffic controls and safety.
 2. Access: Provide safe access to bottom of trenches or excavations, including, as appropriate, ladders, ramps, steps or other access, where depth of trench or excavation is greater than three feet, and where access to trench or excavation is required for the Work.
 3. Side Slopes: Sides of excavations and trench walls shall be sloped, benched, sheeted and shored to maintain stability of wall or sides. Pile materials obtained

from the excavation a minimum of four feet from edge of excavation. Keep roads, streets, sidewalks, railroad tracks and traveled ways clear of excavation material at all times. The CONTRACTOR shall be responsible to ensure stability of trench and excavation walls for the safety of personnel and the Work. Trenches and excavation walls shall be constructed in compliance with the latest OSHA and State of Texas standards.

4. Blasting: Blasting will not be allowed.
5. Working Conditions: Nothing contained herein shall be construed to relieve the CONTRACTOR of his/her responsibility to provide and maintain safe and clean working conditions for his/her employees and others in the construction area.

2.04 DEWATERING

- A. Perform excavation work in a manner to prevent surface water and subsurface or ground water from flowing into excavations, and to prevent water from flooding project site and surrounding areas.
- B. Do not allow water to accumulate in excavations. Remove water from excavations using dewatering methods that will prevent softening or erosion of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Provide and maintain pumps, sumps, suction and discharge lines and other dewatering system components necessary to convey water away from excavations and keep the site continually and effectively drained.
- C. Convey water removed from excavations and rainwater to collecting or runoff areas. Provide and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations for site utilities as temporary ditches.
- D. Storm water control measures outlined in the "Storm Water Pollution Prevention Plan" as prepared by the CONTRACTOR shall be followed throughout the Project.
- E. Any water/muck/slurry tailings from saw cutting, drilling or pavement marking removal operations shall be collected by a vacuum truck and its contents be disposed of as directed by the Owner's Authorized Representative.

2.05 CLEAN-UP

- A. Keep the Work area free of debris, trash, garbage and other offensive waste material and keep all construction materials such as, but not limited to, sheeting, shoring, formwork, pipes and reinforcing steel, stockpiled in a neat, orderly manner, until ready for use on job site. During construction keep construction zone, parking areas, ramps, walkways, passages, traveled ways, adjacent to area of the Work clean and open to vehicular and pedestrian traffic. Upon completion of any stage of the Work in any area, remove all debris, trash, litter, and construction material, and leave the area in suitable condition for the next stage of construction or for use of the OWNER. Conduct daily clean-up of the Work area.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 31 10 10

PREPARING RIGHT OF WAY

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This item shall govern preparing the right-of-way for construction operations by removing and disposing of all obstructions from the right-of-way and from designated easements where removal of such obstructions is not otherwise provided for in the contract documents.
1. It is the intent of this specification to provide for the removal and disposal of all obstructions and/or materials, not specifically provided for elsewhere by the contract documents.
 2. This item shall also include the removal of trees, stumps, bushes, shrubs, brush, roots, vegetation, logs, rubbish, paved parking areas, miscellaneous stone, brick, drainage structures, manholes, inlets, abandoned railroad tracks, scrap iron and all debris, whether above or below ground, except live utility facilities.
 3. This item shall not govern the demolition of buildings by the use of explosives. Such demolition work shall be governed by the use of a special specification controlling the work.
 4. This item includes the labor required for the coordination with residents and businesses to remove items including but not limited to: vehicles, bicycles, trashcans, and dumpsters.

1.02 MEASUREMENT AND PAYMENT

- A. Measurement of the Preparing Right of Way, as specified herein, will be by the "Lump Sum," as the work progresses.
- B. Payment shall be compensation for all work including the furnishing of all materials, equipment, tools, labor, tree pruning, removal, protection, landscape impacts, and incidentals necessary to complete the work. Payment earned for this line item will be withheld, until said documents are submitted and approved by Owner. Partial payments of the "Lump Sum" bid for preparing right-of-way will be as follows: (The adjusted contract amount for construction items, as used below, is defined as the total contract amount, less the lump sum bid for Mobilization and Preparing Right-Of-Way).
1. When 1% of the adjusted contract amount for construction items is earned, 50% of the "Lump Sum" bid or 5% of the total contract amount, whichever is less, will be paid.
 2. When 5% of the adjusted contract amount for construction items is earned, 75% of the "remainder of the Lump Sum" bid or 10% of the total contract amount, whichever is less, will be deducted from the above amount.
 3. When 10% of the adjusted contract amount for construction items is earned, 90% of the "remainder of the Lump Sum" bid or 15% of the total contract amount, whichever is less, will be paid. Previous payments under this item will be deducted from the above amount.

4. Upon completion of all work under this contract, payment for the remainder of the "Lump Sum" bid for Preparing Right-Of-Way will be made on the final pay estimate.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Areas designated in the contract documents shall be cleared of all obstructions, vegetation, abandoned structures, etc., as listed within this specification and as shown on the plans, except trees or shrubs specifically designated by the ENGINEER for preservation.
- B. Such obstructions shall be considered to include, but not be limited to, remains of houses or structures not completely removed by the CONTRACTOR or others, foundations, floor slabs, concrete, brick, lumber, plaster, cisterns, septic tanks, basements, abandoned utility pipes or conduits, equipment or other foundations, fences, retaining walls, outhouses, shacks, and all other debris, as well as buried concrete slabs, curbs, driveways and sidewalks.
- C. All fences along the right-of- way which are damaged or removed temporarily by the CONTRACTOR shall be replaced by the CONTRACTOR to an equal or better condition, at no expense to OWNER.
- D. The CONTRACTOR shall adhere to the current City of Brownsville Tree Ordinance.
- E. Trees and shrubs designated by the tree ordinance for preservation shall be carefully trimmed as noted in the contract documents and shall be protected from scarring, barking, or other injuries during construction operations. Exposed ends of pruned limbs shall be treated with an approved pruning material.
- F. Unless otherwise indicated in the contract documents, all underground obstructions shall be removed to the following depths:
 1. In areas to receive embankment, 2 ft below natural finished grade.
 2. In areas to be excavated, 2 ft below the lowest elevation of the excavation;
 3. All other areas, 2 ft below finished grade.
- G. Holes remaining after removal of all obstructions, objectionable materials, vegetation, etc., shall be backfilled and tamped as directed by the OWNER's Inspector, and the entire area shall be bladed to prevent ponding of water and to provide drainage. In areas that are to be immediately excavated, backfilling and blading may be eliminated, if approved by the OWNER's Inspector.
- H. Areas to be used as borrow sites and material sources shall have all obstruction, objectionable materials, vegetation, etc., removed to the complete extent necessary to prevent such objectionable matter from becoming mixed with the material to be used in the construction.

- I. Where a conduit is shown to be replaced, it shall be removed in its entirety, and all connections to the existing conduit or pipe shall be made. Where an existing conduit or pipe is to be cut and plugged, the line shall be cut back not less than 2 ft, and a plug of concrete not less than 2 ft long shall be poured and held in the end of the conduit or pipe. The plug may also be accomplished by using a precast stopper grouted into place.
- J. Material to be removed will be designated as "salvageable" or "non-salvageable" in the contract documents prior to bidding by the CONTRACTOR. All "salvageable" material will remain the property of the OWNER and will be stored at the site as directed by the OWNER's Inspector. All "non-salvageable" materials and debris removed shall become the property of the CONTRACTOR and shall be removed from the site and shall be disposed of properly.
- K. All asphaltic material shall be disposed of or recycled at the facility authorized to accept the asphalt for such purposes and applicable to appropriate guidelines and regulations.

END OF SECTION

SECTION 31 23 19

DEWATERING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section provides for furnishing all labor, materials, equipment, power and incidentals, and for performing all operations necessary to dewater, drain and maintain excavations and other work as necessary for construction. Included are installing, maintaining, operating and removing pump systems, culverts, channels and other approved devices for removal of standing water, surface drainage and seepage from excavation or other work.
- B. Protecting work against surface runoff and rising flood waters.
- C. Disposing of removed water.
- D. Some shutdowns will not be absolute. The CONTRACTOR will be responsible for dewatering of seepage and leakage past any existing valve, wall or gate.

1.02 RELATED WORK

- A. Division 01 – General Requirements
- B. Division 31 – Earthwork
- C. Division 33 – Utilities

1.03 REFERENCE STANDARDS

- A. ASTM D 698 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb (2.49 kg) Rammer and 12-inch (304.8 mm) Drop.
- B. Federal Regulations, 29 CFR Part 1926, Standards-Excavation, Occupational Safety and Health Administration (OSHA).
- C. Federal Register 40 CFR (Vol. 55, No. 222) Part 122, EPA Administered Permit Programs (NPDES), Para. 122.26(b)(14) Storm Water Discharge.

1.04 DEFINITIONS

- A. Ground water control includes both dewatering and depressurization of water-bearing soil layers.
 - 1. Dewatering includes lowering the water table and intercepting seepage which would otherwise emerge from slopes or bottoms of excavations, or into tunnels and shafts, and disposing of removed water. The intent of dewatering is to increase stability of tunnel excavations and excavated slopes; prevent dislocation of material from slopes or bottoms of excavations; reduce lateral loads on sheeting and bracing; improve excavating and hauling characteristics of excavated material; prevent failure or heaving of the bottom of excavations; and to provide suitable conditions for placement of backfill materials and construction of structures and other installations.

2. Depressurization includes reduction in piezometric pressure within strata not controlled by dewatering alone, as required to prevent failure or heaving of excavation bottom or instability of tunnel excavations.
- B. Excavation drainage includes placement of drainage materials, such as crushed stone and filter fabric, together with sump pumping in order to keep excavations free of surface and seepage water.
 - C. Surface drainage includes use of temporary drainage ditches and dikes and installation of temporary culverts and sump pumps with discharge lines as required to protect the Work from any source of surface water.
 - D. Equipment and instrumentation for monitoring and control of the ground water control system includes piezometers and monitoring wells, and devices, such as flow meters, for observing and recording flow rates.

1.05 PERFORMANCE REQUIREMENTS

- A. Conduct subsurface investigations to identify groundwater conditions and to provide parameters for design, installation, and operation of groundwater control systems.
- B. Design a ground water control system, compatible with requirements of Federal Regulations 29 CFR Part 1926 and Section 31.41.33 - Trench Excavation Safety Protection, to produce the following results:
 1. Effectively reduce the hydrostatic pressure affecting:
 - a. Excavations.
 - b. Tunnel excavation, face stability or seepage into tunnels.
 2. Develop a substantially dry and stable subgrade for subsequent construction operations.
 3. Preclude damage to adjacent properties, buildings, structures, utilities, installed facilities, and other work.
 4. Prevent the loss of fines, seepage, boils, quick condition, or softening of the foundation strata.
 5. Maintain stability of sides and bottom of excavations.
- C. Provide ground water control systems may include single-stage or multiple-stage well point systems, deep wells, or combinations of these equipment types.
- D. Provide drainage of seepage water and surface water, as well as water from any other source entering the excavation. Excavation drainage may include placement of drainage materials, such as crushed stone and filter fabric, together with sump pumping.
- E. Provide ditches, berms, pumps and other methods necessary to divert and drain surface water from excavation and other work areas.
- F. Locate ground water control and drainage systems so as not to interfere with utilities, construction operations, adjacent properties, or adjacent water wells.
- G. Assume sole responsibility for ground water control systems and for any loss or damage resulting from partial or complete failure of protective measures and any settlement or resultant damage caused by the ground water control operations. Modify ground water control systems or operations if they cause or threaten to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells, or

affect potentially contaminated areas. Repair damage caused by ground water control systems or resulting from failure of the system to protect property as required.

- H. Provide an adequate number of piezometers installed at the proper locations and depths as required to provide meaningful observations of the conditions affecting the excavation, adjacent structures, and water wells.
- I. Provide environmental monitoring wells installed at the proper locations and depths as required to provide adequate observations of hydrostatic conditions and possible contaminant transport from contamination sources into the work area or into the ground water control system.
- J. Decommission piezometers and monitoring wells installed during construction.

1.06 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of Section 01 33 00 – Submittal Procedures.
- B. Submit a groundwater control plan, developed and sealed by a licensed Professional Engineer in the State of Texas that outlines the CONTRACTOR's means and methods for controlling groundwater including the location of all proposed groundwater monitoring wells for verification prior to beginning excavation for trench and excavation safety system submitted under Section 31 41 33 – Trench Excavation Safety Protection. Submit a plan to include the following:
 - 1. Results of subsurface investigation and description of the extent and characteristics of water bearing layers subject to ground water control.
 - 2. Names of equipment suppliers and installation subcontractors.
 - 3. A description of the proposed ground water control systems indicating arrangement, location, depth and capacities of the system components, installation details and criteria, and operation and maintenance procedures.
 - 4. A description of proposed monitoring and control system indicating depths and locations of piezometers and monitoring wells, monitoring installation details and criteria, type of equipment and instrumentation with pertinent data and characteristics.
 - 5. A description of proposed filters including types, sizes, capacities and manufacturer's application recommendations.
 - 6. Design calculations demonstrating adequacy of proposed systems for intended applications. Define potential area of influence of ground water control operation near contaminated areas.
 - 7. Operating requirements, including piezometric control elevations for dewatering and depressurization.
 - 8. Excavation drainage methods including typical drainage layers, sump pump applications and other necessary means.
 - 9. Surface water control and drainage installations.
 - 10. Proposed methods and locations for disposing of removed water.
- C. Submit the following records upon completed initial installation:
 - 1. Installation and development reports for well points, educators, and deep wells.
 - 2. Installation reports and baseline readings for piezometers and monitoring wells.

3. Baseline analytical test data of water from monitoring wells.
 4. Initial flow rates.
- D. Submit the following records on a weekly basis during operations:
1. Records of flow rates and piezometric elevations obtained during monitoring of dewatering and depressurization.
 2. Maintenance records for ground water control installations, piezometers, and monitoring wells.
- E. Submit the following records at the end of work:
1. Decommissioning (abandonment) reports for monitoring wells and piezometers installed by the CONTRACTOR.
- F. Adequacy and implementation of the plan is the sole responsibility of the CONTRACTOR. The groundwater control plan will be maintained in the OWNER's Representative files for reference purposes only. No review will be made nor is any responsibility for the plan assumed by the OWNER's Representative.
- 1.07 ENVIRONMENTAL REQUIREMENTS
- A. Comply with requirements of agencies having jurisdiction.
 - B. Comply with Texas Natural Resource Conservation Commission regulations and Texas Water Well Drillers Association for development, drilling, and abandonment of wells used in dewatering system.
 - C. Obtain permit from EPA under the National Pollutant Discharge Elimination System (NPDES), for storm water discharge from construction sites.
 - D. Obtain all necessary permits from agencies with control over the use of groundwater and matters affecting well installation, water discharge, and use of existing storm drains and natural water sources. Because the review and permitting process may be lengthy, take early action to pursue and submit for the required approvals.
 - E. Monitor ground water discharge for contamination while performing pumping in the vicinity of potential contaminated sites.
- 1.08 QUALITY ASSURANCE
- A. The CONTRACTOR shall retain a professional engineer to evaluate groundwater conditions and design appropriate dewatering systems for trench and excavation safety system submitted under Section 31 41 33 – Trench Excavation Safety Protection. The CONTRACTOR shall install an adequate number of groundwater monitoring wells to demonstrate that dewatering has occurred to adequate depths below all excavations prior to beginning excavation as verified by the Owner's Representative.
 - B. When groundwater control is necessary for tunneling operations, do not begin tunneling operations until monitoring data show that it is safe to do so. When dewatering is sole means of groundwater control, draw piezometric level to 5 feet below elevation of invert of tunnel, or to lower elevation as required for excavation face and tunnel stability.

1.09 CONTRACTOR'S RESPONSIBILITY

- A. Assume sole responsibility for dewatering systems and for all loss or damage resulting from partial or complete failure of protective measures.
- B. The CONTRACTOR shall be responsible for design of dewatering and drainage system.

1.10 MEASUREMENT AND PAYMENT

- A. Payment for control of groundwater, regardless of depth, size or number of well points or time required to lower groundwater, is on a linear foot basis measured along the centerline of the structure being installed.
- B. Payment is for the removal of groundwater is by use of well points only, no payment will be made for removal of groundwater by other methods.
- C. No payment will be made for excavation drainage under this Section. Include payment in unit price of applicable utility installation.
- D. No payment will be made for control of surface water or surface drainage under this Section. Include payment in unit price for applicable utility installation.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Equipment and materials are at the option of Contractor as necessary to achieve desired results for dewatering. Selected equipment and materials are subject to review by the OWNER and ENGINEER.
- B. Eductors, well points or deep wells, where used, must be furnished. Installed and operated by an experienced contractor regularly engaged in ground water control system design, installation, and operation.
- C. All equipment must be in good repair and operating order.
- D. Sufficient standby equipment and materials shall be kept available to ensure continuous operation, where required.

PART 3 EXECUTION

3.01 DEWATERING FOR EXCAVATIONS

- A. Perform a subsurface investigation by borings as necessary to identify water bearing layers, piezometric pressures, and soil parameters for design and installation of ground water control systems. Perform pump tests, if necessary, to determine the drawdown characteristics of the water bearing layers. The results shall be presented in the Ground Water and Surface Water Control Plan.
- B. Furnish, install, operate and maintain all necessary pumping for dewatering the various parts of the work and for maintaining free of water the parts of the work as required for construction operations, inspections and safety.
- C. Where hydrostatic pressures in confined water bearing layers exist below excavation, depressurize those zones to eliminate risk of uplift or other instability of excavation or

installed works. Allowable piezometric elevations shall be defined in the Ground Water and Surface Water Control Plan.

- D. Convey water removed from excavations and rainwater to collecting or runoff areas away from buildings and other structures. Establish and maintain temporary drainage ditches and other diversions outside excavation limits. Do not use trench excavations as temporary drainage ditches.
- E. Dewatering devices shall be provided with filters to prevent the removal of fines from the soil.
- F. Maintain groundwater table at least 5 feet below the prevailing and finished excavation subgrade at all times and until there is no possibility of damage.
- G. Continue dewatering in all required areas, until the area has been completed and accepted by the OWNER's Representative.
- H. Obtain from the appropriate agencies and authorities, the dewatering and storm water discharge permits required to remove and dispose of groundwater, surface water, and any other water used in Contractor's operations. The CONTRACTOR shall obtain permits prior to start of construction.
- I. Develop substantially dry and stable subgrade for subsequent construction operations
- J. Provide continuous system operation, including nights, weekends, and holidays. Arrange appropriate backup if electrical power is primary energy source for dewatering system. Enclose generators and equipment used when dewatering near residential or hotel buildings as directed by Resident Inspector.

3.02 DEWATERING FOR TUNNELING

- A. Anticipate that portions of tunnel excavation may be below ground water table and in cohesion-less soils, even when not indicated on soil borings, and in other conditions which may require ground water control system for tunneling operations. Install filter fabrics, backer rods and other means as necessary to prevent piping of fines into tunnel. Remove water that may be encountered during course of work by pumping, well pointing, deep well pumping, or other means determined by the CONTRACTOR as necessary to achieve stable conditions. Do not permit standing water at face, in tunnel or shafts.
- B. The groundwater control method used shall not cause damage to adjacent structures or properties due to lowering of ground water table and subsequent ground settlement. In the event that damage does occur, correct damage.
- C. If the CONTRACTOR chooses pumping installations to control groundwater level or installs pervious tunnel liner through water bearing layers, install and maintain instrumentation system to monitor water level and to detect movement in adjacent structures and properties. Monitor water level by recording initial water level before dewatering is started and thereafter on a weekly basis. Remove water monthly from piezometers to demonstrate that they are operable.
- D. Maintain dewatering system for tunnels in continuous operation until a minimum of 48 hours after carrier pipe has been installed and annular space has been fully grouted (if applicable), or until watertight liner designed for hydrostatic pressures has been installed.

- E. If water eductors, well points or deep wells are used, space them adequately to provide necessary dewatering. Use sand packing and other means to prevent pumping of fine sands or silts from subsurface, and to minimize ground subsidence. Check continuously to ensure that subsurface soil is not being removed by groundwater control operation or subsurface drainage into shafts or through pervious tunnel liner. Before operations begin, maintain availability of pumping equipment and other machinery on site to assure that operation of dewatering system can be maintained.

3.03 REPAIR OF DAMAGE

- A. The CONTRACOR shall assume full responsibility for all loss and damage due to inadequate dewatering prior to excavation or as a result of flood, rising water or seepage in any part of the work. Repair any damage to partially completed work from these or other causes by failure or lack of adequate dewatering or drainage facilities.

3.04 REQUIREMENTS FOR EDUCTOR, WELL POINTS, OR DEEP WELLS

- A. For aboveground piping in ground water control system, include a 12-inch minimum length of clear, transparent piping between every eductor well or well point and discharge header so that discharge from each installation can be visually monitored.
- B. Install sufficient piezometers or monitoring wells to show that all trench or shaft excavations in water bearing materials are pre-drain prior to excavation. Provide separate piezometers for monitoring of dewatering and for monitoring of depressurization. Install piezometers and monitoring wells for tunneling as appropriate for the CONTRACTOR's selected method of work.
- C. Install piezometers or monitoring wells not less than one week in advance of beginning the associated excavation.
- D. Dewatering may be omitted for portions of underdrains or other excavations, but only where auger borings and piezometers or monitoring wells show that soil is pre-drained by an existing system such that the criteria of the ground water control plan are satisfied.
- E. Replace installations that produce noticeable amounts of sediments after development.
- F. Provide additional ground water control installations, or change the methods, in the event that the installations according to the ground water control plan does not provide satisfactory results based on the performance criteria defined by the plan and by the specification.

3.05 EXCAVATION DRAINAGE

- A. The CONTRACTOR may use excavation drainage methods if necessary, to achieve well-drained conditions. The excavation drainage may consist of a layer of crushed stone and filter fabric, and sump pumping in combination with sufficient wells for ground water control to maintain stable excavation and backfill conditions.

3.06 MAINTENANCE AND OBSERVATION

- A. Conduct daily maintenance and observation of piezometers or monitoring wells while the ground water control installations or excavation drainage are operating in an area or seepage into tunnel is occurring. Keep system in good condition.

- B. Replace damaged and destroyed piezometers or monitoring wells with new piezometers or wells as necessary to meet observation schedule.
- C. Cut off piezometers or monitoring wells in excavation areas where piping is exposed, only as necessary to perform observation as excavation proceeds. Continue to maintain and make observations, as specified.
- D. Remove and grout piezometers inside or outside the excavation area when ground water control operations are complete. Remove and grout monitoring wells when directed by the Engineer.

3.07 MONITORING AND RECORDING

- A. Monitor and record average flow rate of operation for each deep well, or for each wellpoint or eductor header used in dewatering system. Also monitor and record water level and ground water recovery. These records shall be obtained daily until steady conditions are achieved, and twice weekly thereafter.
- B. Observe and record elevation of water level daily as long as ground water control system is in operation, and weekly thereafter until the Work is completed or piezometers or wells are removed, except when Engineer determines that more frequent monitoring and recording are required. Comply with ENGINEER's direction for increased monitoring and recording and take measures as necessary to ensure effective dewatering for intended purpose.

3.08 SURFACE WATER CONTROL

- A. Intercept surface water and divert it away from excavations through use of dikes, ditches, curb walls, pipes, sumps or other approved means. The requirement includes temporary works required to protect adjoining properties from surface drainage caused by construction operations.
- B. Divert surface water and seepage water into sumps and pump it into drainage channels or storm drains, when approved by agencies having jurisdiction. Provide settling basins when required by such agencies.

3.09 REMOVAL OF DEWATERING EQUIPMENT

- A. Remove ground water control installations.
 1. Remove pumping system components and piping when ground water control is no longer required.
 2. Remove piezometers, including piezometers installed during construction, upon completion of testing.
 3. Remove monitoring wells when directed by the Engineer.
 4. Grout abandoned well and piezometer holes. Fill piping that is not removed with cement-bentonite grout or cement-sand grout.
- B. During backfilling, dewatering may be reduced to maintain water level a minimum of 5 feet below prevailing level of backfill. However, do not allow that water level to result in uplift pressures in excess of 80 percent of downward pressure produced by weight of structure or backfill in place. Do not allow water levels to rise into cement stabilized sand until at least 48 hours after placement.

- C. Provide a uniform diameter for each pipe drain run constructed for dewatering. Remove pipe drain when it has served its purpose. If removal of pipe is impractical, provide grout connections at 50-foot intervals and fill pipe with cement-bentonite grout or cement-sand grout when pipe is removed from service.
- D. Extent of construction ground water control for structures with a permanent perforated underground drainage system may be reduced, such as for units designed to withstand hydrostatic uplift pressure. Provide a means of draining the affected portion of underground system, including standby equipment. Maintain drainage system during operations and remove it when no longer required.
- E. Remove system upon completion of construction or when dewatering and control of surface or ground water is no longer required.
- F. Compact backfill to not less than 95 percent of the maximum dry density in accordance with ASTM D 698.

END OF SECTION

SECTION 31 23 23.33

FLOWABLE FILL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The work covered by this item consists of furnishing, transporting, mixing, testing and installing flowable fill. Flowable fill is a concrete material suitable as a backfill for utility trenches, abandoned pipes, manholes and valves. It is a heavy material and will exert a high fluid pressure against any forms, embankment, or wall used to contain backfill.

1.02 RELATED WORK

- A. Division 3 - Concrete

1.03 SUBMITTALS

- A. All submittals shall be in accordance with Engineer's requirements. All submittals shall be approved by the Engineer and acknowledge by the Inspector prior to delivery of materials and commencing any portion of the proposed scope of work.
 - 1. Submit proposed mix design. Mix design shall state the following information:
 - a. Mix design number or code designation to order the concrete from the supplier.
 - b. Design strength at 7 days (unless otherwise noted on the Plans).
 - c. Cement type and brand.
 - d. Fly ash type and brand.
 - e. Admixtures type and brand.
 - f. Proportions of each material used.
 - g. Submit a copy of delivery tickets accompanied by batch tickets, providing the information required by ASTM C 94 to SAWS Inspector in the field at time of delivery

1.04 REFERENCE STANDARDS

- A. ASTM C 4318 – Liquid Limit, Plastic Limit and Plasticity Index of Soils. Texas Department of Transportation (TxDOT)
 - 1. TxDOT DMS-4600 Hydraulic Cement
 - 2. TxDOT DMS-4610 Fly Ash
 - 3. TxDOT DMS 4640 Chemical Admixtures for Concrete
 - 4. Tex-401-A
 - 5. TxDOT Tex-106-A
 - 6. TxDOT-Tex-418-A
 - 7. TxDOT-Tex-447-A

1.05 MEASUREMENT AND PAYMENT

- A. This Item will be measured by the cubic yard of material placed of accepted work complete in place.
 - 1. Measurement will not include additional volume caused by slips, slides, or cave-ins resulting from the Contractor's operations.
- B. The work performed and materials furnished in accordance with this item is for full compensation for furnishing, hauling, and placing materials and for equipment, tools, labor, and incidentals and will be paid for at the unit price bid. Flowable Fill shall be paid for at the contract unit price per cubic yard based on the maximum trench widths as established per these plans and specifications.
 - 1. Flowable Fill (Low Strength) – per cubic yard
 - 2. Flowable Fill (High Strength) – per cubic yard
 - 3. Flowable Fill (High Strength emergency Repair) – per cubic yard

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cement. Furnish hydraulic cement that meets the requirements of TxDOT's DMS-4600, "Hydraulic Cement," TxDOT's Hydraulic Cement Quality Monitoring Program (HCQMP), and ASTM C-150 Type I Portland Cement. Sources not on the HCQMP or other sources to be used in combination with an approved source will require approval before use.
- B. Fly Ash. Furnish fly ash conforming to TxDOT DMS-4610, "Fly Ash."
- C. Chemical Admixtures. Furnish chemical admixtures conforming to TxDOT DMS-4640, Chemical Admixtures for Concrete.
- D. Fine Aggregate. Provide fine aggregate that will stay in suspension in the mortar to the extent required for proper flow and that meets the gradation requirements of Table 1. Test fine aggregate gradation in accordance with TxDOT standard laboratory test procedure Tex-401-A. Plasticity Index (PI) must not exceed 6 when tested in accordance with TxDOT standard laboratory test procedure Tex-106-A.
- E. Mixing Water. Use mixing water conforming to the requirements of Section 03 30 00.

Table 1 Aggregate Gradation Chart	
Sieve Size	Percent Passing
¾ inch	100
No. 200	0-30

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Unless otherwise shown on the plans, furnish a mix meeting the requirements of this section as set forth below.
- B. Strength. The compressive strength range shall be between the following strength values unless otherwise directed by the Engineer or shown on the plans:
 - 1. Low Strength. Between 80 psi and 150 psi at 28 days,
 - 2. High Strength. Greater than 500 psi at 28 days. For emergency repairs, strength shall be greater than 50 psi at 2 hours.
- C. Consistency. Design the mix to be placed without consolidation and to fill all intended voids.
 - 1. Fill an open-ended, 3-inch diameter by 6-inch high cylinder to the top to test the consistency.
 - 2. Immediately pull the cylinder straight up. The correct consistency of the mix must produce a minimum 8-inch diameter circular spread with no segregation.
 - 3. When necessary, use specialty type admixtures to enhance the flowability, reduce shrinkage, and reduce segregation by maintaining solids in suspension.
 - 4. All admixtures must be used and proportioned in accordance with the manufacturer's recommendations.
 - 5. Mix the flowable fill using a central-mixed concrete plant, ready-mix concrete truck, pug mill, or other approved method.
- D. Shrinkage and Bleeding. Limit shrinkage to 0.5% or less based upon the results from ASTM C 827, "Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures."
 - 1. Batch, mix and transport flowable fill in accordance with ASTM C 94, except when directed otherwise by the Engineer.
 - 2. Mix flowable fill in quantities required for immediate use. Do not use portions which have developed initial set or which are not in place within 90 minutes after the initial water has been added.
 - 3. Do not mix flowable fill while the air temperature is at or below 35 degrees F without prior approval from the Engineer.
 - 4. Monitor and control the fluid pressure during placement of flowable fill prior to set. Take appropriate measures to avoid excessive pressure that may damage or displace structures or cause flotation. Cease operations if flowable fill is observed leaking from the area.
 - 5. Repair or replace damaged or displaced structures at no additional cost to Owner.
 - 6. Clean up excess flowable fill discharged from the work area and remove excess flowable fill from pipes at no additional cost to Owner.

3.02 TESTING

- A. Testing shall be in accordance with TxDOT standard laboratory test procedure Tex-418-A
1. Contractor to furnish all labor, equipment, tools, containers, and molds required for sampling, making, transporting, curing, removal, and disposal of test specimens. Furnish test molds meeting the requirements of TxDOT standard laboratory test procedure Tex-447-A
 2. Two specimens are required for a strength test, and the compressive strength is defined as the average of the breaking strength of the 2 cylinders.
 3. Contractor to transport, strip, and cure the test specimens as scheduled at the designated location.
 4. Cure test specimens in accordance with TxDOT standard laboratory test procedure Tex-447-A.
 5. The Contractor will sample, take, and test all quality control testing.
 6. Contractor to dispose of used, broken specimens in an approved location and manner.
 7. The frequency of job control testing will be at the direction of the Engineer.
 8. Owner will be responsible for quality assurance testing.

END OF SECTION

SECTION 31 23 33

TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The work under this Section of the Specifications consists of furnishing all labor, equipment and materials, and performing all operations in connection with the trenching, excavation, backfill, embedment, and concrete encasement required to install the pipelines shown on the Drawings, and as specified.
- B. Excavation shall include the removal of any trees, stumps, brush, debris, or other obstacles that may obstruct the line of work, and the excavation, and removal of all earth, rock or other materials to the extent necessary to install the pipe and appurtenances in conformance with the lines and grades shown on the Drawings, or as specified.
- C. Backfill shall include the refilling and consolidation of the fill in the trenches and excavations up to the surrounding ground surface or road grade at crossing. The backfill from the trench bottom to 12-inches above the top of the pipes and conduit when laid to the grade including the bedding layer sustaining the pipeline as shown on the drawings is termed "embedment". Backfill above the embedment is termed "final backfill".
- D. Waste material disposal consists of trees, stumps, logs, brush, roots, grass, vegetation, humus, rubbish, large rocks exceeding a dimension of six (6") in any direction, demolished equipment not retained by the CONTRACTOR, and other objectionable matter from operations such as clearing and grubbing, demolition, excavation, and grading.
- E. Where construction enters the limits of City, State or County rights-of-way, the requirements of these agencies shall be met.

1.02 RELATED WORK

- A. Division 01 – General Requirements
- B. Division 31 – Earthwork

1.03 SUBMITTALS

- A. Submit the following in accordance with the requirements in Section 01 33 00 – Submittal Procedures:
 - 1. Submit testing laboratory reports, as specified or required, to show compliance with specifications for material from off-site locations. The specified tests shall be performed by a certified independent testing laboratory retained and paid by the CONTRACTOR.

2. Submit details of excavation plans designed and prepared by a licensed Professional Engineer, who is registered in the State of Texas and has experience in soils engineering, for all structure excavation. The plans shall include details of any proposed shoring systems, systems to protect existing facilities, slope stability monitoring, and the CONTRACTOR's means and methods for controlling groundwater. The plans shall be submitted to the ENGINEER for record purposes prior to proceeding with any excavation work.
3. Submit details of temporary excavation support system plans for all trench excavations, where an existing structure or utility falls within a 2 horizontal to 1 vertical (2:1) slope from the bottom of the excavation, or where considerations dictate a plan. The plans shall be developed by the CONTRACTOR's licensed Professional Engineer, who is registered in the State of Texas and has experience in trench safety analysis. The plans shall be submitted to the OWNER's representative for record purposes prior to proceeding with any excavation work.

1.04 REFERENCE STANDARDS

- A. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- C. ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- D. ASTM D75 Standard Practice for Sampling Aggregates
- E. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
- F. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
- G. 3.ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³).
- H. 4.ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- I. ASTM D2922 Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- J. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- K. ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.05 QUALITY ASSURANCE

- A. Density: All references to "Maximum dry density" shall mean the maximum dry density defined by the "Maximum Density- Optimum Moisture Test," ASTM D698, unless otherwise specified. Determination of the density of backfill in-place shall be in accordance with the requirements of ASTM D2922, "Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)." The CONTRACTOR will provide for initial density testing of in-place backfill and all additional density testing of backfills found not to be within the minimum requirements of the Specifications.
- B. One in place density and moisture test whenever there is a suspicion of a change in the quality of moisture control or effectiveness of compaction.
- C. Additional gradation, Proctor, and maximum index density tests whenever the source or quality of material changes
- D. For every 200 cubic yards of flowable fill placed, test four cylinders in accordance with ASTM C39. Two cylinders shall be tested at 3 days and the other two cylinders shall be tested at 28 days.
- E. Sources and Evaluation Testing: Materials to be used for embedment and granular material to be used for select backfill shall be obtained in accordance with a sampling plan and ASTM D75, Sampling Aggregates. Testing of materials to certify conformance with the specification requirements shall be performed by an independent testing laboratory and paid by the CONTRACTOR. The CONTRACTOR's testing agency shall perform tests upon change of source and at sufficient intervals to certify conformance of all select material furnished for use on this project.
- F. Trench Width Dimension: The sides of all trenches shall be cut as nearly vertical as possible. The minimum and maximum widths of trenches, measured at an elevation twelve inches above the top of the pipe, shall be as shown on drawings. If the maximum width is exceeded at any point, the Contractor shall provide adequate support for the pipe as specified in Paragraph 3.01 B Item 3 of this Section.

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS

- 1.07 This project is located in areas of reduced vertical and/or horizontal construction clearance. Conventional excavation equipment for the purposes of this project shall be verified, prior to bidding, to clear all overhead and surrounding structures.

1.08 DELIVERY, HANDLING AND STORAGE

- A. Excavated materials to be used for backfill may be deposited in stockpiles at points convenient for re-handling the material during the backfilling process. The location of stockpiles must be within the limits of construction easements or other locations coordinated and submitted by the CONTRACTOR. The location of stockpiles is subject to the approval of the Owner or the Owner's representative. Keep drainage channels clear of stockpiled materials.

1.09 MAINTENANCE/SPARE PARTS

- A. Following completion of pipe laying, maintain paved surfaces, unpaved trench surfaces, fences, curbs, sidewalks, and gutters, for a period of twelve (12) months. Material and labor required for the maintenance shall be supplied by the CONTRACTOR, and the work shall be done in a manner satisfactory to the OWNER's Representative. Maintenance shall include repair of any trench settlement and any damages to structures or paving due to trench settlement or workmanship.

1.10 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for items contained under this specification.

PART 2 PRODUCTS

2.01 MATERIALS

A. CRUSHED ROCK

- 1. Crushed rock shall consist of sound and durable particles free from injurious amounts of salt, alkali, vegetable matter, or other material either free or as adherent coating. Its quality shall be reasonably uniform throughout.
- 2. Wear shall not exceed 40 percent when tested in accordance with TxDOT's Standard Specifications for Construction of Highways, Street and Bridges Test Method Tex-410-A.
- 3. Gradation shall meet the following requirements for percentage by weight when tested in accordance with ASTM C136
 - a. Standard Crushed Rock
 - (i) Passing 1-1/2-inch sieve100%
 - (ii) Passing 1-inch sieve95-100%
 - (iii) Passing 1/2-inch sieve25-60%
 - (iv) Passing No. 4 sieve 0-10%
 - (v) Passing No. 8 sieve 0-5%
 - b. Fine Crushed Rock
 - (i) Passing 1/2-inch sieve100%
 - (ii) Passing 3/8-inch sieve 95-100%
 - (iii) Passing No. 4 sieve 40-65%
 - (iv) Passing No. 8 sieve 0-10%
- 4. Fine crushed rock shall be rounded or sub rounded particles. Fine crushed rock with sharp edges will not be accepted.

B. GRAVEL

- 1. Gravel shall consist of uncrushed stones and shall not have by weight more than one percent organic matter, clay, or loam and not more than five percent by weight of any, one or combination of slate, shale, schist, or soft particles of sandstone.
- 2. Gradation shall meet the following requirements for percentage by wight when tested in accordance with ASTM C136
 - (i) Passing 1-1/2-inch sieve100%

(ii) Passing ¾ sieve95%

C. SAND BEDDING (Bank Run Sand)

1. Durable bank run sand classified as SP, SW, or SM by the Unified Soil Classification System (ASTM D 2487) meeting the following requirements:

(i) Less than 15 percent passing the number 200 sieve when tested in accordance with ASTM D 1140. The amount of clay lumps or balls not exceeding 2 percent.

(ii) Material passing the number 40 sieve shall meet the following requirements when tested in accordance with ASTM D 4318:

(a) Liquid limit: not exceeding 25 percent.

(b) Plasticity index: not exceeding 7.

D. GRANULAR MATERIAL

1. Granular material shall be free flowing, such as sand or hydraulically graded crushed stone fines, or mixed sand and gravel. Material shall have no more than 10- percent fines and shall be free from lumps, stones over two inches in diameter, and organic matter.

E. SELECT BACKFILL MATERIAL

1. Where select material is shown or specified, use an approved material, free of organic matter and foreign substances, obtained from an approved off-site source. The material shall have a plasticity index between 7 and 15 and a maximum liquid limit less than 30 as determined by ASTM D4318, and a maximum of 70 percent passing the No. 200 sieve. Prior to bringing any of the proposed material to the site, submit for review by the OWNER's Representative, an analysis of the proposed material, including a moisture-density relationship curve prepared in accordance with ASTM D698 by a certified independent testing laboratory employed and paid by the CONTRACTOR.

F. CEMENT STABILIZED SAND

1. Stabilized sand shall be mixed in the proportions of at least 160 pounds of Portland cement to each cubic yard of sand. Sand shall be as specified in this section. The cement stabilized sand shall be thoroughly mixed in a mechanical mixer and shall contain only enough water to produce an easily handled mixture.

G. FLOWABLE BACKFILL

1. Refer to Section 31 23 23.33 - Flowable Fill.

H. FINAL BACKFILL

1. From 12-inches above the top of the pipe or conduit, the trench or excavation shall be backfilled with select material or excavated material free from rocks with any dimension greater than four inches unless otherwise specified or required elsewhere. The top 6-inches shall be the topsoil which has been placed separately.

2. Unless otherwise indicated on the drawings, no material of a perishable, spongy, or otherwise unsuitable nature, or excessively large rock (largest dimension greater than 4 inches), shall be used in backfilling.

I. MARKING TAPE

1. Non detectable:
 - a. For use above all pipe.
 - b. Insert polyethylene, impervious to known alkalis, acids, chemical reagents, and solvents likely to be encountered in soil.
 - c. Thickness: Minimum 5 mils.
 - d. Width: 6 inches.
 - e. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
2. Detectable: Not required.
3. Color: In accordance with APWA Uniform Color Code for Temporary Marking of Underground Facilities.

<u>Color*</u>	<u>Facility</u>
Red	Electric power lines, cables, conduit, and lightning cables
Orange	Communicating alarm or signal lines, cables, or conduit
Yellow	Gas, oil, steam, petroleum, or gaseous materials
Green	Sewers and drain lines
Blue	Potable water
Purple	Reclaimed water, irrigation, and slurry lines

PART 3 EXECUTION

3.01 FIELD TESTING

- A. The in-place field density tests shall be determined by using a nuclear gage in accordance with ASTM D 2922. One test shall be taken on every other compacted lift at 800' intervals for each pipeline. When backfill placement is under pavement, part of a roadway embankment, or within the influence zone of an existing structure, two tests shall be taken at random on every other compacted lift at each road crossing and intervals not to exceed 200 feet for each pipeline.

3.02 GENERAL

- A. Demonstration Section:
 1. Prior to beginning pipe laying operations for each embedment section, each pipe laying crew shall perform a demonstration section to validate that their methods

and materials to be utilized will satisfy all project installation requirements including, but not limited to compaction requirements for the pipe foundation, pipe zone embedment, and trench zone in accordance with this Section and the Contract Documents.

2. The minimum length of the demonstration section shall be a single full length pipe joint and simulated bell excavation for each pipe laying crew. Pipe shall be embedded in accordance with this Section and then removed for OWNER's Representative to inspect and verify conformance to embedment requirements.
3. The CONTRACTOR shall not proceed with production pipe laying beyond the demonstration section without the Owner's Representative's approval.
4. The entire demonstration section length that does not comply with the Contract Documents shall be reworked as necessary to comply with all project requirements.
5. The OWNER's Representative will observe construction of the demonstration section.
6. The OWNER's Representative will take measurements and keep records for quality assurance purposes.
7. Any change in means, methods, and trench conditions, and backfill and compaction methods, and welding will require another successful demonstration section before additional production pipe installation.

B. Excavation:

1. Trench widths shall be governed by the pipe bedding detail or trench safety measures used by the contractor.
2. Trenches shall be excavated to the lines and grades shown on the Drawings with the centerlines of the trenches on the centerlines of the pipes. Measure for grade at the pipe invert, not at the top of the pipe, because of permissible verification in pipe wall thickness.
3. The sides of all trenches shall be vertical to a point one foot above the top of the pipe. Unless otherwise indicated on the Drawings, the trench width shall be as shown on the drawings within a tolerance of +3 inches. Trench width will be measured at an elevation in the trench which is 12-inches above the top of the pipe when laid to grade.
4. Where the normal trench width below the top of the pipe is exceeded for any reason, the CONTRACTOR shall, unless the Owner's Representative determines that the pipe being used is strong enough for the actual trench width, furnish an adequate support for the pipe. This may be accomplished by furnishing a stronger pipe or a concrete cradle, next higher class embedment or encasement, cap or envelope as approved.
5. The trenches shall be excavated to the required depth allowing for the placement of pipe bedding to the thickness shown on the Drawings. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between bell holes, except that the grade may be disturbed for the removal of lifting tackle.
6. Should the bottom of the trench become an unstable foundation for the pipe through the failure of the CONTRACTOR to adequately perform, the CONTRACTOR shall remove the unstable material and fill the trench to the proper subgrade with standard crushed rock.

7. Should the undisturbed material encountered at the grade depth constitute, in the opinion of the OWNER's Representative, an unstable foundation for the pipe, the CONTRACTOR is required to remove such unstable material and fill the trench to the proper subgrade with standard crushed rock. Depth of the standard crushed rock will be determined by the OWNER's Representative.

3.03 TRENCH SAFETY SYSTEMS

- A. Refer to Specification Section 31 41 33 – Trench Excavation Safety Protection.

3.04 DEWATERING EXCAVATIONS

- A. Refer to Section 31 23 19 – Dewatering.

3.05 EXCAVATED MATERIALS

- A. Unless otherwise specified elsewhere, excavated material shall be placed adjacent to the work area and used for backfilling as required. Topsoil shall be placed separately in a careful manner and replaced in its original position. Excess excavated materials shall be disposed of offsite as per Division 01 – General Requirements.

3.06 ROCK REMOVAL

- A. Rock excavation shall include removal and disposal of the following items:
 1. Boulders measuring 1/3 of a cubic yard or more in volume.
 2. Rock material in ledges, bedding deposits, and un-stratified masses that cannot be removed using conventional equipment as defined herein and which requires systematic drilling and blasting for removal.
 3. Concrete or masonry structures that have been abandoned.
 4. Conglomerate deposits that are so firmly cemented that they possess the characteristics of solid rock and cannot be removed using conventional equipment as herein defined and require systematic drilling and blasting for removal.

3.07 EMBEDMENT

- A. Embedment for coated steel pipe, polyethylene wrapped ductile iron pipe and all plastic pipe shall be sand (Min. thickness = 6").
- B. Provide pipe bedding material under all pipe for the full width of the trench. Minimum depth of bedding material below the pipe barrel shall be as shown on the Drawings or as specified.
- C. Minimum depth of pipe bedding material under the pipe bell shall not be less than 6 inches under normal trench conditions and not less than 6 inches in rock excavation areas. Minimum depth of pipe bedding material below the pipe shall be as shown on the drawings.
- D. Placement:
 1. Place the pipe bedding or foundation stabilization material for the full width of the trench in layers not exceeding 6 inches deep and compact each layer, until the

material does not yield or move to the grade established for the pipe bedding. Where the distance to stable ground is excessive (more than two (2) feet), the OWNER reserves the right to order as an extra, in writing, such other types of foundation or pipe supports as deemed necessary.

2. Particular attention must be given to the area of the pipe zone from the flow line to the spring line of the pipe to ensure that firm support is obtained to prevent any lateral movement of the pipe during the final backfilling of the pipe zone.

E. Compaction:

1. Compact embedment materials using vibration or mechanical tamping. Vibration methods shall limit vibration frequency and amplitude to avoid disturbance of adjacent in-situ soils.
2. All embedment materials, which includes material placed in trench bottom for pipe foundation, and all material within the pipe zone shall be compacted to a minimum of 95% of maximum dry density defined by ASTM D698 for cohesive material. For cohesionless material compact to a minimum of 75% of relative density as determined by ASTM D4253 and D4254, whichever is applicable.

3.08 CONCRETE EMBEDMENT AND ENCASEMENT

- A. After pipe joints are completed, the voids at the joints in the embedment's shall be brought to proper grade. Where concrete is placed over or along the pipe, it shall be placed in such manner as not to injure the joints or displace the pipe.
- B. While placing concrete embedment and until the concrete sets up, each pipe shall be properly braced and held to grade so as to prevent any possible shifting or floating of the pipe.
- C. Backfilling shall be done in a careful manner and no less than 24 hours after concrete embedment, cradle, thrust block, or encasement has been placed.

3.09 FINAL BACKFILL PLACEMENT

- A. From 12-inches above the top of the pipe, or as shown on the Drawings, the trench or excavation shall be backfilled with select material or excavated material approved by the OWNER's Representative. No excavated material or excessively large rocks (largest dimension greater than 4 inches) or debris of any sort are to be placed into the backfill. No appreciable weight of any sort, other than backfill, shall be allowed on the pipe until it has been covered to such a depth that damage to the pipe or joints will not occur. The top six (6) inches of backfill shall be topsoil free from rock outside of paved area.
- B. Excavated material which is unsuitable for backfilling and excess material shall be disposed of as specified in Division 01 – General Requirements.
- C. Method of Consolidation:
 1. The CONTRACTOR shall provide a method of consolidation of material 12-inches or more above the pipe. Backfill material shall be compacted in layers from six to eight inches in thickness of loose fill. This material may be placed mechanically or by other means to provide at least 85% ASTM D698 of maximum dry density at 0

to 4 percent above optimum moisture or the compaction indicated on the Drawings. Where the soil PI is less than 20, the compaction moisture content shall be within $\pm 3\%$ of optimum. Such material shall be tested and approved by the OWNER's Representative before continuing.

2. The initial test section shall be a minimum of 100 lineal feet. Material not meeting required compaction shall be removed and replaced at no additional cost to the OWNER. See Item 6 below for deep-fill requirements.
3. Jetting and flooding. Not allowed.
4. Backfill under Road, Concrete Slabs, and Related Items. The backfill for trenches under roads, concrete slabs, and related items shall be compacted to 95% ASTM D698 of the maximum dry density at 0 to 4 percent above optimum moisture..
5. Backfill in Structural Excavation Zone. The backfill for pipeline trenches located in the zone of excavation for structures shall be in accordance with this section
6. Fill depths between 15' to 25' shall be compacted to 98% ASTM D 698. Fill depths between 25' to 35' shall be compacted to 100% ASTM D698.

END OF SECTION

SECTION 31 25 00

EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Section Includes:
 - 1. Implementation of the project's Storm Water Pollution Prevention Plan (SWPPP) and installation, maintenance and removal of erosion and sediment control devices
- B. Deviations from this Specification
 - 1. None.

1.02 RELATED WORK

- A. Related Specification Sections include, but are not necessarily limited to:
 - 1. Division 0 – Bidding Requirements, Contract Forms and Conditions of the Contract
 - 2. Division 1 – General Requirements

1.03 SUBMITTALS

- A. Storm Water Pollution Prevention Plan (SWPPP)
- B. TCEQ Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity under the TPDES General Permit
- C. Construction Site Notice
- D. TCEQ Notice of Termination (NOT) for Storm Water Discharges Associated with Construction Activity under the TPDES General Permit
- E. Notice of Change (if applicable)

1.04 REFERENCE STANDARDS

- A. Reference Standards
 - 1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification, unless a date is specifically cited.
 - 2. ASTM Standard:
 - a. ASTM D3786, Standard Test Method for Bursting Strength of Textile Fabrics—Diaphragm Bursting Strength Tester Method
 - b. ASTM D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
 - c. ASTM D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile

- d. ASTM D4833, Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
- 3. Texas Commission on Environmental Quality (TCEQ) TPDES General Permit No. TXR150000
- 4. TxDOT Departmental Material Specifications (DMS)
 - a. DMS-6230 "Temporary Sediment Control Fence Fabric"

1.05 MEASUREMENT AND PAYMENT

- A. Storm Water Pollution Prevention Plan
 - a. Measurement for this Item shall be per month.
 - b. Payment
 - (i) The work performed and the materials furnished in accordance with this Item shall be paid for at the monthly price bid for "TEMPORARY EROSION, SEDIMENTATION AND WATER POLLUTION PREVENTION AND CONTROL (SWPPP)".
 - c. The price bid shall include:
 - (i) Preparation of SWPPP
 - (ii) Implementation
 - (iii) Permitting fees
 - (iv) Installation
 - (v) Maintenance
 - (vi) Removal

PART 2 PRODUCT

2.01 MATERIALS

- A. Rock Filter Dams
 - 1. Aggregate
 - a. Furnish aggregate with hardness, durability, cleanliness and resistance to crumbling, flaking and eroding acceptable to the Engineer.
 - b. Provide the following:
 - (i) Types 1, 2 and 4 Rock Filter Dams
 - (a) Use 3 to 6 inch aggregate.
 - (ii) Type 3 Rock Filter Dams
 - (a) Use 4 to 8 inch aggregate.
 - 2. Wire
 - a. Provide minimum 20 gauge galvanized wire for the steel wire mesh and tie wires for Types 2 and 3 rock filter dams
 - b. Type 4 dams require:
 - (i) Double-twisted, hexagonal weave with a nominal mesh opening of 2½ inches x 3 ¼ inches
 - (ii) Minimum 0.0866 inch steel wire for netting
 - (iii) Minimum 0.1063 inch steel wire for selvages and corners

- (iv) Minimum 0.0866 inch for binding or tie wire
- B. Geotextile Fabric
1. Place the aggregate over geotextile fabric meeting the following criteria:
 - a. Tensile Strength of 250 pounds, per ASTM D4632
 - b. Puncture Strength of 135 pounds, per ASTM D4833
 - c. Mullen Burst Rate of 420 psi, per ASTM D3786
 - d. Apparent Opening Size of No. 20 (max), per ASTM D4751
- C. Sandbag Material
1. Furnish sandbags meeting Section 2.5 except that any gradation of aggregate may be used to fill the sandbags.
- D. Stabilized Construction Entrances
1. Provide materials that meet the details shown on the Drawings and this Section.
 - a. Provide crushed aggregate for long and short-term construction exits.
 - b. Furnish aggregates that are clean, hard, durable and free from adherent coatings such as salt, alkali, dirt, clay, loam, shale, soft or flaky materials and organic and injurious matter.
 - c. Use 3 to 5 inch coarse aggregate with a minimum thickness of 12 inches.
 - d. The aggregate shall be placed over a geotextile fabric meeting the following criteria:
 - (i) Tensile Strength of 300 pounds, per ASTM D4632
 - (ii) Puncture Strength of 120 pounds, per ASTM D4833
 - (iii) Mullen Burst Rate of 600 psi, per ASTM D3786
 - (iv) Apparent Opening Size of No. 40 (max), per ASTM D4751
- E. Embankment for Erosion Control
1. Provide rock, loam, clay, topsoil or other earth materials that will form a stable embankment to meet the intended use.
- F. Sandbags
1. Provide sandbag material of polypropylene, polyethylene or polyamide woven fabric with a minimum unit weight of 4 ounces per square yard, a Mullen burst-strength exceeding 300 psi, and an ultraviolet stability exceeding 70 percent.
 2. Use natural coarse sand or manufactured sand meeting the gradation given in Table 1 to fill sandbags.
 3. Filled sandbags must be 24 to 30 inches long, 16 to 18 inches wide, and 6 to 8 inches thick.

**Table 1
Sand Gradation**

Sieve #	Maximum Retained (% by Weight)
4	3 percent
100	80 percent
200	95 percent

G. Temporary Sediment Control Fence

1. Provide a net-reinforced fence using woven geo-textile fabric.
2. Logos visible to the traveling public will not be allowed.
 - a. Fabric
 - (i) Provide fabric materials in accordance with DMS-6230, "Temporary Sediment Control Fence Fabric."
 - b. Posts
 - (i) Provide essentially straight wood or steel posts with a minimum length of 48 inches, unless otherwise shown on the Drawings.
 - (ii) Soft wood posts must be at least 3 inches in diameter or nominal 2 x 4 inch
 - (iii) Hardwood posts must have a minimum cross-section of 1-1/2 x 1-1/2 inch
 - (iv) T- or L-shaped steel posts must have a minimum weight of 1.3 pounds per foot.
 - c. Net Reinforcement
 - (i) Provide net reinforcement of at least 12-1/2 gauge galvanized welded wire mesh, with a maximum opening size of 2 x 4 inch, at least 24 inches wide, unless otherwise shown on the Drawings.
 - d. Staples
 - (i) Provide staples with a crown at least 3/4 inch wide and legs 1/2 inch long.

PART 3 EXECUTION

3.01 INSTALLATION

A. Storm Water Pollution Prevention Plan

1. Develop and implement the project's Storm Water Pollution Prevention Plan (SWPPP) in accordance with the TPDES Construction General Permit TXR150000 requirements. Prevent water pollution from storm water runoff by using and maintaining appropriate structural and nonstructural BMPs to reduce pollutants discharges to the MS4 from the construction site.

B. Control Measures

1. Implement control measures in the area to be disturbed before beginning construction, or as directed. Limit the disturbance to the area shown on the Drawings or as directed.
2. Control site waste such as discarded building materials, concrete truck washout water, chemicals, litter and sanitary waste at the construction site.
3. If, in the opinion of the ENGINEER, the CONTRACTOR cannot control soil erosion and sedimentation resulting from construction operations, the ENGINEER will limit the disturbed area to that which the CONTRACTOR is able to control. Minimize disturbance to vegetation.

4. Immediately correct ineffective control measures. Implement additional controls as directed. Remove excavated material within the time requirements specified in the applicable storm water permit.
 5. Upon acceptance of vegetative cover by the City, remove and dispose of all temporary control measures, temporary embankments, bridges, matting, falsework, piling, debris, or other obstructions placed during construction that are not a part of the finished work, or as directed.
- C. Do not locate disposal areas, stockpiles, or haul roads in any wetland, water body, or streambed.
- D. Do not install temporary construction crossings in or across any water body without the prior approval of the appropriate resource agency and the Engineer.
- E. Provide protected storage area for paints, chemicals, solvents, and fertilizers at an approved location. Keep paints, chemicals, solvents, and fertilizers off bare ground and provide shelter for stored chemicals.
- F. Installation and Maintenance
1. Perform work in accordance with the TPDES Construction General Permit TXR150000.
 2. When approved, sediments may be disposed of within embankments, or in areas where the material will not contribute to further siltation.
 3. Dispose of removed material in accordance with federal, state, and local regulations.
 4. Remove devices upon approval or when directed.
 5. Upon removal, finish-grade and dress the area.
 6. Stabilize disturbed areas in accordance with the permit, and as shown on the Drawings or directed.
 7. The CPNTRACTOR retains ownership of stockpiled material and must remove it from the project when new installations or replacements are no longer required.
- G. Rock Filter Dams for Erosion Control
1. Remove trees, brush, stumps and other objectionable material that may interfere with the construction of rock filter dams.
 2. Place sandbags as a foundation when required or at the CONTRACTOR's option.
 3. For Types 1, 2, 3, and 5, place the aggregate to the lines, height, and slopes specified, without undue voids.
 4. For Types 2 and 3, place the aggregate on the mesh and then fold the mesh at the upstream side over the aggregate and secure it to itself on the downstream side with wire ties, or hog rings, or as directed.
 5. Place rock filter dams perpendicular to the flow of the stream or channel unless otherwise directed.
 6. Construct filter dams according to the following criteria, unless otherwise shown on the Drawings:
 - a. Type 1 (Non-reinforced)

- (i) Height - At least 18 inches measured vertically from existing ground to top of filter dam
 - (ii) Top Width - At least 2 feet
 - (iii) Slopes - At most 2:1
- b. Type 2 (Reinforced)
 - (i) Height - At least 18 inches measured vertically from existing ground to top of filter dam
 - (ii) Top Width - At least 2 feet
 - (iii) Slopes - At most 2:1
- c. Type 3 (Reinforced)
 - (i) Height - At least 36 inches measured vertically from existing ground to top of filter dam
 - (ii) Top Width - At least 2 feet
 - (iii) Slopes - At most 2:1
- d. Type 4 (Sack Gabions)
 - (i) Unfold sack gabions and smooth out kinks and bends.
 - (ii) For vertical filling, connect the sides by lacing in a single loop–double loop pattern on 4- to 5-inches spacing. At 1 end, pull the end lacing rod until tight, wrap around the end, and twist 4 times. At the filling end, fill with stone, pull the rod tight, cut the wire with approximately 6 inches remaining, and twist wires 4 times.
 - (iii) For horizontal filling, place sack flat in a filling trough, fill with stone, and connect sides and secure ends as described above.
 - (iv) Lift and place without damaging the gabion.
 - (v) Shape sack gabions to existing contours.
- e. Type 5
 - (i) Provide rock filter dams as shown on the Drawings.

H. Construction Entrances

1. When tracking conditions exist, prevent traffic from crossing or exiting the construction site or moving directly onto a public roadway, alley, sidewalk, parking area, or other right of way areas other than at the location of construction entrances.

I. Place the exit over a foundation course, if necessary.

- a. Grade the foundation course or compacted subgrade to direct runoff from the construction exits to a sediment trap as shown on the Drawings or as directed.
2. At drive approaches, make sure the construction entrance is the full width of the drive and meets the length shown on the Drawings.
 - a. The width shall be at least 14 feet for 1-way and 24 feet for 2-way traffic for all other points of ingress or egress or as directed by the ENGINEER.

J. Earthwork for Erosion Control

1. Perform excavation and embankment operations to minimize erosion and to remove collected sediments from other erosion control devices.
 - a. Excavation and Embankment for Erosion Control Measures
 - (i) Place earth dikes, swales or combinations of both along the low crown of daily lift placement, or as directed, to prevent runoff spillover.
 - (ii) Place swales and dikes at other locations as shown on the Drawings or as directed to prevent runoff spillover or to divert runoff.
 - (iii) Construct cuts with the low end blocked with undisturbed earth to prevent erosion of hillsides.
 - (iv) Construct sediment traps at drainage structures in conjunction with other erosion control measures as shown on the Drawings or as directed.
 - (v) Where required, create a sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures for drainage locations that serve an area with 10 or more disturbed acres at 1 time, not including offsite areas.
 - b. Excavation of Sediment and Debris
 - (i) Remove sediment and debris when accumulation affects the performance of the devices, after a rain, and when directed.

- K. Sandbags for Erosion Control
 1. Construct a berm or dam of sandbags that will intercept sediment-laden storm water runoff from disturbed areas, create a retention pond, detain sediment and release water in sheet flow.
 2. Fill each bag with sand so that at least the top 6 inches of the bag is unfilled to allow for proper tying of the open end.
 3. Place the sandbags with their tied ends in the same direction.
 4. Offset subsequent rows of sandbags 1/2 the length of the preceding row.
 5. Place a single layer of sandbags downstream as a secondary debris trap.
 6. Place additional sandbags as necessary or as directed for supplementary support to berms or dams of sandbags or earth.

- L. Temporary Sediment-Control Fence
 1. Provide temporary sediment-control fence near the downstream perimeter of a disturbed area to intercept sediment from sheet flow.
 2. Incorporate the fence into erosion-control measures used to control sediment in areas of higher flow. Install the fence as shown on the Drawings, as specified in this Section, or as directed.
 - a. Post Installation
 - (i) Embed posts at least 18 inches deep, or adequately anchor, if in rock, with a spacing of 6 to 8 feet and install on a slight angle toward the runoff source.
 - b. Fabric Anchoring
 - (i) Dig trenches along the uphill side of the fence to anchor 6 to 8 inches of fabric.
 - (ii) Provide a minimum trench cross-section of 6 x 6 inches

- (iii) Place the fabric against the side of the trench and align approximately 2 inches of fabric along the bottom in the upstream direction.
- (iv) Backfill the trench, then hand-tamp.
- c. Fabric and Net Reinforcement Attachment
 - (i) Unless otherwise shown under the Drawings, attach the reinforcement to wooden posts with staples, or to steel posts with T-clips, in at least 4 places equally spaced.
 - (ii) Sewn vertical pockets may be used to attach reinforcement to end posts.
 - (iii) Fasten the fabric to the top strand of reinforcement by hog rings or cord every 15 inches or less.
- d. Fabric and Net Splices
 - (i) Locate splices at a fence post with a minimum lap of 6 inches attached in at least 6 places equally spaced, unless otherwise shown under the Drawings.
 - (a) Do not locate splices in concentrated flow areas.
 - (ii) Requirements for installation of used temporary sediment-control fence include the following:
 - (a) Fabric with minimal or no visible signs of biodegradation (weak fibers)
 - (b) Fabric without excessive patching (more than 1 patch every 15 to 20 feet)
 - (c) Posts without bends
 - (d) Backing without holes

3.02 CLEANING

A. Waste Management

1. Remove sediment, debris and litter as needed.

3.03 CLOSEOUT ACTIVITIES

- A. Erosion control measures remain in place and are maintained until all soil disturbing activities at the project site have been completed.
- B. Establish a uniform vegetative cover with a density of 70 percent on all unpaved areas, on areas not covered by permanent structures, or in areas where permanent erosion control measures (i.e. riprap, gabions, or geotextiles) have been employed.

3.04 MAINTENANCE

- A. Install and maintain the integrity of temporary erosion and sedimentation control devices to accumulate silt and debris until earthwork construction and permanent erosion control features are in place or the disturbed area has been adequately stabilized as determined by the Engineer.
- B. If a device ceases to function as intended, repair or replace the device or portions thereof as necessary.

- C. Perform inspections of the construction site as prescribed in the Construction General Permit TXR150000.
- D. Records of inspections and modifications based on the results of inspections must be maintained and available in accordance with the permit.

END OF SECTION

SECTION 31 41 33

TRENCH EXCAVATION SAFETY PROTECTION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This item shall govern the trench excavation safety protection required for the construction of all trench excavation protection systems to be utilized in the project and including all additional excavation and backfill necessitated by the protection system related work
- B. Work in this section shall consist of furnishing all equipment, materials and labor for a structural safety system meeting appropriate requirements established in the Occupational Safety and Health Administration (OSHA) Safety and Health Regulations, Part 1926, Subpart P - Excavations, Trenching and Shoring, and other applicable regulations.

1.02 RELATED WORK

- A. Section 31 23 33 – Trenching and Backfilling

1.03 SUBMITTALS

- A. The CONTRACTOR shall submit manufacturer's product data, instructions recommendations, shop drawings, and certifications. All submittals shall be in accordance with Engineer's requirements and submittals shall be approved prior to delivery.
 - 1. Submit a safety program specifically for the construction of trench excavation. Design the trench safety program to be in accordance with OSHA 29CFR standards governing the presence and activities of individuals working in and around trench excavations.
 - 2. Construction and shop drawings containing deviations from OSHA standards or special designs shall be sealed by a Professional Engineer Licensed in the State of Texas retained and paid by the CONTRACTOR.
 - 3. Review of the safety program by ENGINEER will only be in regard to compliance with specification and will not constitute approval by ENGINEER nor relieve the CONTRACTOR of obligations under State and Federal trench safety laws.
 - 4. Submit certification that trench safety system will not be subjected to loads exceeding those which the system was designed to withstand according to the available construction and geotechnical information.
 - 5. An excavation plan submittal signed and sealed by a Texas licensed professional engineer shall be submitted for review and acceptance by the OWNER'S Representative, if applicable, prior to the delivery of materials and commencing any portion of proposed construction activities where the planned excavation is 20 feet or greater.

1.04 REFERENCE STANDARDS

- A. Texas Commission of Environmental Quality (TCEQ)
 - 1. Chapter 217 Design Criteria for Domestic Wastewater Systems
 - 2. Chapter 290; Subchapter D – Rules and Regulations for Public Drinking Water
- B. Occupational Safety and Health Administration (OSHA).
 - 1. Federal Regulations, 29 CFR, Part 1926, Standards – Safety and Health Regulations for Construction – Subpart P Excavation

1.05 MEASUREMENT AND PAYMENT

- A. Trench Excavation Safety Protection shall be measured by the linear foot along the centerline of any OSHA defined trench that may be entered by personnel and is not greater than 15 feet wide, including manholes and other structures.
- B. Payment for Trench Excavation Safety Protection, measured as described above, shall be made at the unit price bid per linear foot of "TRENCH EXCAVATION SAFETY PROTECTION" regardless of the depth of the trench.
 - 1. Payment shall include all components of the Trench Excavation Safety Protection System which can include, but not be limited to, sloping, sheeting, trench boxes or trench shields, sheet piling, cribbing, bracing, and shoring.
 - 2. Payment shall also include the additional excavation and backfill required, any jacking, jack removal, and removal of the trench supports after completion.Payment of all work prescribed under this item shall be full compensation for all additional excavation and backfill associated with the item; for any retention by the CONTRACTOR of structural design/geotechnical/safety/equipment consultant; for furnishing, placing and removing all shoring, sheeting, or bracing; for dewatering or temporary diversion and proper recapture and transportation of water; for all jacking and jack removal; and for all other labor, material, tools, equipment and incidentals necessary to complete this portion of the work

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Trench excavation safety protection shall be accomplished as required by the latest provision of Part 1926, Subpart P – Excavations, Trenching, and Shoring of the OSHA Standards and Interpretations, or the most approved equal provision.
 - 1. A trench shall be defined as a narrow excavation made below the surface of the ground or pavement. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet.
 - 2. 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 or less (measure at the bottom of the excavation), the excavation is also considered to be a trench.

3. In addition, "Trench Excavation Protection" will not be limited to these applications, but may be used whenever deemed expedient and proper to ensuing work.

END OF SECTION

SECTION 32 11 13.13

LIME TREATED SUB-GRADE

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Treat the subgrade by pulverizing, adding lime, mixing, and compacting to the required density. This item applies to both natural ground and embankment subgrade and shall be constructed as specified herein and in conformance with the typical sections, lines and grades as shown on the plans or as established by the Engineer.

1.02 MEASUREMENT AND PAYMENT

- A. When Lime is furnished in trucks, the weight of lime will be determined on certified scales, or the CONTRACTOR must provide a set of standard platform scales at a location approved by the ENGINEER. Scales must conform to the requirements of TxDOT Standard Specification Item 520, "Weighing and Measuring Equipment."
 - 1. Hydrated Lime.
 - a. Dry. Lime will be measured by the ton (Dry Weight).
 - b. Slurry. Lime slurry will be measured by the ton (dry weight) of the hydrated lime used to prepare the slurry at the site.
 - c. Commercial Lime Slurry. Lime slurry will be measured by the ton (dry weight) as calculated from the minimum percent dry solids content of the slurry, multiplied by the weight of the slurry in tons delivered.
 - 2. Quicklime.
 - 3. Dry. Lime will be measured by the ton (dry weight) of the quicklime.
 - 4. Slurry. Lime slurry will be measured by the ton (dry weight) of the quicklime used to prepare the slurry multiplied by a conversion factor of 1.28 to give the quantity of equivalent hydrated lime, which will be the basis of the payment.
- B. Work performed and materials furnished as prescribed by this item and will be paid for as follows:
 - 1. "LIME TREATED SUBGRADE" will be paid for at the contract unit price bid per square yard, which price shall be full compensation for all correction of secondary subgrade, for loosening, mixing, pulverizing, spreading, drying, application of lime, water content of the slurry, shaping and maintaining, for all sprinkling and rolling, for all manipulations required, for all hauling and freight involved, for all tools, equipment, labor and incidentals necessary to complete the work.
 - a. Lime Treated Subgrade (12" inches compacted depth) – per square yard

PART 2 PRODUCTS

2.01 MATERIALS

- A. Lime for this item shall conform to the requirements of TxDOT Item No. 260, "Lime Treatment – Road Mixed" of the Texas Department of Transportation Standard Specifications (Latest Edition). Acceptable forms of lime shall be:

- "Type A, Hydrated Lime,"
 - "Type B, Commercial Lime Slurry," or
 - "Type C, Quicklime."
- B. The CONTRACTOR shall select, prior to construction, the grade to be used and shall notify the ENGINEER in writing before changing from one grade to another. Lime shall be placed in slurry form only, unless written permission is granted by the ENGINEER and a safety and containment plan is submitted to the ENGINEER by the CONTRACTOR seven days prior to use. In circumstances where it would be beneficial to utilize lime for "drying" subgrade materials to expedite construction, the CONTRACTOR may request approval from the Engineer to use pelletized lime.
- C. Provide materials in conformance with the following Items and requirements:
1. Lime. TxDOT DMS-6350 "Lime and Lime Slurry."
 2. Mix Design. The ENGINEER will determine the target lime content and optimum moisture content in accordance with TxDOT Tex -121-E.

2.02 EQUIPMENT

- A. The machinery, tools and equipment necessary for proper prosecution of the work shall be on the project and approved by the ENGINEER prior to the beginning of construction operations. All machinery, tools and equipment used shall be maintained in a satisfactory and workmanlike manner.

When lime is furnished in trucks, the weight of lime shall be determined on certified scales and delivered to the job site with exit ports sealed at the plant.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. General. The completed course shall be uniformly treated, free from loose or segregated areas, of uniform density and moisture content, well bound for its full depth and shall have a smooth surface.
- B. Preparation of Subgrade or Existing Base. Prior to treating existing material, it shall be shaped to conform to the typical sections, as shown on the plans.

Before pulverizing or scarifying an existing material, when directed by the Engineer, the CONTRACTOR shall proof roll the roadbed in accordance with TxDOT Item 216, "Proof Rolling."

Soft spots shall be corrected as directed by the ENGINEER. When the CONTRACTOR elects to use a cutting and pulverizing machine that will process the material to the plan depth, the CONTRACTOR will not be required to excavate to the secondary grade or windrow the material. This method will be permitted only if a machine is provided which will ensure that the material is cut uniformly to the proper depth and which has cutters

that will plane the secondary grade to a uniform surface over the entire width of the cut. The machine shall provide a visible indication of the depth of cut at all times.

In lieu of using the cutting and pulverizing machine, the CONTRACTOR shall excavate and windrow the material to expose the secondary grade to the typical sections, lines and grades as shown on the plans or as established by the ENGINEER.

- C. Pulverization. The existing pavement or base material shall be pulverized or scarified so that 100 % shall pass the 2-1/2 inch sieve.
- D. Application. The percentage by weight or pounds per square yard of lime to be added will be as shown on the plans and may be varied by the ENGINEER if conditions warrant.

Lime shall be spread only on that area where the mixing operations can be completed during the same working day.

Unless otherwise approved by the Engineer, the lime operation shall not be started when the air temperature is below 40°F and falling, but may be started when the air temperature is above 35°F and rising. The temperature will be taken in the shade and away from artificial heat. Lime shall not be placed when weather conditions in the opinion of the Engineer are unsuitable.

The application and mixing of lime with the material shall be accomplished by the methods herein described as "Slurry Placing." "Dry Placing" is not allowed unless approved by the ENGINEER as described in Section 108.2, "Materials." Type A, Hydrated Lime shall be applied by "Slurry Placing" unless otherwise shown on the plans or approved by the ENGINEER. Type B Commercial Lime Slurry shall be applied by "Slurry Placing." Type C Quicklime shall be applied by "Slurry Placing" only. "Dry Placing" will not be allowed unless approved by the ENGINEER. When Type C Quicklime is used for dry placement, it shall be Grade "DS." When Type C Quicklime is used for slurry placement, it shall be either Grade "DS" or Grade "S." Grade "S" shall be used in slurry placement only.

CAUTION: Use of quicklime can be dangerous. Users should be informed of the recommended precautions in handling, storage and use of quicklime

1. Slurry Placing. When Type A Hydrated Lime is specified and slurry placement is to be used, the Type A Hydrated Lime shall be mixed with water to form a slurry with a solids content approved by the ENGINEER.

Type B Commercial Lime Slurry shall be delivered to the project in slurry form at or above the minimum dry solids content approved by the ENGINEER. The distribution of lime at the rate(s) shown on the plans or approved by the ENGINEER shall be attained by successive passes over a measured section of roadway until the proper lime content has been secured.

When Type C Quicklime is applied as slurry, the amount of dry quicklime shall be 80 percent of the amount shown on the plans. The slurry shall contain at least the minimum dry solids content approved by the ENGINEER. The residue from the

slurrying procedure shall be spread uniformly over the length of the roadway currently being processed unless otherwise approved by the ENGINEER. This residue is primarily inert material with little stabilizing value but may contain a small amount of quicklime particles that slake slowly. A concentration of these particles could cause the compacted stabilized material to swell during slaking.

Slurry shall be of such consistency that it can be applied uniformly without difficulty.

When the distributor truck is not equipped with an agitator, the CONTRACTOR shall have a standby pump available on the project for agitating the lime and water as required by the ENGINEER in case of undue delays in dispersing the slurry.

2. Dry Placing. Dry placing is not allowed unless approved by the ENGINEER as described in Section 108.2, "Materials." If allowed, the lime shall be distributed by an approved spreader at the rate shown on the plans or as directed by the ENGINEER. The lime shall be distributed at a uniform rate and in such a manner as to reduce the scattering of lime by the wind. The material shall be sprinkled as approved by the Inspector.
- E. Mixing. The mixing procedure shall be the same for "Slurry Placing" or "Dry Placing" as herein described.

Begin Mixing within 6 hours of lime application. During the interval between application and mixing, hydrated lime that has been exposed to the open air for a period of six (6) hours or more or to excessive loss due to washing or blowing will not be accepted for payment.

1. Initial Mixing. The material and lime shall be thoroughly mixed. The material and lime shall be brought to the proper moisture content and left to mellow for 1 to 4 days. When pebble grade quicklime is used, allow the mixture to mellow for 2 to 4 days as approved by the ENGINEER.

In addition to the above, when Type C Quicklime, Grade "DS," is approved for use by the ENGINEER under "Dry Placing," the material and lime shall be mixed as thoroughly as possible at the time of the lime application. Sufficient moisture shall be added during the mixing to hydrate the quicklime.

During the mellowing period, the material shall be kept moist as directed by the Inspector.

When shown on the plans or approved by the ENGINEER, the pulverization requirement may be waived when the material contains a substantial quantity of aggregate.

2. Final Mixing. After the required mellowing time, the material shall be uniformly mixed by approved methods. If the soil binder-lime mixture contains clods, they shall be reduced in size by the use of approved pulverization methods.

Following mixing, a sample of the material at roadway moisture will be obtained for pulverization testing. All non-slaking aggregates retained on the $\frac{3}{4}$ inch sieve will be removed from the sample. The remainder of the material shall meet the following pulverization requirement when tested by TXDOT Test Method Tex-101-E, Part III:

Minimum passing 1 $\frac{3}{4}$ " sieve	100
Minimum passing $\frac{3}{4}$ " sieve	85
Minimum passing No. 4 sieve	60

- F. Compaction. Prior to compaction, the material shall be aerated or sprinkled as necessary to provide the optimum moisture. Compaction of the mixture shall begin immediately after final mixing and in no case more than 24 hours after final mixing.

Compaction shall continue until the entire depth of the mixture is uniformly compacted. Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface upon completion shall be smooth and in conformity with the typical sections, lines and grades as shown on the plans or as established by the Engineer.

1. Ordinary Compaction. Roll with approved compaction equipment, as directed. Correct irregularities, depressions, and weak spots immediately by scarifying the areas affected, adding or removing treated material as required, reshaping, and recompacting.
2. Density Control. Each course shall be sprinkled as required and compacted to the extent necessary to provide not less than 95 percent of the optimum density. Unless otherwise shown on the plans, the ENGINEER will determine roadway density of completed sections in accordance with TxDOT Test Method Tex-115-E. The ENGINEER may accept the section if no more than 1 of the 5 most recent density tests is below the specified density and the failing test is no more than 3 pcf below the specified density.

When the material fails to meet the density requirements, or should the material lose the required stability, density or finish before the next course is placed, or the project is accepted, it shall be reworked as specified below.

- G. Reworking a Section. When a section is reworked within 72 hours after completion of compaction, the Contractor shall rework the section to provide the required compaction. When a section is reworked more than 72 hours after completion of compaction, the Contractor shall add 25 percent of the specified rate of lime. Reworking shall include loosening, road mixing as approved by the ENGINEER, compacting, and finishing. When a section is reworked, a new optimum density will be determined from the reworked

material in accordance with TXDOT Test Method Tex-121-E, part II and shall compact in-place to a minimum of 95% of this density.

- H. Finishing. Immediately after completing compaction, clip, skin, or tight-blade the surface of the lime treated material with a maintainer or subgrade trimmer to a depth of approximately ¼-inch. Remove loosened material and dispose of it at an approved location. Roll the clipped surface immediately with a pneumatic-tire roller until a smooth surface is attained. Add small increments of water as needed during rolling. Shape and maintain the course and surface in conformity with the typical sections, lines and grades shown on the plans or as directed.

Finish grade of constructed subgrade in accordance with the following grade tolerances

1. Staged Construction. Grade to within 0.1-foot in the cross-section and 0.1-foot in 16- feet measured longitudinally.
2. Turnkey Construction. Grade to within ½-inch in the cross-section and ½-inch in 16- feet measured longitudinally.

Do not surface patch.

- I. Curing. After the final layer or course of the lime treated material has been compacted, it shall be brought to the required lines and grades in accordance with the typical sections.

The completed section shall then be finished by rolling with a pneumatic tire or other suitable roller. The completed section shall be moist cured or prevented from drying by addition of an asphalt material at the rate of 0.05 to 0.20 gallons per square yard. Curing shall continue for 2 to 5 days before further courses are added or traffic is permitted, unless otherwise approved by the ENGINEER.

However, the lime treated material may be covered by other courses, the day following finishing, when approved by the ENGINEER. When the plans provide for the treated material to be covered by other courses of material, the next course shall be applied within 14 calendar days after final compaction is completed, unless otherwise approved by the ENGINEER.

END OF SECTION

SECTION 32 11 26

ASPHALTIC BASE COURSES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish labor, materials, equipment and incidentals necessary to perform operations in connection with the construction of flexible base access roads. Flexible base shall consist of a foundation for a road surface or for other courses. Construct the flexible base as specified herein in one or more courses in conformance with the typical sections, lines, and grades indicated.

1.02 RELATED WORK

- A. Section 32 12 16 – Asphalt Paving

1.03 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of Section 01 33 00 – Submittal Procedures.
- B. Quality Control Submittals:
 - 1. Certified Test Results on Source Materials: Submit copies from commercial testing laboratory 20 days prior to delivery of materials to project.
 - 2. Certified Results of In-Place Density Tests from independent testing agency.

1.04 REFERENCE STANDARDS

- A. TXDOT Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges, latest edition.

1.05 DEFINITIONS

- A. Completed Course: Compacted, unyielding, free from irregularities, with smooth, tight, even surface, true to grade, line, and cross-section.
- B. Completed Lift: Compacted with uniform surface reasonably true to cross-section.
- C. Standard Specifications: When referenced in this Section, unless otherwise specified, shall mean the Current Edition of Standard Specifications for Construction of Highways, Streets, and Bridges, Texas State Department of Highways and Public Transportation. Parts of these standard specifications that are specifically referenced shall become a part of this Section containing references to them as though stated in full. In case of a discrepancy between the requirements of the standard specifications and the requirements stated in these specifications, the requirements in these specifications shall prevail.

1.06 MEASUREMENT AND PAYMENT

- A. MEASUREMENT: Flexible base will be measured by the square yard method per thickness shown in the plans. This item shall also include the Geogrid for the pavement restoration in the alleyway.

The quantity to be paid for is the quantity shown in the proposal unless modified by the Engineer. Additional measurements or calculations will be made if adjustments of quantities are required.

Measurement is further defined for payment by the square yard of surface area in the completed and accepted final position. The surface area of the base course is based on the width of flexible base as shown on the plans.

- B. PAYMENT: The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for the types of work shown below. No additional payment will be made for thickness or width exceeding that shown on the typical section or provided on the plans for square yard measurement.

Sprinkling and rolling will not be paid for directly but will be subsidiary to this Item unless otherwise shown on the plans.

Where subgrade is constructed under this Contract (Subgrade Treatment), correction of soft spots in the subgrade will be at the Contractor's expense. Where subgrade is not constructed under this project, correction of soft spots in the subgrade will be paid in accordance with pertinent Items.

Payment will be made for the type and grade specified. For square yard measurement, a depth will be specified. This price is full compensation for furnishing materials, Geogrid, temporary stockpiling, assistance provided in stockpile sampling and operations to level stockpiles for measurement, loading, hauling, delivery of materials, spreading, blading, mixing, shaping, placing, compacting, reworking, finishing, correcting locations where thickness is deficient, curing, furnishing scales and labor for weighing and measuring, and equipment, labor, tools, and incidentals.

PART 2 PRODUCTS

2.01 FLEXIBLE BASE

- A. Flexible base shall be per TXDOT Item 247 Type A Grade 1 or 2.

2.02 GEOGRID

- A. TXDOT DMS-6240 Geogrid (Type 1)

2.03 SOURCE QUALITY CONTROL

- A. CONTRACTOR: Perform tests necessary to locate acceptable source of materials meeting specified requirements.
- B. Final approval of aggregate material shall be based on materials' test results on installed materials.

- C. Should separation of coarse from fine materials occur during processing or stockpiling, immediately change methods of handling materials to correct uniformity in grading.

PART 3 EXECUTION

3.01 CLEANING

- A. Remove excess material; clean stockpile areas of aggregate.

3.02 SUBGRADE PREPARATION

- A. Scarify subgrade and compact to a minimum of 95% of maximum dry density (TxDOT Test Method TEX-113-E) at a moisture content @1% to 6% of optimum.
- B. Where P.I. of subgrade material is 20 or greater, subgrade shall be lime stabilized. Apply hydrated lime at a minimum rate of 6% by weight.
- C. Apply emulsified asphalt SS-1 at 0.25 gallon per square yard, if the subgrade is treated with lime.
- D. Obtain Owner's acceptance of subgrade before placement of base course rock. The subgrade shall be shaped to conform as shown on the drawings.
- E. Do not place base materials in snow or on soft, muddy, or frozen subgrade.

3.03 EQUIPMENT

- A. Compaction Equipment: Adequate in design and number to provide compaction and obtain the specified density for each layer.
- B. The Contractor shall sprinkle water for dust control as directed by the Owner.

3.04 HAULING AND SPREADING

- A. Hauling Materials:
 - 1. Do not haul over surfacing in process of construction.
 - 2. Loads: Of uniform capacity.
 - 3. Maintain consistent gradation of material delivered; loads of widely varying gradations will be cause for rejection.
- B. Spreading Materials:
 - 1. Distribute material to provide required density, depth, grade and dimensions with allowance for subsequent lifts.
 - 2. Produce even distribution of material upon roadway without segregation.
 - 3. Should segregation of coarse from fine materials occur during placing, immediately change methods of handling materials to correct uniformity in grading.

3.05 CONSTRUCTION OF COURSES

- A. General: Complete each lift in advance of laying succeeding lift to provide required results and adequate inspection.
- B. Asphalt Treated Base:

1. Completed Asphalt Treated Base Total Thickness: as shown on drawings.
2. Spread lift on preceding course to required cross-section.
3. Lightly blade and roll surface until thoroughly compacted.
4. Blade or broom surface to maintain true line, grade, and cross-section. This surface shall be smooth and in conformity with the grades as shown on the drawings.

3.06 ROLLING AND COMPACTION

- A. Commence compaction of each layer of base after spreading operations and continue until density of 95 percent of maximum dry density has been achieved as determined by TxDOT Test Method TEX 126-E.
- B. Roll each course of surfacing until material shall not creep under roller before succeeding course of surfacing material is applied.
- C. Commence rolling at outer edges of surfacing and continue toward center; do not roll center of road first.
- D. Place and compact each lift to required density before succeeding lift is placed.
- E. Bind up preceding course before placing surfacing. Remove floating or loose stone from surface.
- F. Blade or otherwise work surfacing as necessary to maintain grade and cross-section at all times, and to keep surface smooth and thoroughly compacted.
- G. Surface Defects: Remedy surface defects by loosening and rerolling. Reroll entire area, including surrounding surface, until thoroughly compacted.
 1. Finished Surface: True to grade and crown before proceeding with surfacing.

3.07 SURFACE TOLERANCES

- A. Finished Surface of Asphalt Treated Base: Within plus or minus 0.04-foot of grade shown at any individual point.
- B. Compacted Surface of Asphalt Treated Base: Within 0.04-foot from lower edge of 10-foot straight edge placed on finished surface, parallel to centerline.
- C. Overall Average: Within plus or minus 0.01-foot from crown and grade specified.

3.08 FIELD QUALITY CONTROL

- A. In-Place Density Tests:
 1. Construct asphalt treated base so areas shall be ready for testing.
 2. Allow reasonable length of time for testing laboratory to perform tests and obtain results during normal working hours.
 3. Show proof that areas meet specified requirements before identifying density test locations.
 4. Perform a minimum of 2 tests on completed asphalt treated base in accordance with TxDOT Test Method TEX 126-E at locations acceptable to Owner.

END OF SECTION

SECTION 32 12 16

ASPHALT PAVING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish labor, materials, equipment and incidentals necessary to perform operations in connection with the construction of hot mix asphaltic concrete (HMAC) base course, leveling-up course and surface course or any other combination of these courses. Construct the pavement on the previously completed and approved subgrade, base, or existing pavement.

1.02 RELATED WORK

- A. Division 01 – General Requirements

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 – Submittal Procedures and shall include:
 1. Aggregate gradation test reports for coarse and fine aggregates
 2. A mix design
 3. Mixing Plant certification by Texas Department of Transportation (TXDOT)

1.04 REFERENCE STANDARDS

- A. Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges - Texas Department of Transportation (TXDOT Current Edition)
- B. Tex-204-F – Design of Bituminous Mixtures
- C. Tex-207-F – Determining Density of Compacted Bituminous Mixtures

1.05 QUALITY ASSURANCE

- A. The CONTRACTOR shall retain a qualified independent testing laboratory to prepare a mix design to comply with TXDOT Standard Specification Item 340 - Hot Mix Asphaltic Concrete Pavement.
- B. The CONTRACTOR will retain a qualified independent testing laboratory to perform the field inspections and tests. When such testing indicates that Contractor's work does not comply with the specified requirements, the CONTRACTOR will be responsible the cost of additional testing.

1.06 DELIVERY, HANDLING AND STORAGE

- A. Haul the asphaltic mixture to the job site in tight vehicles previously cleaned of foreign materials. Arrange the dispatching of vehicles so that all material delivered shall be placed and all rolling shall be completed during daylight hours. In cool weather, or for

long hauls, canvas covers may be required. The inside of the truck body shall be given a light coating of oil to prevent the asphaltic mixture from adhering to the body.

1.07 MEASUREMENT AND PAYMENT

- A. Hot Mix Asphaltic Concrete Pavement shall be measured by square yard, complete in place, for the thickness specified on the plans. Limits of payment will be from face of curb to face of curb. Pavement area shall not exceed the limits shown on the plans without written authorization.
- B. The work performed and materials furnished, as described by this item and measured as provided herein, shall be paid for at the contract unit bid price per square yard specified on the plans of "HOT MIX ASPHALTIC CONCRETE PAVEMENT," which price shall be full compensation for furnishing and placing all materials, and for all labor, tools, equipment, and incidentals necessary to complete the work. The prime coat and tack coat, when required, shall be paid under the provisions of Sections 32 12 16.01 and 32 12 16.02, respectively.
 - 1. Hot Mix Asphaltic Pavement Type D - per square yard 4"

PART 2 PRODUCTS

2.01 MATERIALS

- A. Aggregate: Conform to TXDOT Standard Specification Item 340.

Gradation for surface course shall comply with Type D listed as follows:

Type "D" (Fine-Graded Surface Course):

<i>Sieve Size</i>	<i>% passing by weight or volume</i>
1/2"	100
3/8"	85-100
No. 4	50-70
No. 10	32-42
No. 40	11-26
No. 80	4-14
No. 200	1-6
VMA % Minimum	14

The asphalt content shall be from four (4) to eight (8) percent of the mixture by weight.

- B. Asphaltic Materials: The grade of asphalt shall be AC-20. Other grades of asphalt shall be considered if weather conditions or mix design appear to warrant a change. Prime

coat shall be cut back asphalt MC-30 and tack coat shall be emulsified asphalt SS-1. Prime coat and tack coat shall comply with TXDOT Standard Specification Item 300-Asphalts, Oils and Emulsions.

2.02 MIXES

- A. The CONTRACTOR shall retain a testing laboratory to prepare design mixes. Mix shall be designed in accordance with Construction Bulletin C-14 and Test Method Tex-204-F to conform to the requirements herein.
- B. Density: The mixture shall be designed to produce a density of 94.5 to 97.5 percent, when tested in accordance with TXDOT Test Method Tex-207-F.
- C. Stability: The material used in the mix design shall produce a mixture with a stability value of at least 35, unless otherwise indicated on Drawings, when tested in accordance with TXDOT Test Method Tex-208-F.

PART 3 EXECUTION

3.01 FIELD TESTING

- A. Surface Tests
 - 1. The finished surface of the pavement after compression shall be smooth and true to the established line, grade, and cross section. When tested with a 16' straightedge placed parallel to the centerline of the roadway, the finished surface shall have no deviation in excess of 1/16" per foot from the nearest point of contact. The maximum ordinate measured from the face of the straightedge shall not exceed 1/4" at any point. Any point in the pavement surface not meeting these requirements shall be immediately corrected.
- B. Pavement Thickness Test
 - 1. Upon completion of the work and before final acceptance shall be made, pavement thickness test shall be made by the OWNER's Representative or authorized representative unless otherwise specified in the special provisions or in the Drawings. The number and location of tests shall be at the discretion of the OWNER's Representative. The cost for the initial pavement thickness test shall be at the expense of the OWNER. In the event a deficiency in the thickness of the pavement is revealed during normal testing operations, subsequent tests necessary to isolate the deficiency shall be at the CONTRACTOR's expense. The cost for the additional coring test shall be at the same rate charged by commercial laboratories.
- C. Stability Tests
 - 1. The paving mixture shall have a retained stability of not less than 70 percent when tested in accordance with ASTM Standard Procedure D1075.

3.02 EQUIPMENT

- A. The equipment necessary for the construction of the hot mix asphaltic concrete pavement shall be on the project site and shall be approved by the OWNER's Representative as to condition before the CONTRACTOR shall be permitted to begin

construction operations on which the equipment is to be used. Equipment shall be maintained in good repair and operating condition.

B. Spreading and Finishing Machines

1. The spreading and finishing machine shall be of a type approved by the OWNER's Representative and capable of producing a surface that shall meet the requirements of the typical cross section and surface test.

C. Rollers

1. Pneumatic Tire Roller

- a. The roller shall consist of not less than seven (7) pneumatic tire wheels, running on axles in such a manner that the rear group of tires shall cover the entire gap between adjacent tires of forward group; mounted in a rigid frame; and provided with a loading platform or body suitable for ballast loading. The front axle shall be attached to the frame in such a manner that the roller may be turned within a minimum circle. The tire shall afford surface contact pressures up to 90 pounds per square inch or more. The roller shall be so constructed as to operate in both forward and a reverse direction with suitable provisions for moistening the surface of the tires while operating; and shall be approved by the OWNER.

2. Two Axle Tandem Roller

- a. The roller shall be an acceptable power-driven, steel-wheel tandem roller weighing not less than eight (8) tons. The roller must operate in forward and reverse directions; contain provisions for moistening the surface of the wheels while in motion; and shall be approved by the OWNER.

3. Three Wheel Roller

- a. The roller shall be an acceptable power-driven, all steel three (3) wheel roller weighing not less than ten (10) tons. The roller must operate in forward and reverse directions; contain provisions for moistening the surface of the wheels while in motion; and shall be approved by the OWNER.

4. Vibratory Steel Wheel Roller

- a. If approved for use by the OWNER's Representative, this roller shall have a minimum weight of six (6) tons. The CONTRACTOR shall be equipped with amplitude and frequency controls and shall be specifically designed to compact the material on which it is used. The roller shall be operated in accordance with the Supplier's recommendations.

D. Straightedges

1. The CONTRACTOR shall provide acceptable straightedges for the surface testing. Satisfactory templates shall be provided as required by the Owner's Representative.

3.03 SUBGRADE PREPARATION

A. The subgrade shall be excavated and shaped to the lines and grades as shown on the Drawings.

B. Irregularities of more than 1/2 inch, as shown by straightedge or template, shall be corrected.

- C. The subgrade shall be uniformly compacted to at least 95 percent of the maximum dry density as determined by ASTM D698. Moisture content shall be at 1 to 6 percent of optimum moisture content.
- D. The prepared subgrade shall be wetted down sufficiently.
- E. Where plasticity index of subgrade materials is 20 or greater, subgrade shall be modified.
- F. Lime treatment of subgrade is specified in Section 32 11 13.13 - Lime Treated Sub-Grade.
- G. Apply emulsified asphalt SS-1 at 0.25 gallon per square yard; if the subgrade is treated with lime.
- H. The prepared subgrade shall be wetted down sufficiently in advance of placing the pavement to ensure its being in a firm and moist condition.
- I. Sufficient subgrade shall be prepared in advance to ensure satisfactory prosecution of the work.
- J. After the specified moisture and density are achieved, the CONTRACTOR shall maintain the subgrade moisture and density in accordance with this Section.
- K. In the event that rain or other conditions may have adversely affected the condition of the subgrade or base, additional tests may be required by the Independent Testing Laboratory.
- L. The CONTRACTOR shall notify the Owner's Representative at least 24 hours in advance of paving operation.

3.04 PREPARATION

- A. Temperature
 - 1. Do not apply prime coat when the air temperature is below 50⁰ F and falling, but may be applied when the air temperature is above 40⁰ F and rising, the air temperature being taken in the shade and away from artificial heat. Do not place asphaltic material when general weather conditions, in the opinion of the Owner are not suitable.
 - 2. The asphaltic mixture shall be at a temperature between 225⁰ and 350⁰ F when dumped from the mixer. The testing laboratory shall take the temperature of the mixture at the mixer. The temperature of the mixture when dumped from the mixer shall not vary more than 30⁰ F from the selected temperature.
- B. Prime Coat
 - 1. Apply a uniform coat of prime coat asphaltic material to the surface of the prepared subgrade, sub-base, or base, applied at a rate of not less than 0.20 gallon per square yard of surface. Apply a thin uniform coat of the prime coat material to contact surfaces of gutters, manholes, and other structures.

- C. Tack Coat
 - 1. Thoroughly clean the surface of the asphalt base course and apply a uniform coat of tack material meeting the requirements for cutback asphalt MC-30. Apply a tack coat when the surface to be paved is portland cement concrete, brick, or asphaltic pavement. Apply the tack coat using sprayer at a rate not exceeding 0.05 gallon per square yard surface. Paint contact surfaces of curbs, gutters, vertical faces, and other structures in actual contact with asphaltic mixes with asphaltic material to provide a closely bonded, watertight joint.

- D. Compacted Thickness of Asphaltic Concrete Surface Courses and Base Courses
 - 1. Surface Course
 - a. The compacted thickness or depth of the asphaltic concrete surface shall be as indicated on the Drawings. Where the Drawings indicate a depth or thickness of the surface course greater than two (2) inch compacted depth, same shall be placed in multiple courses of equal depth, each which shall not exceed two (2) inch compacted depth. A tack coat shall be applied at the specified rate on each multiple courses.

3.05 PLACEMENT

- A. Place the asphaltic mixture on an approved subgrade or base course with the previously specified spreading and finishing machine in such a manner that, when properly compacted, the finished course shall comply with the maximum thickness requirements, shall be smooth, of uniform density and meet the requirements of the typical cross sections and the surface test. During the placing and spreading of the asphaltic material, take care to prevent the spilling of the material onto adjacent pavement, gutters, or structures.

- B. In small areas, which are inaccessible to the spreading and finishing machine, hand spreading may be authorized by the Owner, provided an acceptable surface can be obtained.

- C. Lifts shall be no more than 2.5-inches thick (compacted thickness). Design HMAC thickness greater than 2.5-inches shall be placed in two lifts with appropriate tack coat between lifts.

3.06 COMPACTION

- A. Rolling with the 3-wheel and tandem rollers shall start longitudinally at the sides and proceed toward the center of the surface course, overlapping on successive trips by at least half the width of the rear wheels. Alternate trips of the roller shall be slightly different in length. Rolling with the pneumatic tire roller shall be done as directed by the OWNER's Representative. Rolling shall continue until no further compression can be obtained and all roller marks are eliminated. The motion of the rollers shall be slow enough at all times to avoid displacement of the asphaltic surface material. If displacement should occur, correct the situation at once by the use of rakes and fresh asphaltic mixtures. The roller shall not be allowed to stand on the surface course when it has not been fully compacted and allowed to cool. To prevent adhesion of the surface to the roller, the wheels shall be kept thoroughly moistened with water, but an excess

of water shall not be permitted. Rollers shall be in good mechanical condition. Take the necessary precautions to prevent the dripping of gasoline, oil, grease, or other foreign matter on the surface course while the rollers are in motion or when standing. In areas where surface course cannot be compacted with the roller, hand tamps, lightly oiled, and shall be used to secure the required compaction.

- B. With approval by the OWNER, the vibratory steel wheel roller may be substituted for the 3-wheel roller and tandem roller. Each course, after final compaction, shall contain from five (5) to nine (9) percent air voids determined by TXDOT Test Method Tex 207-F.

END OF SECTION

SECTION 32 12 16.01

PRIME COAT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This item shall govern for the application of asphaltic material on the completed base course and/or other areas in accordance with this specification and as directed by the ENGINEER.

1.02 MEASUREMENT AND PAYMENT

- A. The asphaltic material for prime coat will be measured at the point of delivery on the project in gallons at the applied temperature. The quantity to be paid for shall be the number of gallons of asphaltic material used, as directed, in the accepted prime coat to the pay limits as shown on the plans. When emulsions are used, only that percentage of emulsified asphalt as a percentage by volume of the total mixture shall be paid for by the gallon of asphaltic material used in the accepted prime coat. Water used will not be measured for payment.
- B. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "PRIME COAT" of the type and grade of bituminous material specified. This price is full compensation for cleaning and sprinkling the area to be primed; materials, including blotter material; and rolling, equipment, labor, tools, and incidentals.
 - 1. Prime Coat – per gallon

PART 2 PRODUCTS

2.01 MATERIALS

- A. Provide materials in accordance with the following requirements:
 - 1. Bituminous. Unless the type and grade are shown on the plans, utilize an MC-30 or AE-P asphalt cement in accordance with Item 300, "Asphalts, Oils, and Emulsions" of the Standard Specifications of the Texas Department of Transportation for prime coat. Where Emulsified Asphalts are used, the amount of emulsified asphalt as a percentage by volume of the total mixture shall be within the limits shown on the plans or shall be of a percentage as directed by the ENGINEER.
 - 2. Blotter. Unless otherwise shown on the plans or approved, use either base course sweepings obtained from cleaning the base or sand as blotter materials.

2.02 EQUIPMENT

- A. Provide applicable equipment in accordance with this specification or as specified on the plans.
- B. Distributor. Furnish a distributor that will apply the asphalt material uniformly at the specified rate or as directed.

1. Transverse Variance Rate. When a transverse variance rate is shown on the plans, confirm that the nozzles outside the wheel paths will output a predetermined percentage more of asphalt material by volume than the nozzles over the wheel paths.
2. Calibration. a. Transverse Distribution. Furnish a distributor test report, no more than 1 year old, documenting that the variation in output for individual nozzles of the same size does not exceed 10% when tested at the greatest shot width in accordance with Tex-922- K, "Calibrating Asphalt Distribution Equipment," Part III.

Include the following documentation on the test report:

- a. the serial number of the distributor,
- b. a method that identifies the actual nozzle set used in the test, and
- c. the fan width of the nozzle set at a 12 inch bar height.

When a transverse variance rate is required, perform the test using the type and grade of asphalt material to be used on the project. The Engineer may verify the transverse rate and distribution at any time. If verification does not meet the requirements, correct deficiencies, and furnish a new test report.

3. Tank Volume. Furnish a volumetric calibration and strap stick for the distributor tank in accordance with Tex-922-K, "Calibrating Asphalt Distribution Equipment," Part I. Calibrate the distributor within the previous 3 years of the date first used on the project. The Engineer may verify calibration accuracy in accordance with Tex-922-K, "Calibrating Asphalt Distribution Equipment," Part II.
4. Computerized Distributor. When paying for asphalt material by weight, the ENGINEER may allow use of the computerized distributor display to verify application rates. Verify application rate accuracy at a frequency acceptable to the Engineer.
5. Broom. Furnish rotary, self-propelled brooms.
6. Rollers. Rollers provided shall meet the requirements for their type.
7. Asphalt Storage and Handling Equipment. When the plans or the ENGINEER allows storage tanks, furnish a thermometer in each tank to indicate the asphalt temperature continuously. Keep equipment clean and free of leaks. Keep asphalt material free of contamination.
8. Digital Measuring Instrument. Furnish a vehicle with a calibrated digital-measuring instrument accurate to ± 6 ft. per mile.

PART 3 EXECUTION (NOT USED)

3.01 CONSTRUCTION

- A. General. Apply the mixture when the air temperature is 60°F and above, or above 50°F and rising. Measure the air temperature in the shade away from artificial heat. The ENGINEER will determine when weather conditions are suitable for application.

Do not permit traffic, hauling, or placement of subsequent courses over freshly constructed prime coats. Maintain the primed surface until placement of subsequent courses or acceptance of the work.

- B. Surface Preparation. Prepare the surface by sweeping or other approved methods. When directed, before applying bituminous material, lightly sprinkle the surface with water to control dust and ensure absorption.
- C. Application.
 - 1. Bituminous. The ENGINEER will select the application temperature within the limits recommended in Item 300, "Asphalts, Oils, and Emulsions." of the Standard Specifications of the Texas Department of Transportation. Apply material within 15°F of the selected temperature.

Unless otherwise shown on the plans, prime coat shall be applied at a rate not to exceed 0.20 gallon per square yard of surface. The prime coat shall be applied evenly and smoothly, under a pressure necessary for proper distribution.

When emulsified asphalts are used as prime coat, agitate the water and emulsified asphalt to produce a uniform blend. Evenly distribute, at the rate specified, to locations shown on the plans or as directed. Regulate the percentage of emulsified asphalt in the mixture and distribute successive applications to achieve the specified rate, if necessary.

During the application of prime coat, care shall be taken to prevent splattering of adjacent pavement, curb and gutters or structures. When directed, roll the freshly applied prime coat with a pneumatic-tire roller to ensure penetration.

END OF SECTION

SECTION 32 12 16.02

TACK COAT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Apply asphaltic material on the completed base course after the prime coat has sufficiently cured, existing pavement, bituminous surface, or in the case of a bridge, on the prepared floor slab in accordance with these specifications and/or as directed by the ENGINEER.

1.02 MEASUREMENT AND PAYMENT

- A. The asphaltic material for tack coat will be measured at point of delivery on the project in gallons at the applied temperature. The quantity to be paid for shall be the number of gallons of asphaltic material used, as directed, in the accepted tack coat. Water used with Emulsions will not be measured for payment.
- B. The work performed and materials furnished as prescribed by this item will be paid for at the contract unit price bid per gallon for "TACK COAT" which price shall be full compensation for cleaning the surface, for furnishing, heating, hauling and distributing the tack coat as specified; for all freight involved; and for all manipulations, labor, tools, equipment, and incidentals necessary to complete the work.
 - 1. Tack Coat – per gallon

PART 2 PRODUCTS

2.01 MATERIALS

- A. The asphaltic material used for Tack Coat shall meet the requirements for "Asphalt Cement", "Cut-Back Asphalt" or "Emulsified Asphalt" in Item No. 300, "Asphalts, Oils and Emulsions" of the Texas Department of Transportation Standard Specifications. The asphaltic material used for Tack Coat shall be the type or grade shown in the referring specification, or on the plans, or as directed/approved by the ENGINEER.

2.02 EQUIPMENT

- A. Provide equipment that conforms to the requirements of Section 32 12 16.01 - Prime Coat," Part 2, "Equipment".

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Before the tack coat is applied, the surface shall be cleaned thoroughly with a vacuum sweeper to the satisfaction of the ENGINEER. The asphaltic material shall be applied on the clean surface by an approved type of self-propelled pressure distributor evenly and smoothly under a pressure necessary for proper distribution.

The tack coat shall be applied at the rate specified by the referring specification or on the plans. Unless otherwise stated or allowed by the ENGINEER the application rate shall not exceed 0.05 gallon per square yard of surface.

Where the pavement mixture will adhere to the surface on which it is to be placed without the use of a tack coat, the tack coat may be eliminated by the ENGINEER. All contact surfaces of curbs and structures and all joints shall be painted with a thin uniform coat of the asphaltic material used for tack coat. During the application of tack coat, care shall be taken to prevent splattering of adjacent pavement, curb and gutters or structures.

END OF SECTION

SECTION 32 12 16.16

HOT APPLIED THERMOPLASTIC PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Apply thermoplastic pavement markings, in conformance with the minimum optical and physical properties required for a thermoplastic road marking compound described herein, in a molten state, onto a pavement surface.

1.02 MEASUREMENT AND PAYMENT

- A. Measurement shall be based on the length of satisfactorily installed line, in feet, or as appropriate, the number of symbols or words which are satisfactorily installed on the roadway surface by the CONTRACTOR.
- B. Payment shall be according to the quantities measured for each bid item.
 - 1. 4 inch wide white line – per linear foot
 - 2. 8 inch wide white line – per linear foot
 - 3. Right White Arrow – per each
 - 4. Straight White Arrow – per each

PART 2 PRODUCTS

2.01 MATERIALS

- A. All materials shall conform to the requirements of TxDOT DMS-8220 "Hot Applied Thermoplastic." Thermoplastic materials shall be stored in a dry environment to minimize the amount of moisture retained during storage.

2.02 EQUIPMENT

- A. Provide the necessary equipment to conduct the work specified herein. All equipment shall be maintained in good working order such that neat and clean thermoplastic markings are applied at the proper thicknesses and glass beads are placed at the correct rate. Equipment that is deemed deficient by the Engineer shall be replaced immediately.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. The appearance of the finished markings shall have a uniform surface, crisp edges with a minimum over-spray, clean cut-off, meet straightness requirements and conform to the design drawings and/or engineer instructions.

The CONTRACTOR shall provide the ENGINEER with certification from the marking manufacturer that the CONTRACTOR has been adequately trained and certified to apply the manufacturer's material. This certification shall be considered current if the

certification date provided by the manufacturer is within two years of the date of marking application.

All striping and pavement markings shall be placed in accordance with the requirements of this specification, the detailed plans, and the current edition of the Texas Manual on Uniform Traffic Control Devices (TMUTCD). The CONTRACTOR shall provide all other engineering services necessary for pre-marking of all proposed stripe within the limits of the designated work.

Unless authorized otherwise in writing by the ENGINEER, striping shall be accomplished during daylight hours. Approved lighting arrangements will be required for night time operations when allowed.

The CONTRACTOR may be required to place markings over existing markings, as determined by the ENGINEER. The CONTRACTOR shall adjust the operation of the thermoplastic screed shoe to match the previous lengths of stripes and skips, when necessary.

Failure of the striping material to adhere to the pavement surface during the life of the contract shall be prima facie evidence that the materials, even though complying with these specifications, or the application thereof, was inconsistent with the intent of the requirements for the work under the latest City specifications and shall be cause for ordering corrective action or replacement of the marking without additional cost to the City.

Unless otherwise approved by the ENGINEER, permanent pavement markings on newly constructed pavements surfaced with asphaltic concrete or bituminous seals shall not be applied for a minimum of 14 days or a maximum 35 days. Temporary pavement marking shall be provided during the 14 to 35 day period.

B. Surface Preparation.

1. Moisture. All surfaces shall be inspected for moisture content prior to application of thermoplastic. Approximately two square feet of a clear plastic or tar paper shall be laid on the road surface and held in place for 15 to 20 minutes. The underside of the plastic or tar paper shall then be inspected for a buildup of condensed moisture from the road surface. Pavement is considered dry if there is no condensation on the underside of the plastic or tarpaper. In the event of moisture, this test shall be repeated until there is no moisture on the underside of the plastic or tar paper.
2. Cleaning. All surfaces shall be clean and dry, before thermoplastic can be applied. Loose dirt and debris shall be removed by thoroughly blowing compressed air over the area to be striped. If the thermoplastic is to be applied over existing paint lines, the paint line shall be swept with a mechanical sweeper or wire brush to remove poorly adhered paint and dirt that would interfere with the proper bonding of the thermoplastic. Additional cleaning through the use of compressed air may be required to remove embedded dirt and debris after sweeping. Latence and curing compound shall be removed from all new portland cement concrete surfaces.
3. Layout. The pavement markings shall be placed in proper alignment with guidelines established on the roadway. Deviation from the alignment established shall not exceed 2 inches and, in addition, the deviation in alignment of the marking being

placed shall not exceed 1 inch per 200 feet of roadway nor shall any deviation be abrupt.

No striping material shall be applied over a guide cord; only longitudinal joints, existing stripes, primer, or other approved type guides will be permitted. In the absence of a longitudinal joint or existing stripe, the CONTRACTOR shall mark the points necessary for the placing of the proposed stripe. Edge striping shall be adjusted as necessary so that the edge stripe will be parallel to the centerline and shall not be placed off the edge of the pavement.

Longitudinal markings shall be offset at least 2-inches from construction joints of portland cement concrete surfaces and joints and shoulder breaks of asphalt surfaces.

4. **Primer Sealer.** Primer sealer shall be used on all portland cement concrete surfaces. A primer sealer shall be used on asphalt surfaces that are over two years old and/or on asphalt surfaces that are worn or oxidized to a condition where 50 percent or more of the wearing surface is exposed aggregate. Existing pavement markings may act as the primer sealer if, after cleaning, more than 70 percent of the existing pavement marking is still properly bonded to the asphalt surface (see coverage check procedure in Appendix A to estimate percent of marking remaining).
5. **Primer Sealer Application.** When required as described, the primer-sealer shall be applied to the road surface in a continuous film at a minimum thickness of 3 to 5 mils. Before the Thermoplastic is applied, the primer-sealer shall be allowed to dry to a tacky state. The thermoplastic shall be applied within 4 hours after the primer application.

C. **Temperature Requirements.**

1. **Ambient Conditions.** The ambient air and road surface shall be 55°F and rising before application of thermoplastic can begin.
2. **Material Requirements.** Unless otherwise specified by the material manufacturer, the thermoplastic compound shall be heated from 400°F to 450°F and shall be a minimum of 400°F as it makes contact with road surface during application. An infrared temperature gun shall be used to determine the temperature of the thermoplastic as it is being applied to the road surface.

D. **Drop-on Glass Sphere Application.**

1. **Application Rate.** Retro-reflective glass spheres shall be applied at the rate of 10 pounds per 100 square feet of applied markings. This application rate shall be determined by confirming the following consumption rates:
 - a. 200 pounds of drop on glass spheres per ton of applied thermoplastic when the thermoplastic is being applied at 0.090 inch film thickness.
 - b. 150 pounds of drop on glass spheres per ton of applied thermoplastic when the thermoplastic is being applied at 0.125 inch thickness.
2. **Application Method.** Retro-reflective glass spheres shall be applied by a mechanical dispenser properly calibrated and adjusted to provide proper application rates and uniform distribution of the spheres across the cross section of the entire width of the line. To enable the spheres to embed themselves into the hot thermoplastic, the sphere dispenser shall be positioned immediately behind the thermoplastic

application device. This ensures that the spheres are applied to the thermoplastic material while it is still in the molten state.

E. Application Thickness.

1. Longitudinal and Transverse Markings. On previously unmarked pavements or pavements where markings have been effectively removed, all lane lines, center lines, transverse markings and pavement markings in traffic areas with $\leq 1,000$ vehicles per day per lane shall have a minimum film thickness of 0.090 inch at the edges and a maximum of 0.145 inch at the center. A minimum average film thickness of 0.090 inch shall be maintained. On pavements with existing markings, meeting the traffic requirements stated above, all lane lines, center lines, transverse markings and pavement markings shall have a minimum film thickness of 0.060 inch for re-application over existing strip line.
2. High Wear Longitudinal and Transverse Marking. On previously unmarked pavements or pavements where markings have been effectively removed, all lane lines, center lines, transverse markings and pavement markings in high traffic areas ($>1,000$ vehicles per day per lane) shall have a minimum film thickness of 0.125 inch at the edges and a maximum of 0.188 inch at the center. A minimum average film thickness of 0.125 inch shall be maintained. On pavements with existing markings, meeting the traffic requirements stated above, all lane lines, center lines, transverse markings and pavement markings shall have a minimum film thickness of 0.090 inch for re-application over existing strip line.

F. Packaging.

1. Containers. The thermoplastic material shall be delivered in 50 pound containers or bags of sufficient strength to permit normal handling during shipment and handling on the job without loss of material.
2. Labeling. Each container shall be clearly marked to indicate the color of the material, the process batch number and/or manufacturer's formulation number, the manufacturer's name and address and the date of manufacture.

G. Acceptance.

1. Sampling Procedure. Random samples may be taken at the job site at the discretion of the Engineer for quality assurance. The owner reserves the right to conduct the tests deemed necessary to identify component materials and verify results of specific tests indicated in conjunction with the specification requirements.

The sample(s) shall be labeled as to the shipment number, lot number, date, quantity, and any other pertinent information. At least three randomly selected bags shall be obtained from each lot. A 10 pound) sample from the three bags shall be submitted for testing and acceptance. The lot size shall be approximately 44,000 pounds unless the total order is less than this amount.

2. Manufacturer's Responsibility.

- a. Sampling and Testing. The manufacturer shall submit test results from an approved independent laboratory. All material samples shall be obtained 20 days in advance of the pavement marking operations. The cost of testing shall be included in the price of thermoplastic material. The approved independent laboratory's test results shall be submitted to the City Traffic Engineer in the form of a certified test report.
 - b. Bill of Lading. The manufacturer shall furnish the Material and Tests Laboratory with copies of Bills of Lading for all materials inspected. Bill of lading shall indicate the consignee and the destination, date of shipment, lot numbers, quantity, type of material, and location of source.
 - c. Material Acceptance. Final acceptance of a particular lot of thermoplastic will be based on the following.
 - (i) Compliance with the specification for material composition requirements verified by approved independent laboratory with tests results.
 - (ii) Compliance with the specification for the physical properties required and verified by an approved independent laboratory with test results.
 - (iii) Manufacturer's test results for each lot thermoplastic have been received.
 - (iv) Identification requirements are satisfactory.
3. CONTRACTOR's Responsibility.
- a. Notification. The CONTRACTOR shall notify the Construction Inspector 72 hours prior to the placement of the thermoplastic markings to enable the inspector to be present during the application operation. At the time of notification, the CONTRACTOR shall indicate the manufacturer and the lot numbers of the thermoplastic that will be used. A check should be made by the CONTRACTOR to ensure that the approved lot numbers appear on the material package. Failure to do so is cause for rejection.
 - b. Warranty or Guarantee. If the normal trade practice for manufacturers is to furnish warranties or guarantees for the materials and equipment specified herein, the CONTRACTOR shall turn the guarantees and warranties over to the Engineer for potential dealing with the manufactures. The extent of such warranties or guarantees will not be a factor in selecting the successful bidder

END OF SECTION

SECTION 32 13 13
CONCRETE PAVING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals and perform all operations required to construct concrete pavement, driveways, parking lots and sidewalks as shown on the Drawings and as specified herein to the lines and grades as established by the Contract Documents.

1.02 RELATED WORK

- A. 01 33 00 – Submittal Procedures
- B. 32 11 26 – Asphaltic Base Courses
- C. 32 13 73 – Concrete Paving Joints and Sealants

1.03 SUBMITTALS

- A. Submit shop drawings and product data in accordance with Section 01 33 00 – Submittal Procedures.
 - 1. Design Mixes: Submit concrete mix design for each class of concrete. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - 2. Submit product data for each type of manufactured material to be used in this project.
 - 3. Submit a plan showing the location of pavement, sidewalk and curb joints.
- B. Certifications: Manufacturers of material suppliers shall certify that each of the following materials complies with the requirements of this Sections:
 - 1. Cementitious materials and aggregates
 - 2. Steel reinforcement and reinforcement accessories
 - 3. Admixtures
 - 4. Curing compounds
 - 5. Bonding agent or adhesive
 - 6. Joint fillers

1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
 - 1. A615 – Standard Practice for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
 - 2. C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - 3. C33 – Standard Specification for Concrete Aggregates

4. C39 – Standard Test Method for Compressive Strength of Cylinder Concrete Specimens
 5. C42 – Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
 6. C94 – Standard Specifications for Ready-Mixed Concrete
 7. C150 – Standard Specification for Portland Cement
 8. C260 – Standard Specification for Air Entraining Admixtures for Concrete
 9. C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
 10. C494 – Standard Specification for Chemical Admixtures for Concrete
 11. C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use in Concrete
 12. D698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft³)
- B. American Concrete Institute (ACI)
1. 305.1 – Specification for Hot Weather Concreting
 2. 306.1 – Standard Specification for Cold Weather Concreting
 3. 318 – Building Code Requirements for Reinforced Concrete

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed pavement work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C94 requirements for production facilities and equipment.
 1. Manufacturer shall be certified according to the National Ready Mix Concrete Association's Plant Certification Program.
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.
- E. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by the requirements of the Contract Documents.
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixes.

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

- 1.08 MAINTENANCE/SPARE PARTS (NOT USED)
- 1.09 EXTENDED WARRANTY (NOT USED)
- 1.10 PROJECT CONDITIONS
 - A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- 1.11 DEFINITIONS
 - A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, expansive hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.
- 1.12 MEASUREMENT AND PAYMENT
 - A. Concrete pavement will be measured by the square yard of surface area in place.
 - B. Payment includes full compensation for sand cushion, materials, equipment, labor, tools, and incidentals. The work performed and materials furnished in accordance with this Item and measured as provided will be paid for at the adjusted unit price bid for "CONCRETE PAVEMENT" of the type and depth specified on plans.
 - 1. Concrete Pavement (8" inches of depth) – per square yard

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cement: Cement shall conform to ASTM C150, Type I.
- B. Coarse Aggregate
 - 1. Coarse aggregate shall consist of gravel, crushed gravel, crushed stone, or combination of these materials conforming to ASTM C33. The aggregate shall be free from an excess amount of salt, alkali, vegetable matter, or other objectionable matter. At the time of its use the aggregate shall be free from frozen material and all foreign material which may have become mixed with it in the stockpiles.
 - 2. The coarse aggregate shall consist of sound particles having a percent of wear not more than 45, and when tested by standard laboratory sieves, shall meet the following grading requirements.
 - a. Retained on 1-3/4-inch sieve 0%
 - b. Retained on 1-1/2-inch sieve0 to 5%
 - c. Retained on 3/4-inch sieve..... 30 to 65%
 - d. Retained on 3/8-inch sieve 70 to 90%
 - e. Retained on No. 4 sieve 95 to 100%
 - 3. Coarse aggregate of different characteristics, though tested and approved, shall not be mixed with other aggregates; but shall be stored, batched, and weighed separately.

C. Fine Aggregate

1. Fine aggregate shall consist of sand or a mixture of sands with or without mineral filler conforming to ASTM C33. The sand or mixture of sand comprising fine aggregate shall consist of clean, hard, durable, uncoated grains and shall be free from lumps.
2. The fine aggregate shall be well graded from fine to coarse and when tested by laboratory sieves shall meet the following requirements:
 - a. Retained on 3/8-inch sieve 0%
 - b. Retained on No. 4 sieve 0% to 5%
 - c. Retained on No. 8 sieve0% to 20%
 - d. Retained on No. 16 sieve.....15% to 50%
 - e. Retained on No. 30 sieve.....35% to 75%
 - f. Retained on No. 50 sieve.....70% to 90%
 - g. Retained on No. 100 sieve..... 90% to 100%
 - h. Retained on No. 200 sieve..... 97% to 100%
3. Fine aggregate of different characteristics shall not be mixed prior to batching, but shall be weighed and batched separately.

D. Mineral Filler

1. Stone dust, or crushed sand may be added as mineral filler, if acceptable to the OWNER's Representative, in the amount not to exceed 5% of the fine aggregate to improve the workability of the concrete mix. Mineral filler when tested by standard laboratory sieves shall meet the following requirements:
 - a. Retained on No. 30 sieve..... 0%
 - b. Retained on No. 200 sieve.....0% to 35%

E. Water

1. Water for use in concrete and for curing shall meet the requirements of ASTM C94.
2. Water from municipal supplies approved by State Health Department for drinking will not require testing, but water from other sources shall be sampled and tested before use.

F. Forms

1. The material for forms shall be plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
2. Use flexible or curved forms for curves of a radius 100 feet or less.
3. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

G. Steel Reinforcement

1. Steel reinforcing bars shall be of the size and type indicated and shall conform to the requirements of ASTM A615, Grade 60, deformed. Steel shall be bent cold.

When tie bars are to be bent they shall be grade 40 conforming to the requirements of ASTM A615.

- H. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement bars, and dowels shall be in place prior to concrete placement. Manufacture bar supports according to Concrete Reinforcing Steel Institute (CRSI's) "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than the concrete in which it is to be located.
- I. Steel Dowel Bars: Plain steel bars, conforming to the requirements of ASTM A615, Grade 60. Cut bars true to length with ends square and free of burrs.
- J. Dowel Caps
 - 1. Provide dowel caps where shown on the drawings. Encase one end of each dowel bar with a cap having an inside diameter of 1/16-inch greater than the diameter of the dowel bar. The cap shall be of such strength, durability, and design as to provide free movement of the dowel bar and shall be filled with a soft felt plug or shall be void in order to permit free movement of the dowel bar for a distance of 1-1/2 times the width of the expansion joint used. Securely hold the dowel caps and dowel bars in place.

2.02 CONCRETE MIXES

- A. Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
- B. Proportion mixes to provide concrete with the following properties:
 - 1. Compressive Strength (28 Days) for Pavement, Driveways and Parking Lots: 4,000 psi unless noted otherwise. Minimum six (6) sacks of cement per cubic yard of concrete. Maximum water cement ratio shall be 0.45.
 - 2. Compressive Strength (28 Days) for Sidewalks: 3,000 psi unless noted otherwise. Minimum five and half (5-1/2) sacks of cement per cubic yard of concrete. Maximum water cement ratio shall be 0.50.
 - 3. Slump Limit: 2-1/2 to 4 inches (maximum).

2.03 JOINT FILLER

- A. Joint filler is the material placed in concrete pavement and concrete structures to allow for the expansion and contraction of the concrete.
- B. Expansion joint materials shall consist of wood boards or a fiber board.
- C. Wood Boards
 - 1. Boards for expansion joint filler shall be of the required size, shape and type indicated on the Drawings or required in the specification.

2. Boards shall be selected from stock of redwood or cypress. The boards shall be sound heartwood and shall be free from sapwood, knots, clustered, birdseyes, and splits.

D. Fiber Boards

1. Fiber boards for expansion joint filler shall be of the required size and uniform thickness indicated on the Drawings or required in the specification.
2. Fiber used for filler shall be pre-formed strips which have been formed of cane or other suitable fiber of cellulose nature securely bond together and uniformly and thoroughly impregnated with a suitable asphaltic binder.
3. Fiber joint filler shall meet the requirements of ASTM D1751.

2.04 JOINT SEALANTS

- A. Joint sealant shall in accordance with Section 32 13 73 – Concrete Paving Joints and Sealants

2.05 ADMIXTURES

- A. Provide admixtures produced by established reputable manufacturers, and use in compliance with the manufacturer's printed instructions. Admixtures are specified in Section 03 30 00 – Cast-in-Place Concrete.
- B. Concrete shall be air-entrained and the volume of air in freshly mixed concrete shall be 5%, \pm 1-1/2% of the total volume. The entrained air shall be obtained either by using air entrained cement or air-entraining admixture. Air-entraining admixture shall comply with the requirements of ASTM C260.

2.06 MEMBRANE CURING COMPOUND

- A. Membrane curing compound shall be white pigmented compound conforming to the requirements of ASTM C309, Type 2. It shall not produce permanent discoloration of concrete surfaces nor react deleteriously with the concrete.
- B. The compound shall produce a firm, continuous uniform moisture-impermeable film free from pinholes and shall adhere satisfactorily to the surface of damp concrete.
- C. It shall, when applied to the damp concrete surface at the specified rate of coverage, dry to touch in one (1) hour and dry through in not more than four (4) hours under normal conditions suitable for concrete operations.
- D. It shall adhere in a tenacious film without running off or appreciably sagging.
- E. It shall not disintegrate, peel or crack during the required curing period.
- F. The compound shall not peel or pick up under traffic and shall disappear from the surface of the concrete by gradual disintegration.
- G. The compound shall be delivered to the job site in the manufacturer's original containers only, which shall be clearly labeled with the manufacturer's name, the trade name

of the material and a batch number or symbol with which test samples may be correlated.

- H. The liquid membrane-forming compound shall restrict the loss of water present in the test specimen at the time of application of the curing compound to not more than 0.01-oz. per square inch of surface when tested in accordance with ASTM C156.

PART 3 EXECUTION

3.01 FIELD TESTING

- A. Testing Agency: Engage a qualified testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.
- B. Testing Services: Testing shall be performed according to the following requirements:
 1. Sampling Fresh Concrete: Representative samples of fresh concrete shall be obtained according to ASTM C172, except modified for slump to comply with ASTM C 94.
 2. Slump: ASTM C143; one test at point of placement for each compressive-strength test, but not less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.
 3. Air Content: ASTM C231, pressure method; one test for each compressive-strength test, but not less than one test for each day's pour of each type of air-entrained concrete.
 4. Concrete Temperature: ASTM C1064; one test hourly when air temperature is 40 F and below and when 80 F and above, and one test for each set of compressive strength specimens.
 5. Compression Test Specimens: ASTM C31; and as specified in Section 03 30 00 – Cast-in-Place Concrete.
 6. Compressive Strength Tests: As specified in Section 03 30 00 – Cast-in-Place Concrete.
- C. Test results shall be reported in writing to Owner's Representative, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in pavement, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by OWNER's Representative but will not be used as the sole basis for approval or rejection.
- E. Additional Tests: Testing agency shall make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by OWNER's Representative. Testing agency may con-

duct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed.

3.02 SUBGRADE PREPARATION

- A. The subgrade shall be excavated and shaped to the lines and grades as shown on the Drawings.
- B. Irregularities of more than ½ inch, as shown by straightedge or template, shall be corrected.
- C. The subgrade shall be uniformly compacted to at least 95 percent of the maximum dry density as determined by ASTM D698. Moisture content shall be @1% to 6% of optimum moisture content
- D. The prepared subgrade shall be wetted down sufficiently
- E. Where plasticity index of subgrade materials is 20 or greater, subgrade shall be stabilized.
- F. Lime treatment of subgrade is specified in Section 32 11 13.13 – Lime Treated Subgrade.
- G. Apply emulsified asphalt SS-1 at 0.25 gallon per square yard; if the subgrade is treated with lime.
- H. The prepared subgrade shall be wetted down sufficiently in advance of placing the pavement to ensure its being in a firm and moist condition.
- I. Sufficient subgrade shall be prepared in advance to ensure satisfactory prosecution of the work.
- J. After the specified moisture and density are achieved, the CONTRACTOR shall maintain the subgrade moisture and density in accordance with this Section.
- K. In the event that rain or other conditions may have adversely affected the condition of the subgrade or base, additional tests may be required by the Independent Testing Laboratory.
- L. The CONTRACTOR shall notify the OWNER at least 24 hours in advance of pouring concrete for the pavement.

3.03 PLACING AND REMOVING FORMS

- A. Set forms to line and grade in advance of the paving operations. Forms shall be capable of resisting the pressure of concrete placed against them and the thrust and the vibration of the construction equipment operating upon them without appreciable springing or settlement.

- B. When forms settle over 1/8-inch under finishing operations, paving operations shall be stopped and reset the forms to line and grade, and bring the pavement to the required section and thickness.
- C. Clean forms after each use and coat with form release agent to ensure separation from concrete without damage.
- D. Forms shall remain in place until the concrete has taken its final set. Avoid damage to the edge of the pavement when removing forms. Repair damage resulting from form removal and honeycombed area with a mortar mix within 24 hours after form removal unless otherwise acceptable to the OWNER 's Representative.
- E. When forms are removed before 72 hours after concrete placement, promptly apply membrane curing compound to the edge of the concrete pavement.

3.04 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating reinforcement and with recommendations in CRSI's "Placing Reinforcing Bars" for placing and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Install reinforcing bars and bar mats in the slab at the required depth below the finished surface. Reinforcing bars and bar mats shall be securely attached and supported by bar chairs.
- D. After the reinforcing steel is securely installed above the subgrade, there shall be no loading imposed upon the bar mats or individual bars before or during the placing or finishing of the concrete.

3.05 JOINTS

- A. Construct joints in accordance with Section 32 13 73 – Concrete Paving Joints and Sealants.

3.06 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subgrade surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subgrade to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.

- D. Comply with requirements and with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery, at Project site, or during placement.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- H. Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or darbies to form an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading dry-shake surface treatments.
- I. Cold-Weather Placement: Comply with ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperature has fallen to or is expected to fall below 40°F, heated mixing water or a combination of heated mixing water and heated aggregates shall be used, if required, to raise the concrete temperature to 70°F. The temperature of the heated water or aggregates shall not exceed 150°F when entering the mixer.
 - 2. Concrete placement is not permitted when the air temperature is at or below 35°F. The temperature shall be taken in shade away from artificial heat.
 - 3. Do not use frozen materials or materials containing ice or snow.
 - 4. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
 - 5. When freezing temperatures may be expected during the curing period, the concrete shall be maintained at a temperature of at least 50°F for five days or 70°F for three days after placement. Concrete and adjacent form surfaces shall be kept continuously moist. Sudden cooling of concrete shall not be permitted.
- J. Warm-Weather Placement: The air temperature of the concrete as placed shall not exceed 95 degrees F except where an approved retarder is used. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. In no case shall the placing air temperature exceed 100 degrees F.

3.07 CONCRETE FINISHING

- A. Machine Finishing

1. When the concrete has been deposited, level and strike off concrete to such elevation that when mechanically screeded and temped the concrete is thoroughly compacted and finished to the required line, grade, and section with surface voids filled.
2. After the finishing machine has processed the concrete surface, use the longitudinal float on the surface. Operate the float from parallel bridges or float carriages moving on the side forms. Operate the float transversely across the slab with a sawing motion, always maintaining the float parallel to the center line of the pavement, in such a manner as to remove variations in the surface. Add concrete to fill minor depressions, if needed, during the longitudinal floating operation. The longitudinal float shall not be moved ahead more than 1/2 its length at each time. The longitudinal float must be maintained straight and free from warp at all times. Take care to preserve the true cross-section of the pavement.
3. While the concrete is still workable, test for irregularities with a 10 foot straight edge placed parallel to the center line of the pavement so as to bridge depressions and to touch high spots. Ordinates measured from the face of the straight edge to the surface of the pavement shall at no place exceed 1/16-inch per foot from the nearest point of contact, and in no case shall the maximum ordinate to a 10 foot straight edge be greater than 1/8-inch. Rework and refinish any surface not within tolerance limits.
4. While the concrete is still workable, give the surface final belting in order to produce a uniform surface of gritty texture. This belting shall be of short, rapid, transverse strokes combined with a longitudinal sweeping motion. When the burlap drag is permitted in lieu of the belting, accomplish the burlap drag finish by drawing a wet drag over the surface in a longitudinal direction to produce a uniform surface of a gritty nature.
5. Carefully tool the edges of slabs and joints requiring edging with an edger, of the radius required by the Drawings, at the time the concrete begins to set and becomes non-workable. Leave work smooth and true to lines.

B. Hand Finishing

1. Hand finishing shall be permitted only in intersections, driveways, and parking areas inaccessible to a finishing machine.
2. When the hand method of striking off and consolidating is permitted, level and strike off the concrete, as soon as placed, and screed to such elevation above grade that when consolidated and finished the surface of the pavement is at the grade elevation shown on the Drawings. Vibrate the entire surface to consolidate the concrete so as to ensure maximum compaction and a minimum of voids. For the strike off and consolidation, provide both a strike template and tamping template on the work. Once in operation, move the strike template forward with a longitudinal and transverse motion and manipulate so that neither end of the template is raised from the forms during the striking process. Keep a slight excess of material in front of the cutting edge at all times.
3. The longitudinal floating, straightedging, belting, and joint finishing shall be as specified herein.

3.08 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and follow recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. per hour before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.
- D. Curing
 1. The curing of concrete pavement shall be through and continuous throughout the entire curing period.
 2. Failure to provide proper curing shall be considered as sufficient cause for immediate suspension of the paving operations.
 3. The curing method specified herein does not preclude the use of any of the other commonly used methods of curing.
 4. If any selected method of curing does not afford the desired results, the OWNER shall have the rights to order another curing method be instituted.
 5. After removal of the side forms, the sides of the slab shall receive a like coating before earth is banked against them.
 6. The solution shall be applied, under pressure with a spray nozzle, in such a manner as to cover the entire surfaces thoroughly and completely with a uniform film.
 7. The rate of application shall be such as to ensure complete coverage and shall not exceed 20 square yard per gallon of curing compound.
 8. When thoroughly dry, it shall provide a continuous and flexible membrane, free from cracks or pinholes, and shall not disintegrate, check, peel or crack during the curing period.
 9. If any reason the seal is broken during the curing period, it shall be immediately repaired with additional sealing solution.
 10. When tested in accordance with ASTM C156 Water Retention by Concrete Curing Materials, the curing compound shall provide a film which shall have retained within the test specimen a percentage of the moisture present in the specimen when the curing compound was applied according to the following:

<i>Time</i>	<i>Retained Moisture (Min)</i>
After 24 Hours	97%
After 3 Days	95%
After 7 Days	91%

11. The CONTRACTOR shall maintain and properly repair damage to curing materials on exposed surfaces of concrete pavement continuously for at least 72 hours.

3.09 CLEANING JOINTS

- A. Immediately after sawing the joint, completely remove the resulting slurry from the joint and clean the immediate area by flushing with a jet of water under pressure, and by the use of other tools as necessary. After flushing, blow out the joint with compressed air. When the surfaces are thoroughly clean and dry and just before the joint sealer is placed, use compressed air having a pressure of at least 90 psi to blow out the joint and remove traces of dust. Equip air compressors, used for cleaning joints, with suitable traps capable of removing water and oil in the compressed air.
- B. In the event freshly cut sawed joints become contaminated before they are sealed, re-clean the joints as outlined above.
- C. Cleaning methods shall not alter the joint profile, including rounding of the top corners, or alter the texture of the concrete riding surface. Accomplish cleaning of the joint faces by sand blasting.
- D. Do not leave open, cleaned joints unsealed overnight.

3.10 BACKER ROD INSTALLATION

- A. Prior to placing the baker rod, thoroughly dry and clean the joint. Complete necessary cleaning, air blasting, or air drying before placing backer rod and sealant. If backer rod specified for applicable joint detail are on joints less than 1-inch wide after cleaning, install a round backer rod of resilient material compatible with silicone sealant, and slightly oversized to prevent movement during the sealing operation in the joint at the depth specified on the appropriate joint detail in the Drawings. The thickness of the backer rod shall be greater after squeezing it into the joint and some rebound may occur. Allowance shall be made for rebound to ensure placing at correct depth.
- B. Install backer rod tape in the clean joint prior to the application of the joint sealant.

3.11 SEALANT INSTALLATION

- A. The installation of sealant shall be done soon after cleaning joint and after placing backer rod as reasonably possible to ensure that joint is still clean and dry. In the event the joint does become contaminated, damp, or wet, remove backer rod, clean and dry the joint, and reinstall a new backer rod prior to placing the sealant material. The sealant material used shall be a low modulus silicone sealant material as specified. The temperature of the concrete surface and air at time of placement shall be 40⁰ F or higher. Apply the silicone sealant by pumping only.
- B. The pump shall be of sufficient capacity to deliver the necessary volume of material to completely fill the joint to the specified width and height of sealant in one (1) pass. The nozzle shall be of sufficient size and shape to closely fit into the joint and introduce the sealant inside the joint with sufficient pressure to prevent voids occurring in the sealant and to force the sealant into contact with the joint faces. Tool the sealant, after being placed, to provide the specified recess depth, thickness, and shape of sealant. Apply sufficient force or pressure to the sealant in this tooling operation to force the sealant against the joint faces. The silicone sealant is not self-leveling and will not

position itself correctly in the joint under its own weight. Place the sealant to reasonable close conformity with the dimensions and shape shown on the Drawings.

- C. Remove and discard excess sealant left on the pavement surface. The pavement surface shall present a clean final condition as determined by Owner.
- D. Do not allow traffic on the fresh sealant until it becomes tack free.

3.12 PAVEMENT TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
 1. Elevation: ¼-inch.
 2. Thickness: Plus 3/8-inch, minus ¼-inch.
 3. Surface: Gap below 10-foot long, unleveled straightedge not to exceed ¼-inch.
 4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1-inch.
 5. Vertical Alignment of Tie Bars and Dowels: ¼-inch.
 6. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel ¼-inch per 12-inches.
 7. Joint Spacing: 3-inches.
 8. Contraction Joint Depth: Plus ¼-inch, no minus.
 9. Joint Width: Plus 1/8-inch, no minus.

3.13 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this Section.
- B. Drill test cores where directed by OWNER's Representative when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.
- C. All traffic shall be excluded from the pavement for at least 14 days after placement or unless the OWNER directs to open the section of pavement to traffic at an earlier date. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspection.

END OF SECTION

SECTION 32 13 13.10

CONCRETE CURBS, GUTTERS AND SIDEWALKS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Repair or construct concrete sidewalks, stair steps, curbs and gutters.

1.02 RELATED WORK

- A. Section 31 23 33 – Trenching and Backfilling
- B. Section 32 13 73 – Concrete Paving Joints and Sealants

1.03 SUBMITTALS

- A. Samples: Submit for review samples, applicable manufacturer's product data, test reports and material certifications.
- B. Shop Drawings:
 - 1. Detailed Reinforcing Steel Layout.
 - 2. Detailed Construction And Control Joint Layout.

1.04 REFERENCE STANDARDS

- A. ASTM D 1190, Concrete Joint Sealer Hot Poured Elastic Type.
- B. ASTM D 994-71 (R1977), Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- C. ASTM D 1751-73 (R1978) Preformed Expansion Joint Fillers for concrete Paving Structural Construction.

1.05 QUALITY ASSURANCE (NOT USED)

1.06 PRICE AND PAYMENT PROCEDURES

- A. Sidewalks: By the square foot. Includes preparation of substrate, sand bedding, steel reinforcement, concrete sidewalk, jointing, and finishing.
 - 1. Concrete Sidewalks - Conventionally Formed 4" Thickness per square yard
- B. Concrete Curbs and Gutters: By the linear foot. Includes trenching, steel reinforcement, concrete curb installation, and cleaning.
 - 1. Concrete Curb and Gutter – per linear foot

PART 2 PRODUCTS

2.01 MATERIALS

- A. Unless otherwise specified in this Section, all concrete and concrete materials shall conform to TxDOT, Item 529, "Concrete Curb, Gutter and Combined Curb and Gutter" and Item 531 "Sidewalks".
- B. Bituminous Joint Filler: Bituminous type conforming to ASTM D 994 or D 1751 unless otherwise indicated on drawings.
- C. Steel Reinforcement
 - 1. Reinforcing steel shall be ASTM A 615 grade 60, deformed and conform to the provisions of TxDOT Standard Specifications.
 - 2. All reinforcing steel to be new billet steel.
- D. Fiber Reinforcement
 - 1. Fibrillated Polypropylene Fiber:
 - a. Addition Rate: 1.5 pounds of fiber per cubic yard of concrete.
 - b. Physical Properties:
 - (i) Material: Polypropylene
 - (ii) Length: ½ inch or graded
 - (iii) Specific Gravity: 0.9l.
 - c. Acceptable Manufacturer: W.R. Gracy Company, Fibermesh, or approved equal.
 - 2. Steel Fiber: Comply with applicable provisions of ACI 544 and ASTM A 820.
 - a. Ratio: 50 to 200 pounds of fiber per cubic yard of concrete.
 - b. Physical Properties:
 - (i) Material: Steel
 - (ii) Aspect Ratio (for fiber lengths of 0.5 to 2.5-inch, length divided by diameters or equivalent diameter): 30:1 to 100:1
 - (iii) Specific Gravity: 7.8
 - (iv) Tensile Strength: 40-400 ksi
 - (v) Young's Modulus: 29,000 ksi
 - (vi) Minimum Average Tensile Strength: 50,000 psi
 - (vii) Bending Requirements: Withstand bending around 0.125-inch diameter mandrel to an angle of 90 degrees, at temperatures not less than 60 degrees F, without breaking

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

- A. Preparation of the subgrade including compaction shall be completed two feet (2') beyond the limits of the work:

1. The subgrade shall be uniformly compacted to at least 95 percent of the maximum dry density as determined by ASTM D698. Moisture content shall be @1% to 6% of optimum moisture content.
2. The subgrade shall be brought to the final lines and grades utilizing select backfill.
3. Pit Run Sand or Granular Embedment:
 - a. Pit run sand or granular embedment shall be provided as shown on drawings.

3.02 FORM CONSTRUCTION

- A. Forms shall be in conformance with TxDOT Standard Specification, Item 529, "Concrete Curb, Gutter and Combined Curb and Gutter" and Item 531 "Sidewalks".
- B. Set forms to line and grade. Install forms over full length of curbs, gutters and sidewalks.

3.03 REINFORCEMENT

- A. Locate, place, and support reinforcement as specified in TxDOT Standard Specifications, Item 529, "Concrete Curb, Gutter and Combined Curb and Gutter" and Item 531 "Sidewalks", unless otherwise shown on drawings.

3.04 CONCRETE PLACEMENT

- A. General: Comply with the requirements of TxDOT Standard Specifications, Item 529, "Concrete Curb, Gutter and Combined Curb and Gutter" and Item 531 "Sidewalks".
- B. Machine Formed/Hand Formed:
 1. Automatic curb, gutter and sidewalk machine may be used in lieu of hand formed methods for forming and placing.
 2. Concrete shall have properties as previously specified, except that maximum slump shall be 2-1/2 inches (2 1/2") and air content shall be two percent (2%).
 3. Machine forming shall produce curbs, gutters and sidewalks to the required cross-section, lines, and grades, finish and jointing, as specified for conventionally formed concrete.
 4. Unacceptable work will be removed and replaced at Contractor's expense.

3.05 JOINTS

- A. Construct joints in accordance with Section 32 13 73 – Concrete Paving Joints and Sealants.

3.06 CONCRETE FINISHING

- A. Smooth the exposed surface by screeding and floating.
- B. Work edges of gutter and sidewalks, back top edge of curb, and transverse joints; and round to 1/4-inch radius.
- C. Complete surface finishing by drawing a fine-hair broom across surface, perpendicular to line of traffic unless alternative finish is indicated on drawings.

3.07 CURING

- A. Protect and cure finished concrete curbs, gutters and sidewalks, complying with applicable requirements of TxDOT Standard Specifications, Item 529, "Concrete Curb, Gutter and Combined Curb and Gutter" and Item 531 "Sidewalks".

3.08 REPAIR AND CLEANING

- A. Broken or defective curb, gutters and sidewalks shall be repaired or replaced as directed by the ENGINEER at the CONTRACTOR's expense.
- B. Sweep work and wash free of stains, discolorations, dirt or other foreign material.

END OF SECTION

SECTION 32 13 73

CONCRETE PAVING JOINTS AND SEALANTS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Joints for concrete paving; concrete sidewalks; concrete driveways, curbs, and curb and gutters.
- B. Saw-cutting existing concrete or asphalt pavements for new joints.

1.02 SUBMITTALS

- A. Submit product data and samples in accordance with requirements of Section 01 33 00 - Submittal Procedures.
- B. Submit product data for joint sealing compound and proposed sealing equipment for approval.
- C. Submit samples of dowel cup, metal supports, and deformed metal strip for approval.

1.03 REFERENCE STANDARDS

- A. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- B. ASTM D 994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- C. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-Extruding and Resilient Bituminous Types).
- D. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants for Concrete Pavements.

1.04 PRICE AND PAYMENT PROCEDURES

- A. No additional payment will be made for concrete joints and sealants under this Section. Include payment in unit price for applicable concrete work.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Board Expansion Joint Material: Filler board of selected stock. Use wood of density and type as follows:
 - 1. Clear, all-heart cypress weighing no more than 40 pounds per cubic foot, after being oven dried to constant weight.

2. Clear, all-heart redwood weighing no more than 30 pounds per cubic foot, after being oven dried to constant weight.
- B. Preformed Expansion Joint Material: Bituminous fiber and bituminous mastic composition material conforming to ASTM D 994 and ASTM D 1751.
- C. Joint Sealing Compound: Self-leveling polyurethane sealant (gray in color) as conforming to ASTM C 920.
- D. Load Transmission Devices:
 1. Smooth, steel dowel bars conforming to ASTM A 615, Grade 60. When indicated on Drawings, encase one end of dowel bar in approved cap having inside diameter 1/16 inch greater than diameter of dowel bar.
 2. Deformed steel tie bars conforming to ASTM A 615, Grade 60.
- E. Metal Supports for Reinforcing Steel and Joint Assembly: Employ metal supports of approved shape and size that will secure reinforcing steel and joint assembly in correct position during placing and finishing of concrete.

PART 3 EXECUTION

3.01 PLACEMENT

- A. When new work is adjacent to existing concrete, place joints at same location as existing joints in adjacent pavement.
- B. If the limit of removal of existing concrete or asphaltic pavement does not fall on existing joint, saw cut existing pavement minimum of 2 inches deep to provide straight, smooth joint surface without chipping, spalling or cracks.

3.02 EXPANSION (CONSTRUCTION OR ISOLATION) JOINTS

- A. Place 3/4-inch expansion joints at radius points of curb returns of cross street intersections, wherever concrete placement must be stopped for more than 30 minutes or as located in adjacent pavement but no further than 40 feet apart or as shown in the drawings. Use boards greater than 6 feet in length. When pavement is 24 feet or narrower, use not more than 2 lengths of board. Secure pieces to form straight joint. Shape board filler accurately to cross section of concrete slab. Use No. 5 smooth dowel, 36 inches long and spaced 18 inches on centers. Seal with joint sealing compound.

3.03 CONTRACTION (DUMMY) JOINTS (SAWED OR GROOVED)

- A. Place contraction joints between expansion joints at even spacing, but no further than 10 feet apart, or shown in the Drawings. Seal groove with joint sealing compound.

3.04 SAWED JOINTS

- A. Use sawed joints as an alternative to contraction and weakened plane joints. Circular cutter shall be capable of cutting straight line groove minimum of 1/2 inch wide. Depth shall be one quarter of pavement thickness plus 1/2 inch. Commence sawing as soon

as concrete has hardened sufficiently to permit cutting without chipping, spalling or tearing and prior to initiation of cracks. Once sawing has commenced, it shall be continued until completed. Make saw cut with one pass. Complete sawing within 48 hours of concrete placement. Saw joints at required spacing consecutively in sequence of concrete placement.

- B. Concrete Saw: Provide sawing equipment adequate in power to complete sawing to required dimensions and within required time. Provide at least one standby saw in good working order. Maintain an ample supply of saw blades at work site at all times during sawing operations. Sawing equipment shall be on job at all times during concrete placement.

3.05 JOINTS FOR CURB, CURB AND GUTTER

- A. Place 3/4-inch preformed expansion joints through curb and gutters at locations of expansion and contraction joints in pavement; at end of radius returns at street intersections and driveways; and at curb inlets. The maximum spacing shall be 40-foot centers.

3.06 JOINTS FOR CONCRETE SIDEWALKS

- A. Provide 3/4-inch expansion joints conforming to ASTM A 1751 along and across sidewalk at back of curbs, at intersections with driveways, steps, and walls; and across walk at intervals not to exceed 40 feet. Provide expansion joint material conforming to ASTM D 994 for small radius curves and around fire hydrants and utility poles. Extend the expansion joint material full depth of the slab.

3.07 JOINTS FOR CONCRETE DRIVEWAYS

- A. Provide 3/4-inch expansion joints conforming to ASTM D 1751 across driveway in line with street face of sidewalks, at existing concrete driveways, and along intersections with sidewalks and other structures. For driveways wider than 20-feet, also include an expansion joint at the center point of the driveway perpendicular to the roadway. Extend expansion joint material full depth of slab.

3.08 JOINT SEALING

- A. Seal joints only when surface and joints are dry, cured and an ambient temperature is above 50 degrees F and less than 85 degrees F, and weather is not foggy or rainy.
- B. Clean joints of loose scale, dirt, dust and curing compound. The term joint includes wide joint spaces, expansion joints, dummy groove joints or cracks, either preformed or natural. Remove loose material from concrete surfaces adjacent to joints.
- C. Fill joints neatly with self-leveling polyurethane sealant (gray in color) as conforming to ASTM C 920. Follow all manufacturer's installation recommendation.
- D. Fill joints so that, upon completion, surface of sealer within joint will be within a 1/4 inch of the adjacent concrete surface or at elevation as directed by the Owner.

END OF SECTION

SECTION 32 16 33

DRIVEWAYS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Construct and pave driveways. Reconstruct existing driveways.

1.02 SUBMITTALS

- A. Conform to requirements of Section 01 33 00 - Submittal Procedures.
- B. Submit a description of source, material classification and product description, production method, and application of materials.

1.03 REFERENCE STANDARDS

- A. ASTM C 33 - Specification for Concrete Aggregate.
- B. ASTM C 40 - Test Method for Organic Impurities in Fine Aggregates for Concrete.

1.04 MEASUREMENT AND PAYMENT

- A. No separate measurement of excavation, base material, prime coat, tack coat, Portland cement concrete, or asphalt surfacing will be made. Accepted work as prescribed by this item will be measured by the square yard of Portland cement concrete driveway, asphaltic concrete driveway or gravel driveway.
- B. The work performed as prescribed by this item will be paid for at the contract unit price bid per square yard for "Portland Cement Concrete Driveway," "Portland Cement Concrete Driveway - Commercial," "Asphaltic Concrete Driveway," or "Gravel Driveway," which price shall be full compensation for removal of existing driveway (if required), preparing the subgrade, for furnishing and placing all materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.
 - 1. Portland Cement Concrete Driveway - per square yard
 - 2. Portland Cement Concrete Driveway - Commercial - per square yard
 - 3. Exposed Aggregate Driveway - per square yard
 - 4. Asphaltic Concrete Driveway - per square yard
 - 5. Gravel Driveway - per square yard

PART 2 PRODUCTS

2.01 MATERIALS

- A. Furnish materials in accordance with the requirements herein unless otherwise shown on the plans. Provide materials of the type and grade as shown on the plans or directed by the Engineer and in accordance with the pertinent Items listed below:
 - 1. Lime Treated Subgrade – 32 11 13.13
 - 2. Flexible Base – 32 11 26
 - 3. Prime Coat – 32 12 16.01

4. Tack Coat – 32 12 16.02
5. Hot Mix Asphaltic Concrete Pavement – 32 12 16
6. Asphalt Treated Base – 32 11 26
7. Concrete Pavement – 32 14 14
8. Concrete – Division 3

PART 3 EXECUTION

3.01 EQUIPMENT

- A. Furnish equipment as required and/or in accordance with the pertinent Items. Use of a motor grader will be permitted for asphalt concrete pavement unless otherwise shown on the plans.

3.02 CONSTRUCTION

- A. Removal of Existing Driveway or Curbs. If an existing driveway is to be reconstructed, remove existing driveway pavement to the depths and limits shown on the plans or identified by the Engineer using the methods described herein. All concrete and asphaltic concrete driveway pavements shall be cut with a concrete saw or other equipment approved by the Engineer from existing pavement lanes and/or parking areas. Existing gravel driveways shall be removed with appropriate excavation equipment as shown on the plans or approved by the Engineer. If necessary, remove adjacent soil and vegetation to prevent contamination of the driveway area, and place it in a windrow or stockpile. Do not damage adjacent pavement structure during removal and reconstruction operations.
 1. Existing Asphaltic Concrete Driveway. Unless otherwise shown on the plans or directed by the Engineer, saw-cut the existing driveway from existing pavement lanes and/or parking areas. The depth of the cut shall be such that upon removal of asphaltic concrete, the sides of the cut will be straight and square. Where existing base materials are to remain, driveway pavements shall be removed to their full depth up to the top of the base material. Care shall be taken not to damage the existing base. Remove or repair loose or damaged base material if present, and replace or repair it with approved base material to the original top of base grade. If subgrade work is required, remove flexible pavement structure layers to the top of subgrade and remove material from work area.
 2. Existing Portland Cement Concrete Driveway. If required, saw-cut full depth through the concrete around the perimeter of the existing driveway before removal. Do not spall or fracture concrete adjacent to the repair area. Remove or repair loose or damaged base material if present, and replace or repair it with approved base material to the original top of base grade. Allow treated materials used as base material to attain sufficient strength to prevent displacement when placing concrete pavement. If subgrade work is required, remove the entire pavement structure to the top of subgrade and remove material from work area.
 3. Curb Cuts. If required, saw-cut full depth through the concrete curb before removal. Do not spall or fracture concrete adjacent to the repair area. Remove or repair loose or damaged base material if present, and replace or repair it with approved base material to the original top of base grade. Allow treated materials used as base

material to attain sufficient strength to prevent displacement when placing concrete pavement.

B. Surfacing. Apply surfacing with materials as shown on the plans to the completed base section.

1. Gravel Driveway. A gravel driveway is defined as a driveway consisting entirely of flexible base material without an asphaltic concrete, Portland cement concrete, or surface treatment layer. The surface of the compacted base shall be smooth and in conformity with typical sections and to the established lines and grades. Prime coat the surface if shown on the plans or directed.
2. Prime Coat. Protect the compacted, finished, and cured flexible or cement-treated base mixtures with a prime coat. Unless otherwise shown on the plans, apply prime coat with an approved sprayer at a rate not to exceed 0.20 gallons per square yard of surface. The type and grade shall be shown on the plans or directed by the Engineer.
3. Asphalt Concrete Pavement. Unless otherwise shown on the plans, apply tack coat at a rate not to exceed 0.10 gallons per square yard. The type and grade shall be shown on the plans or directed by the Engineer. Place asphaltic concrete in accordance with Item 32 12 16, "Hot Mixed Asphaltic Concrete Pavement," to achieve required section. Testing requirements may be altered or waived by the Engineer.
4. Portland Cement Concrete Pavement. If shown on the plans, tie the concrete driveway to concrete pavement or concrete parking lot pavement. Use only drilling operations that do not damage the surrounding operations when drilling holes for replacement steel. Unless otherwise shown on the plans, reinforcement shall consist of either one layer of 6" x 6" - W5 x W5 welded wire flat sheet or No. 3 ($\frac{3}{8}$ ") reinforcing steel placed not more than 12 inches on centers both directions. All reinforcement shall be placed equidistant from the top and bottom of the concrete. Care shall be exercised to keep all steel in its proper position during the depositing of concrete. Splices in the No. 3 bars shall have a minimum lap of 12 inches. For existing driveways with existing steel, place new deformed reinforcing steel bars of the same size and spacing as the bars removed or as shown on the plans. Epoxy-grout all tiebars for at least a 12 inch embedment into existing concrete. Completely fill the tiebar hole with Type III, Class A or Class C epoxy before inserting the tiebar into the hole. Provide grout retention disks for all tiebar holes. Provide and place approved supports to firmly hold the new reinforcing steel, tiebars, and dowel bars in place.

Place a polyethylene sheet at least 4 mils thick as a bond breaker at the interface of the base or subgrade and new driveway pavement. Provide Class P concrete conforming to Item 32 13 13, "Concrete Pavement."

If the time frame designated for opening to traffic is less than 72 hours after concrete placement, provide Class HES concrete designed to attain a minimum average flexural strength of 255 psi or a minimum average compressive strength of 1,800 psi within the designated time frame. Type III cement is permitted for Class HES concrete. For driveways that are to be opened to traffic before 72 hours, use curing mats to maintain a minimum concrete surface temperature of 70°F when air temperature is less than 70°F.

Match the grade and alignment of existing concrete pavement. Broom-finish the concrete surface unless otherwise shown on the plans. Saw and seal contraction joints, if shown on the plans or directed by the Engineer, in accordance with Item 32 13 13, "Concrete Pavement."

- a. Commercial Driveways. Reinforcing for commercial driveways shall consist of either one (1) layer of 6" x 6" - W10 x W10 welded wire flat sheets or No. 4 (1/2") reinforcing steel placed not more than 12 inches on center both directions. The concrete slab shall be a minimum of 6 inches thick or as shown on the plans.
- b. Exposed Aggregate Surface. For exposed Aggregate finished driveways, wash concrete surface after initial set with staff bristle brush and water to remove matrix and clean each piece of exposed coarse aggregate. Unless otherwise acceptable to the Engineer, perform washing and brushing 3 - 4 hours after casting. Care shall be taken to uniformly expose about a third of each piece of coarse aggregate, removing no more of the matrix than necessary across the panel surface and as required to achieve appearance similar to adjacent existing work. After seven days, follow with a final cleaning with a mild acid solution and final rinsing with clear water

END OF SECTION

SECTION 32 31 13

CHAIN LINK FENCE AND GATES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Section Includes:

1. Galvanized coated chain link fencing and accessories.
2. On utility projects:
 - a. When existing fence is within the project Site (i.e. parallel to the utility trench and/or within utility easement) and is directly disturbed by construction activities, fencing will be replaced in kind.

1.02 RELATED WORK

A. Division 01 – General Requirements

1.03 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of Section 01 33 00 – Submittal Procedures.
- B. Shop drawings
 1. Shop drawings showing material sizes and weights, fencing heights, mounting details, gates and operators.
- C. Product data
 1. Manufacturer's catalog cuts indicating material compliance and specified options.

1.04 REFERENCE STANDARDS

1. Reference standards cited in this specification refer to the current reference standard published at the time of the latest revision date logged at the end of this specification, unless a date is specifically cited.
2. American Society for Testing and Materials (ASTM):
 - a. A 36, Standard Specification for Carbon Structural Steel
 - b. A 121, Standard Specification for Metallic-Coated Carbon Steel Barbed Wire
 - c. A 123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - d. A 392, Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
 - e. A 500, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
 - f. F 567, Standard Practice for Installation of Chain-Link Fence
 - g. F 626, Standard Specification for Fence Fittings
 - h. F 900, Standard Specification for Industrial and Commercial Swing Gates
 - i. F 1043, Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework

- j. F 1083, Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
- k. F 1183, Standard Specification for Aluminum Alloy Chain Link Fence Fabric
- l. F 1184, Standard Specification for Industrial and Commercial Horizontal Slide Gates

1.05 MEASUREMENT AND PAYMENT

- A. Chain Link Wire Fence, of the height specified, will be measured by the linear foot of fence at the bottom of the fabric along the center line of the fence from center to center of end posts, exclusive of gates. Chain Link Wire Fence shall include all end posts, angle and corner posts, and tension posts, complete in place with all bracing and accessories.
- B. Chain Link Wire Fence measured as prescribed above, will be paid for at the contract unit price bid per linear foot for Chain Link Wire Fence of the height specified, which price shall be full compensation for furnishing and installing all fencing materials, end posts, angle and corner posts, tension posts, line posts, caps, tension wires, top rail, and connection fittings; digging post holes or setting into retaining wall and structures; furnishing and placing concrete for setting posts; all hauling and hauling charges; and for all manipulation, labor, tools, equipment, and incidentals necessary to complete the work.
 - 1. Chain Link Wire Fence - (4 ft. high) - per linear foot
 - 2. Chain Link Wire Fence - (6 ft. high) - per linear foot

PART 2 PRODUCTS

2.01 MATERIALS

- A. Manufacturer
 - 1. Minimum of 5 years of experience manufacturing galvanized coated chain link fencing.
 - 2. Approved Manufacturer or equal:
 - a. Allied Fence, Inc.
 - b. American Fence Corp.
 - c. Anchor Fence, Inc.
 - d. Master Halco, Inc.
- B. Materials
 - 1. Chain Link Fence
 - a. General
 - (i) Posts, gate frames, braces, rails, stretcher bars, truss rods and tension wire shall be of steel.
 - (ii) Gate hinges, post caps, barbed wire supporting arms, stretcher bar bands and other parts shall be of steel, malleable iron, ductile iron or equal
 - (iii) Post tops, rail end, ties and clips may be of aluminum.

- (iv) Use only new material, or salvaged/existing material if approved by OWNER's Representative or noted on Drawings.
- b. Steel Fabric
 - (i) Fabric
 - (a) No. 9 gauge
 - (b) 2-inch mesh
 - (1) Commercial: both top and bottom selvages twisted and barged
 - (c) Residential: match existing or both top and bottom selvages knuckled
 - (1) Furnish 1-piece fabric widths.
 - (ii) Fabric Finish: Galvanized, ASTM A 392, Class I, with not less than 1.2 oz. zinc per square foot of surface.
- c. Aluminum Fabric
 - (i) Fabric
 - (a) ASTM F 1183
 - (b) No. 9 gauge
 - (c) 2-inch mesh, with both top and bottom selvages twisted and barged.
 - (d) Furnish 1-piece fabric widths.
- d. Steel Framing
 - (i) Steel pipe - Type I
 - (a) ASTM F 1083
 - (b) Standard weight schedule 40
 - (c) Minimum yield strength: 30,000 psi
 - (d) Sizes as indicated
 - (e) Hot-dipped galvanized with minimum average 1.8 oz/ft² of coated surface area
 - (ii) Steel pipe - Type II
 - (a) ASTM F 1043, Group IC
 - (b) Minimum yield strength: 50,000 psi
 - (c) Sizes as indicated on Drawings
 - (d) Protective coating per ASTM F 1043
 - (1) External coating Type B
 - (2) Zinc with organic overcoat
 - (a) 0.9 oz/ft² minimum zinc coating with chromate conversion coating and verifiable polymer film
 - (3) Internal coating Type B
 - (b) Minimum 0.9 oz/ft² zinc or Type D, zinc pigmented, 81 percent nominal coating, minimum 3 mils
 - (iii) Formed steel ("C") sections:
 - (a) Roll formed steel shapes complying with ASTM F 1043, Group II
 - (b) Minimum yield strength: 45,000 psi (310 MPa)

- (c) Sizes as indicated on Drawings
 - (d) External coating per ASTM F 1043, Type A
 - (1) Minimum average 2.0 oz/ft² of zinc per ASTM A 123
- (iv) Steel square sections
 - (a) ASTM A 500, Grade B
 - (b) Minimum yield strength: 40,000 psi
 - (c) Sizes as indicated on Drawings
 - (d) Hot-dipped galvanized with minimum 1.8 oz/ft² of coated surface area
- e. Accessories
 - (i) Chain link fence accessories
 - (a) ASTM F 626
 - (b) Provide items required to complete fence system.
 - (c) Galvanize each ferrous metal item and finish to match framing.
 - (ii) Post caps
 - (a) Formed steel or cast malleable iron weather tight closure cap for tubular posts.
 - (b) Provide 1 cap for each post.
 - (c) Cap to have provision for barbed wire when necessary.
 - (d) "C" shaped line post without top rail or barbed wire supporting arms do not require post caps.
 - (e) Where top rail is used, provide tops to permit passage of top rail.
 - (iii) Top rail and rail ends
 - (a) 1 5/8 inch diameter galvanized round pipe for horizontal railing
 - (b) Pressed steel per ASTM F626
 - (c) For connection of rail and brace to terminal posts
 - (iv) Top rail sleeves
 - (a) 7-inch expansion sleeve with a minimum 0.137 inch wire diameter and 1.80 inch length spring, allowing for expansion and contraction of top rail
 - (v) Wire ties
 - (a) 9 gauge galvanized steel wire for attachment of fabric to line posts
 - (b) Double wrap 13 gauge for rails and braces.
 - (c) Hog ring ties of 12-1/2 gauge for attachment
 - (vi) Brace and tension (stretcher bar) bands
 - (a) Pressed steel
 - (b) Minimum 300 degree profile curvature for secure fence post attachment
 - (c) At square post provide tension bar clips.
 - (vii) Tension (stretcher) bars:
 - (a) 1 piece lengths equal to 2 inches less than full height of fabric
 - (b) Minimum cross-section of 3/16 inch x 3/4 inch

- (c) Provide tension (stretcher) bars where chain link fabric meets terminal posts.
 - (viii) Tension wire
 - (a) Galvanized coated steel wire, 6 gauge, [0.192 inch] diameter wire
 - (b) Tensile strength: 75,000 psi
 - (ix) Truss rods & tightener
 - (a) Steel rods with minimum diameter of 5/16 inch
 - (b) Capable of withstanding a tension of minimum 2,000 pounds
 - (x) Nuts and bolts are galvanized.
 - (xi) Barbed Wire
 - (a) 12 ½ gauge, twisted zinc coated barbed wire with 14 gauge 4 point barbs on 5" spacing, conforming to ASTM A121, Class 3.
 - (xii) Barbed Wire Support Arms
 - (a) Heavy weight pressed steel arms having an incline of 45 degrees.
 - (b) Arms shall have holes which allow passage of top rail and slots to receive barbed wire at proper spacing.
 - (c) Arms shall be capable of a downward pull at the outside of the arm of 250 pounds.
 - (d) Post extension arm shall be galvanized similar to post.
2. Setting Materials
- a. Concrete
 - (i) Minimum 28 day compressive strength of 3,000 psi
 - (ii) Bagged concrete allowed.
 - b. Drive Anchors
 - (i) Galvanized angles
 - (ii) ASTM A 36 steel
 - (iii) 1 inch x 1 inch x 30 inch galvanized shoe clamps to secure angles to posts.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions
 1. Verify areas to receive fencing are completed to final grades and elevations.
 2. Ensure property lines and legal boundaries of work are clearly established

3.02 INSTALLATION

- A. Chain Link Fence Framing
 1. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30 degrees or more.
 2. Space line posts uniformly at 10 feet on center.
 3. Set all posts in concrete
 - a. Drill holes in firm, undisturbed or compacted soil.

- b. Drill hole diameter 4 times greater than outside dimension of post.
 - c. Set post bottom 24 inches below surface when in firm, undisturbed soil.
 - d. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads.
 - e. Place concrete around posts in a continuous pour. Trowel finish around post. Slope to direct water away from posts.
4. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.
 5. Bracing
 - a. Install horizontal pipe brace at mid-height for fences 6 feet and taller, on each side of terminal posts.
 - b. Firmly attach with fittings.
 - c. Install diagonal truss rods at these points.
 - d. Adjust truss rod, ensuring posts remain plumb.
 6. Tension wire
 - a. Provide tension wire at bottom of fabric and at top, if top rail is not specified.
 - b. Install tension wire before stretching fabric and attach to each post with ties.
 - c. Secure tension wire to fabric with 12-1/2 gauge hog rings 24 inches on center.
 7. Top rail
 - a. Install lengths, 21 feet
 - b. Connect joints with sleeves for rigid connections for expansion/contraction.
 8. Center Rails for fabric height 12 feet and taller.
 - a. Install mid rails between posts with fittings and accessories.
 9. Bottom Rails: Install bottom rails between posts with fittings and accessories.

B. Chain Link Fabric Installation

1. Fabric
 - a. Install fabric on security side and attach so that fabric remains in tension after pulling force is released.
 - b. Leave approximately 2 inches between finish grade and bottom selvage.
 - c. Attach fabric with wire ties to line posts at 15 inches on center and to rails, braces, and tension wire at 24 inches on center.
2. Tension (stretcher) bars
 - a. Pull fabric taut.
 - b. Thread tension bar through fabric and attach to terminal posts with bands or clips spaced maximum of 15 inches on center.
3. Accessories
 - a. Tie wires: Bend ends of wire to minimize hazard to persons and clothing.
 - b. Fasteners: Install nuts on side of fence opposite fabric side for added security.
 - c. Slats: Install slats in accordance with manufacturer's instructions, if required.

END OF SECTION

SECTION 33 31 00

SANITARY SEWER PIPING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This item shall govern the furnishing, installation, testing, adjustment, or replacement of sanitary sewer pipe of the size and type specified in the contract documents.

1.02 RELATED WORK

- A. Section 31 23 33 – Trenching and Backfilling

1.03 SUBMITTALS

- A. CONTRACTOR shall submit manufacturer's product data, instructions, recommendations, shop drawings, and certifications.
 - 1. CONTRACTOR to submit cut sheets prior to commencement of open cut work.
 - 2. Submit proposed methods, equipment, materials and sequence of operations for sewer construction.
 - 3. Plan operations so as to minimize disruption of utilities to occupied facilities or adjacent property.
 - 4. Submit all test reports and pre and post sewer television inspection video.
 - 5. Videos become property of OWNER.

1.04 REFERENCE STANDARDS

- A. Texas Commission of Environmental Quality (TCEQ)
 - 1. Chapter 217 Design Criteria for Domestic Wastewater Systems
- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM C 150 - Standard Specification for Portland Cement.
 - 2. ASTM C 494 - Standard Specification for Chemical Admixture for Concrete.
 - 3. ASTM C 618 - Standard Specification for Fly Ash and Raw or Calcinated Natural Pozzolan for use as Mineral Admixture in Portland Cement Concrete.
 - 4. ASTM C 937 - Standard Specification for Grout Fluidifier for Pre-placed Aggregate Concrete.
 - 5. ASTM C 940 - Standard Test Method for Expansion and Bleeding of Freshly Mixed Grout for Replaced Aggregate Concrete in the Laboratory.
 - 6. ASTM C 1017 - Standard Specification for Chemical Admixture for Use in Producing Flowing Concrete.
 - 7. ASTM C 1107 - Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
 - 8. A. ASTM D 618 - Standard Practice for Conditioning Plastics for Testing.
 - 9. ASTM D 1248 - Standard Specification for Polyethylene Plastics Molding and Extrusion Materials.

10. ASTM D 1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
11. ASTM D 2122 – Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings.
12. ASTM D 2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
13. ASTM D 2310 - Standard Classification for Machine-Made Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe
14. ASTM D 2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
15. ASTM 2412 – Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel Plate Loading
16. ASTM D 2444 - Standard Test Method for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight).
17. ASTM D 2657 - Standard Practice for Heat Fusion Joining Polyolefin Pipe and Fittings.
18. ASTM D 2680 - Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
19. ASTM D 2837 - Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.
20. ASTM D 2992 - Obtaining Hydrostatic or Pressure Design Basis for "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting) Resin Pipe and Fittings.
21. ASTM D 3034 - Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
22. ASTM D 3035 - Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
23. ASTM D 3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
24. ASTM D 3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
25. ASTM D 3262 - Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Sewer Pipe.
26. ASTM D 3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
27. ASTM D 3681 - Method for Determining Chemical Resistance of "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe in a Deflected Condition.
28. ASTM D 3754 - Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Sewer and Industrial Pressure Pipe.
29. ASTM D 4161 - Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
30. ASTM F 477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
31. ASTM F 679 - Standard Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.

32. ASTM F 714 - Standard Specification for Polyethylene Plastic (PE) Pipe (SDR-PR) Based on Outside Diameter.
33. ASTM F 794 - Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
34. ASTM F 894 - Standard Specification for Polyethylene (PE) Large-Diameter Profile Wall Sewer and Drain Pipe.
35. ASTM G 62 - Standard Test Methods for Holiday Detection in Pipeline Coatings.

C. American Water Works Association (AWWA)

1. AWWA C 110 - American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 Inches Through 48 Inches for Water.
2. AWWA C 111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
3. AWWA C 900 - Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 Inches Through 12 Inches for Water Distribution.
4. AWWA C 909 - Standard for Molecularly-Oriented Polyvinyl Chloride (PVCO) Pressure Pipe, 4 Inches through 12 Inches (100mm through 300 mm), for Water Distribution.
5. AWWA M23 – PVC Pipe – Design and Installation
6. W. PPI TR3 - Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials.
7. AWWA C 300 - Standard for Prestressed Concrete Pressure Pipe, Steel-Cylinder Type, for Water and other Liquids.
8. AWWA C 950 – Fiberglass Pressure Pipe
9. AWWA M 45 – Fiberglass Pipe Design

D. National Science Foundation

1. NSF Standard 61 - Drinking Water System Components - Health Effects.

E. Society of Protective Coatings

1. SSPC-SP 6 - Steel Structures Painting Council, Commercial Blast Cleaning.

F. Uni-Bell

1. UNI-B-13 - Recommended Standard Performance Specification for Joint Restraint Devices for Use with Polyvinyl Chloride Pipe.

1.05 MEASUREMENT AND PAYMENT

A. All sewer pipes will be measured from center of manhole to center of manhole or end of main.

1. Payment for normal depth sanitary sewer, up to 8 feet deep, by open-cut or augered with or without casing is on a linear foot basis for each size of pipe. Depth is measured from bottom of the pipe to the proposed natural ground.
2. Payment for sanitary sewer, greater than 8-foot in depth, by open-cut is on a linear foot basis for each 2-foot increment for depths greater than 8 feet. Depth is measured from bottom of the pipe to the proposed natural ground.

- B. When the minimum separation distances for any water and sewer piping facilities cannot be maintained per 30 TAC §217.53, CONTRACTOR shall install 20-foot joints of PVC pipe that meets the requirements of ASTM 2241 and 30 TAC §217.53(d)(3). Payment for this casing pipe shall be made the contract bid price per linear foot complete in place for the type, and size constructed as described above.
- C. Sewer pipe fittings, as part of the main line such as wyes and tees, are inclusive in the cost of Section 33 31 20 Sanitary Sewer Laterals

PART 2 PRODUCTS

2.01 MATERIALS

- A. All pipe not listed shall be subject to pre-approval by the Engineer.
 - 1. Flexible Pipe: Pipe consisting of materials other than those listed above.
 - a. Any flexible pipe having a deflection of the inside diameter greater than 5% after 30 days of installation will not be accepted.
 - b. Polyvinylchloride (PVC) Sewer Pipe: Pipe shall be made from class 12454 materials as described in ASTM D1784.
 - (i) For pipes 4 inches to 15 inches in diameter, fittings and joints shall conform to ASTM D3034 and D3212, with the exception that solvent cement joints shall not be used.
 - (ii) All sanitary sewer PVC pipe shall be green. White pipe is prohibited. Contractor will need to submit information to request an exemption to use white pipe such as letters from suppliers that pipe is not available. Once a project is awarded Contractor should bring this exemption to BPUB attention via RFI. If white pipe is approved it must have appropriate markings and be wrapped with green poly wrap. This shall include all lateral piping as well.
 - (iii) At waterline crossings and where water and sewer mains are parallel and separation distance cannot be achieved as per 30 TAC 217.53, the pipe shall conform to ASTM 2241.
 - 2. Mechanical or compression joints, concrete jointing collars, or non- reinforced rubber adaptors shall be used only as approved by the Engineer.
 - 3. All sanitary sewer pipe and fittings utilized shall be tested by a manufacturer-approved laboratory at the source of supply.
 - 4. All shipments of pipe shall be accompanied by a certificate of compliance to these specifications prepared by an independent testing laboratory and signed by a Texas registered professional engineer.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. All sanitary sewer mains shall be constructed in accordance with the specifications herein outlined and in conformity with the required lines, grades, and details shown in the contract documents and as directed by the Engineer. Whenever true line and grade is not attained it will be the Contractor's sole responsibility to remove and reinstall any and

all sewer pipe deemed required by the Engineer and shall be done at the Contractor's expense.

1. Successful passage of the Hydrostatic, air test and mandrel test (for flexible pipe, 30 days after installation), as described under TCEQ criteria. In addition sewer pipe must also pass settlement test for the final acceptance of the mains.
2. Mains shall be properly backfilled prior to the start of the 30 day testing period.
3. Water Main Crossings: Where gravity or force main sewers are constructed in the vicinity of water mains, the requirements of the 30 TAC§ 217.53 shall be met.
4. For excavation, trenching and backfill requirements see Section 31 23 33 – Trenching and Backfilling.
5. After the trench is excavated to grade as specified, it shall be filled to grade with a minimum 6-inch bank run sand layer. This material shall be mechanically tamped to a density minimum of 90%. This material shall provide a smooth and uniform pipe bed for the entire length of the sewer pipe barrel. Trench foundation preparation may require dewatering, gravel bedding, or cement stabilized sand to create a stable foundation for pipe installation. Stable foundation conditions and trench improvements will be at the direction of the Utility Owner Inspector or the Engineer and at no additional costs to the Owner.
6. Pipe Installation: The Inspector will inspect all pipe before it is placed in the trench and will reject any sections found to be damaged or defective to a degree that would affect the structural integrity of the pipe.
7. Rejected pipe shall be immediately removed from the site of the work and replaced with new acceptable pipe.
8. Sewer main installation should be constructed from downstream to upstream as standard practice.
9. No pipe shall be laid within 10 feet of any point where excavation is in progress. Pipe installation shall proceed upgrade with the bell pointing in the upstream direction of flow.
10. Pipe shall be lowered into the trench without disturbing the prepared bedding or the trench sides.
11. The drilling of lifting holes in the field will not be permitted.
12. Pipe shall be installed by means of a concentric pressure being applied to the pipe with a mechanical pipe puller. Pulling or pushing a joint of pipe in place by using a crane, bulldozer, or backhoe will not be permitted.
13. Pipe shall be "pulled home" in a straight line with all parts of the pipe on line and grade at all times.
14. No side movement or up and down movement of the pipe will be permitted during or after the pulling operation.
15. Should coupled joints of pipe be out of line or off grade, they shall be removed one joint at a time in the presence of the Inspector and brought to the proper line and grade.
16. The lifting or moving of several joints of coupled pipe at one time to close a partially open joint or to fine grade under laid joints of pipe will not be permitted.
17. CONTRACTOR shall ensure that all existing or proposed manholes or structures shall remain visible and accessible at all times.

18. No manhole or structure covers shall be covered by pavement, equipment, or other obstructions other than a removable, steel plate (min thickness of ½ inch and H-20 traffic bearing rated), temporary lid provided for safety.
19. Pipe Separation: Sewer pipe separation distances shall be maintained in accordance with TCEQ rules 30 §217.53.
20. Contractor to obtain the services of a licensed surveyor in accordance with the General Conditions for the purpose of validating the elevations of all sewer main work including the installation of manholes. It is the CONTRACTOR responsibility to use the latest technology including Laser Beams to establish elevations as per design plans.
 - a. CONTRACTOR to provide Owner with the licensed surveyors report validating the all pipe was installed per design plans.
 - b. If the sewer main or manholes are not constructed per plans it is the contractors responsibility to relay or replace any sewer work at his cost with no additional days granted.
21. No horizontal or vertical curves shall be permitted in conformance with appropriate regulatory agency requirements.
22. Before leaving the work unattended, the upper ends of all pipelines shall be securely closed with a tight fitting plug or closure.
23. The interior of laid pipe shall be kept free from dirt, silt, gravel, or foreign material at all times.
24. All pipes in place must be approved by the Inspector before backfilling.
25. When replacing an existing system in place, Contractor shall maintain screens to prevent the entrance of construction debris into the sewer system.
26. Pipe bursting on AC sanitary sewer pipe is not allowed.

3.02 TESTING

- A. The CONTRACTOR shall perform a low-pressure air test or an infiltration/exfiltration test, and, for pipe installed by open cut method, a settlement test before the installed work shall be considered accepted. If a gravity collection main is composed of flexible pipe, a deflection test will also be required. Flexible pipe is defined as pipe that will deflect at least 2% without structural distress. CONTRACTOR shall ensure that all testing is performed in the presence of the Inspector, with copies of all written test results made available to the Inspector. Tests shall conform to the following requirements:
 1. Low-Pressure Air Test: The procedure for the low-pressure air test shall conform to the procedures described in ASTM C828, ASTM C924, and ASTM F1417 (or other appropriate procedures), except for testing times. The test times shall be as outlined in this section. For sections of pipe less than 36-inch average inside diameter, the following procedure shall apply. The pipe shall be pressurized to 3.5 psi greater than the pressure exerted by groundwater above the pipe. Once the pressure is stabilized, the minimum time allowable for the pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge shall be computed from the following equation:

$$T = (0.085 \times D \times K) / Q$$

T = Time for pressure to drop 1.0 pound per square inch gauge in seconds;
 K = $0.000419 \times D \times L$, but not less than 1.0;
 D = Average inside pipe diameter, in inches;
 L = Length of line of same pipe size being tested, in feet;
 Q = Rate of loss, 0.0015 cubic feet per minute per square foot internal surface shall be used since a K value of less than 1.0 shall not be used

The minimum testing times for each pipe diameter is as follows:

Pipe Diameter	Minimum Time	Length for Minimum Time	Time for Longer Length
Inches	Seconds	Feet	Seconds/Ft
6	340	398	0.855
8	454	298	1.520
10	567	239	2.374
12	680	199	3.419
15	850	159	5.342
18	1020	133	7.693
21	1190	114	10.471
24	1360	100	13.676
27	1530	88	17.309
30	1700	80	21.369
33	1870	72	25.856

* Note: Test time starts after the required 60 seconds of stabilization time has transpired.

The test may be stopped if no pressure loss has occurred during the first 25% of the calculated testing time. If any pressure loss or leakage has occurred during the first 25% of the testing period, then the test shall continue for the entire test duration as outlined above or until failure. Mains with a 27-inch or larger average inside diameter may be air tested at each joint instead of air testing entire pipe. Mains with a 36-inch average inside diameter and larger must be air tested at each joint. If the joint test is used, a visual inspection of the joint shall be performed immediately after testing. The pipe is to be pressurized to 3.5 psi greater than the pressure exerted by groundwater above the pipe. Once the pressure has stabilized, the minimum time allowable for the pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge shall be 10 seconds.

2. Infiltration/Exfiltration Test: The total exfiltration, as determined by a hydrostatic head test, must not exceed 10 gallons per inch of diameter per mile of main per 24 hours, at a minimum test head of 2 feet above the crown of the main at an upstream manhole. The Contractor shall use an infiltration test in lieu of an exfiltration test when mains are installed below the ground water level. In such cases, the total

exfiltration, as determined by a hydrostatic head test, must not exceed 10 gallons per inch diameter per mile of main 24 hours at a minimum test head of 2 feet above the crown of the main at an upstream manhole, or at least 2 feet above the existing groundwater level, whichever is greater. For construction work occurring within a 25-year floodplain, the infiltration or exfiltration must not exceed 10 gallons per inch diameter per mile of main per 24 hours at the same minimum test head as stated in the previous sentence. If the quantity of infiltration or exfiltration exceeds the maximum quantity specified, the Contractor shall propose to the Engineer, and receive approval therefrom, all necessary remedial action, solely at the Contractor's own cost, in order to reduce the infiltration or exfiltration to an amount within the limits specified herein.

3. Deflection Testing: As stated in the 30 TAC § 217, deflection test shall be performed on all flexible pipe installed.
 - a. For mains with inside diameters less than 36 inches, a rigid mandrel shall be used to measure deflection.
 - b. For mains with an inside diameter 36 inches and greater, a method approved by the Engineer shall be used to test for vertical deflections.
 - c. For rigid pipe, a manufacturer approved "Go, No Go" deflection rod may be used to test deflection, but must be approved by Engineer or Inspector prior to testing.
 - d. The deflection test must be accurate to within + 0.2% deflection. The test shall be conducted after the final backfill has been in place at least 30 days. No pipe shall exceed a deflection of five percent. If a pipe should fail to pass the deflection test, the problem shall be corrected, and a second test shall be conducted after the failed area's final backfill has been in place an additional 30 days. The tests shall be performed without mechanical pulling devices. The Engineer should recognize that this is a maximum deflection criterion for all pipes and a deflection test less than 5 % may be more appropriate for specific types and sizes of pipe. Upon completion of construction, the Engineer or other Texas Registered Professional Engineer appointed by the owner shall certify to the Inspector, that the entire installation has passed the deflection test. This certification may be made in conjunction with the notice of completion required in 30 TAC § 217.14. (1) of this title (relating to General Provisions). This certification shall be provided for the Owner to consider the requirements of the approval have been met.
 - e. CONTRACTOR shall provide 24 hr. notice to Engineer and Inspector prior to any testing.
 - f. ENGINEER of Record must witness all tests over the EARZ.
 - g. Mandrel Sizing. The rigid mandrel shall have an outside diameter (O.D.) not less than 95% of the inside diameter (I.D.) of the pipe.
 - h. The inside diameter of the pipe, for the purpose of determining the outside diameter of the mandrel, shall be the average outside diameter minus two minimum wall thicknesses for O.D. controlled pipe and the average inside diameter for I.D. controlled pipe. All dimensions shall be per appropriate standard. Statistical or other "tolerance packages" shall not be considered in mandrel sizing.

- (i) Mandrel Design: The rigid mandrel shall be constructed of a metal or a rigid plastic material that can withstand 200 psi without being deformed.
 - (ii) The mandrel shall have nine or more "runners" or "legs" as long as the total number of legs is an odd number.
 - (iii) The barrel section of the mandrel shall have a length of at least 75% of the inside diameter of the pipe.
 - (iv) A proving ring shall be provided and used for each size mandrel in use.
 - (v) Method Options: Adjustable or flexible mandrels are prohibited. A television inspection is not a substitute for the deflection test.
- i. Test Reports: Submit reports from tests in accordance with relevant standards.
4. Settlement Testing: For all gravity sanitary sewer pipe installed by open-cut method the CONTRACTOR shall conduct settlement testing of the newly installed sewer to determine whether excessive sagging of the pipe has occurred. This test does not identify the precise threshold at which pipe is properly installed. Rather, it provides a simple, easily interpretable means to identify grossly unacceptable installation of gravity sewer pipe. As such, passing this test shall not excuse poor workmanship identified by other means. Contractor shall follow construction QC/QA program established for the specified project and follow best practices to maintain horizontal and vertical alignment control.
- a. This test involves television inspection. Requirement for televising, video format, and submittals shall be governed by Section 33 31 30 – Sanitary Sewer Main Television Inspection. If suitable to the project in question the settlement test televising efforts can be combined with but are in addition to and do not in any way replace or nullify, the efforts.
 - b. Unless otherwise directed by Engineer or Owner, no sewer flow should be introduced into the system when performing settlement test.
 - c. This test shall be conducted no earlier than 30 days after installation of the sanitary sewer pipe and final backfill.
 - d. For the purpose of this test the term "segment" is defined as all pipe between two manholes and/or structures and "pipe section" is defined as a single piece of pipe up to and including where it joins adjacent pipe(s).
 - e. Segment must be isolated and cleaned to ensure no flow through pipe and that it is free of dirt, rocks, scale, mud, silt, and any other foreign matter prior to performing this test.
 - f. Contact the Inspector prior to testing so that they may witness flooding of the system and testing.
 - g. Water shall be introduced into the pipe to provide meaningful observations. To accomplish this, after cleaning, and immediately before performing this test, contractor shall flood system with an amount of water sufficient to flow from the upstream manhole through the segment to be tested and be observed flowing into the downstream manhole. Introduction of water will then be stopped and any standing water allowed to remain in the segment being tested. Testing shall commence when flow is no longer observed in downstream manhole. The established unit cost for settlement testing shall be inclusive of any and all water and work necessary to deliver water to test site and shall thus be provided by contractor at no additional cost to Owner.

- h. Settlement testing varies by pipe diameter:
 - (i) For pipes from 8 to 42 inches in diameter: After advancing television unit through pipe to be tested, connect golf ball with rigid wire and string as necessary for golf ball to be fully visible within CCTV footage and maintain contact with bottom of pipe as golf ball is pulled back through each segment. The golf ball shall have a diameter of 1.68 inches or 42.7 mm. Any and all points along the pipe segment at which the golf ball becomes fully submerged in standing water shall be defined as excessive sag.
 - (ii) For pipes 48 inches in diameter and larger: Manned entry to the pipe will be made. A rigid steel ruler with zero (0) inch mark at the extreme end shall be placed in all areas of standing water in the pipe such that it is in contact with the lowest portion of the pipe's circumference and a reading of the depth of standing water shall be taken. All such readings shall be documented, including, at a minimum, the depth of water and location (STA or upstream or downstream distance from manhole/structure) of each reading taken. Any and all points along the pipe segment at which the measured depth of standing water exceeds 4.0% of the nominal diameter of the pipe in question shall be defined as excessive sag.
- i. Any and all pipe section(s) of gravity sanitary sewer in which excessive sag is identified shall be rejected. Contractor shall correct each and every such pipe section, including as many upstream or downstream sections or segments as necessary to eliminate excessive sag(s) while maintaining grade required by the contract documents.
- j. No segment, regardless of length, shall have more than three (3) excessive sags. Identification of more than three (3) excessive sags in a segment of pipe shall be cause for rejection and Contractor shall reinstall the segment in its entirety at no cost to Owner.
- k. All corrected sections and/or segments of pipe shall be retested at no additional cost to Owner until all pipe segments pass this testing and contract documents for the project in question.
- l. Excessive sags shall be documented in video and shall be in accordance with NASSCO-(PACP) requirements.
- m. Provide televising and associated reports documenting the occurrence of the test and its results to Owner no later than 3 days following the test.
- 5. Sanitary Sewer Television Inspection: The Owner, at their discretion, may televise the sewer lines to determine all sources and conditions of the leakage. The Owner will provide all personnel and televising equipment for the test.
 - a. After construction of the sanitary sewer main and prior to placement of the final course of asphalt, the newly constructed sanitary sewer shall be televised immediately upon cleaning. Any abnormalities such as, but not limited to, misaligned joints, cracked/defected pipe, rolled gaskets, shall be repaired by the contractor at his expense. Sections requiring repair shall be re-televised to verify condition of repair. No additional compensation shall be provided for repair or re-televising.
 - b. If necessary, the Contractor shall perform bypass pumping operations in accordance with all other specification requirements and as outlined below.

- (i) The Contractor shall furnish all labor, supervision, tools, equipment, appliances, and materials to perform all operations in connection with bypass pumping of sewage flow for the purpose of preventing interference with the televising of the sanitary sewer manholes and mainlines as well as providing reliable sewer service to the occupants of the buildings being served.
- (ii) The Contractor will be required to provide adequate pumping equipment and force mains in order to maintain reliable sanitary sewer service to all sanitary sewer lines involved in this project. The Contractor shall notify the Owner should a surcharge occur during the televising process which results in overflows of sewage. In case of bypass equipment failure, the Contractor shall discontinue work and release sewer flows until such time as equipment failure is corrected.
- (iii) The location of the pump(s), force main(s), and discharge points shall be approved by the Owner. Under no circumstances shall the flow be interrupted or stopped, such that damage is done to either private or public property, or sewage flows or overflows into a storm sewer or natural waterway.
- (iv) The Contractor shall provide bypass pumping of sewage around each segment(s) of pipe that is to be televised and shall be responsible for all required bulkheads, pumps, equipment, piping, and other related appurtenances to accomplish the sequence of pumping. A qualified person shall man the pumps, on-site, at all times during the bypass procedure.
- (v) All piping, joints, and accessories shall be designed to withstand the maximum bypass system pressure, or a minimum of 50 psi, whichever is greater. During bypass pumping, no sewage shall be leaked, dumped, or spilled into or onto any area outside of the existing sanitary sewer system. When bypass pumping operations are complete, all piping shall be drained into the sanitary sewer prior to disassembly.
- (vi) The Contractor shall demonstrate that the pumping system is in good working order and can successfully handle flows during cleaning and televising operations, prior to commencing with the cleaning and televising of the system.
- (vii) The Contractor shall be required to have all materials, equipment, and labor necessary to complete the repair or replacement on the jobsite prior to isolating the sewer manhole or line segment and beginning bypass pumping operations.
- (viii) The Contractor shall plug off and pump down the sewer manhole and/or line segment in the immediate work area and shall maintain the sanitary sewer system so that surcharging does not occur. The Contractor shall coordinate with all property owners to ensure that no damage will be caused to their property during any and all sewer televising work. The Contractor shall complete the televising as quickly as possible and shall satisfactorily meet all requirements prior to discontinuing bypass pumping operations and returning flow to the sewer manhole or line segment. The Contractor shall ensure that no damage will be caused to private property as a result of bypass pumping operations. Ingress and egress to adjacent

properties shall always be maintained. Ramps, steel plates, or other methods shall be employed by the Contractor to facilitate traffic over surface piping.

- (ix) If sewage accidentally drains into the drainage system or is spilled within the project, the Contractor shall immediately stop the overflow, notify the Owner, and take the necessary action to clean up and disinfect the spillage using an HTH, or equal, chemical.
- (x) Traffic management shall be done under the approval of respective City, County, or State Traffic Departments. The Contractor shall not open cut existing streets to accommodate bypass pumping pipe unless specific written approval is given.

END OF SECTION

SECTION 33 31 10

SANITARY SEWER MANHOLES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This item shall govern the construction of standard sanitary sewer manholes complete in place and the materials therein, including manhole rings and covers.

1.02 RELATED WORK

- A. Division 01 – General Requirements
- B. Division 31 – Earthwork
- C. Division 33 - Utilities

1.03 SUBMITTALS

- A. CONTRACTOR shall submit manufacturer's product data, instructions, recommendations, shop drawings, and certifications. All submittals shall be in accordance with Engineer's requirements, and submittals shall be approved by the Engineer prior to delivery.
 - 1. Plan operations to minimize disruption of utilities to occupied facilities or adjacent property.
 - 2. Submit all test reports and pre and post sewer television inspection video.
 - 3. Videos become property of Owner.

1.04 REFERENCE STANDARDS

- A. Texas Commission of Environmental Quality (TCEQ)
 - 1. Chapter 217 Design Criteria for Domestic Wastewater Systems
- B. AASHTO – American Association of State Highway and Transportation Officials:
 - 1. M306: Standard Specification for Drainage, Sewer, Utility, and Related Castings.
- C. ASTM – American Society for Testing and Materials:
 - 1. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile
 - 2. A536: Standard Specification for Ductile Iron Castings.
 - 3. ASTM C581 Practice for Determining Chemical Resistance of Thermosetting Resins Used in Glass-Fiber-Reinforced Structures Intended for Liquid Service
 - 4. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
 - 5. ASTM C 443 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.

6. ASTM C 478 - Standard Specification for Precast Reinforced Concrete Manhole Sections
7. ASTM C 890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures
8. ASTM C 913 – Standard Specifications for Precast Concrete Water and Wastewater Structures.
9. ASTM C 990 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
10. ASTM D638: Test Method for Tensile Properties of Plastics.
11. ASTM D648: Standard Test Method for Deflection Temperature of Plastics under Flexural Load in the Edgewise Position.
12. ASTM D 698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft.)
13. ASTM D790: Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
14. ASTM D695 Test Method for Compressive Properties of Rigid Plastics
15. ASTM D785 Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials
16. ASTM D883 Terminology Relating to Plastics
17. ASTM D4161, Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
18. ASTM A307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
19. ASTM C 1107- Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
20. ASTM D1600 Terminology for Abbreviated Terms Relating to Plastics
21. ASTM D2412 Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
22. ASTM D2583 Test Method for Indentation Hardness of Rigid Plastics by Means of Barcol Impressor
23. ASTM D2584 Test Method for Ignition Loss of Cured Reinforced Resins
24. ASTM D3236, Standard Test Method for Apparent Viscosity of Hot Melt Adhesives and Coating Materials
25. ASTM D3262, Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Sewer Pipe
26. ASTM D3681, Standard Test Method for Chemical Resistance of "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe in a Deflected Condition
27. STM D3892 Practice for Packaging/Packing of Plastics
28. ASTM D1238: Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
29. ASTM D1505: Standard Test Method for Density of Plastics by the Density-Gradient Technique.
30. ASTM D1693: Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.

31. ASTM D 2665 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste and Vent Pipe and Fittings
32. ASTM D 2996 - Standard Specification for Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe
33. ASTM D 2997 - Standard Specification for Centrifugally Cast "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe
34. ASTM D 3753 Standard Specification for Glass-Fiber-Reinforced Polyester Manholes and Wetwells.
35. ASTM D 3839 Standard Practice for Underground Installation of "Fiberglass" Pipe
36. ASTM F477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

- D. American Society of Mechanical Engineers
 1. ASME B 16.1 - Cast Iron Pipe Flanges and Flanged Fittings
- E. American Water Works Association (AWWA)
 1. AWWA M45 Fiberglass Pipe Design
- F. International Organization of Standardization (ISO)
 1. ISO9001

1.05 QUALITY ASSURANCE

- A. The quality of materials, the process of manufacture, and the finished sections will be subject to inspection and approval by the Owner's Representative. Such inspection may be made at the place of manufacture, or after delivery, or at both places. The materials shall be subject to rejection at any time on account of failure to meet any of the Specification requirements; even though samples may have been accepted as satisfactory at the place of manufacture. Material rejected after delivery to the job site shall be marked for identification and shall be removed from the job site at once. Materials which have been damaged after delivery will be rejected, and if already installed, shall be acceptably repaired, or removed and replaced, entirely at the Contractor's expense.
- B. At the time of inspection, the materials will be carefully examined for compliance with the latest ASTM designations specified and these Specifications, and with the approved manufacturer's drawings. Manhole sections will be inspected for general appearance, dimension, blisters, cracks, roughness, soundness, etc. The surface shall be dense and close-textured.
- C. Imperfections in manhole sections may be repaired, subject to the approval of the OWNER's Representative, after demonstration by the manufacturer that repairs will result in a strong manhole section. Repairs shall be carefully inspected before final approval. Cement mortar used for repairs shall give a minimum compressive strength of 4,000 psi at seven days and 5,000 psi at 28 days, when tested in three inch by six inch cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the OWNER's Representative.

- D. Manhole sections shall be subject to rejection on account of failure to conform to any of the requirements specified herein or having defects as follows.
 - 1. Variations in any dimensions exceeding the permissible variation allowed in ASTM C478.
 - 2. A piece broken out of the bell, spigot, tongue or groove in such size that the watertightness of the joint will be impaired.
 - 3. Any shattering or flaking of concrete or other conditions indicating an improper concrete mix.
 - 4. Cracks sufficient to impair the strength, durability, or serviceability of the pipe.
 - 5. Joint Sections with spalls, cracks, fractures, or other imperfections that will adversely affect the performance of the joints.

1.06 MEASUREMENT AND PAYMENT

- A. All manholes zero feet to 8 feet deep and designated in the contract documents will be measured as the total number of such manholes constructed, including those exceeding 8 feet in depth from the lowest invert elevation to the top of the ring.
- B. Measurement for manholes, greater than 8 feet in depth, is on a unit each manhole installed for each 2-foot increment. Depth is measured from the lowest invert elevation to the top of the ring.
- C. All manholes shall be paid at the contract unit price bid for each such manhole, which price shall be full compensation for all precast sections or throat rings, UV stabilized polyethylene liner, cones, bases, rings and covers, manhole ring, encasement, manhole rubber joint seal, flowable fill, concrete cradles, mortar, drop pipes, saws cutting of surfaces, surface restoration, and fittings, labor, tools, equipment, testing, tees, wyes, and incidentals necessary to complete the work.
- D. Shallow manholes shall be paid at the contract unit price.
- E. Gravel subgrade filler for manholes shall not be measured separately for payment.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All constructed manholes shall be watertight and equipped with pre-tested and approved ring and covers. Sewer manhole ring and cover castings shall meet the current requirements of the American Association of State Highway and Transportation Officials (AASHTO) Designation M306-10.
 - 1. FRP Manholes and structures: Manholes shall be constructed of glass fiber-reinforced isophalic polyester resin containing chemically enhanced sand for use in sanitary sewer applications. They shall be a one-piece unit of one class, fabricated in a composite laminate. Walls shall be of uniform thickness and shall be free from thin spots and voids. Exterior surface shall be free of ridges and sharp protrusions and reinforcement. Interior surface shall also be smooth and free of ridges to allow for self-cleaning. The exterior surface shall be covered with graded sand to facilitate bonding to the concrete base pad, cement stabilized sand backfill and cement grout

used to seal around all incoming lines. Manholes shall conform to the following design criteria:

- a. ASTM D-3753 "Standard Specification of Glass-Fiber reinforced Polyester Manholes."
 - b. ASTM C-581 "Practice for determining chemical resistance of chemical thermosetting resins used in glass-fiber reinforced structures intended for liquid Service."
 - c. ASTM D-2412 "Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel Plate Loading."
 - d. ASTM D-695 "Test Methods for Compressive Properties of Rigid Plastics."
 - e. ASTM D-2584 "Test Method for Ignition Loss of Cured Reinforced Resins."
 - f. AASHTO H-20 Axial Loading Nominal inside diameter of the manhole shall be 48". Thickness of the manhole shall be 0.50" nominal. Height shall be selected in accordance with project plans.
2. Gaskets
 - a. Rubber gaskets shall be neoprene or another synthetic material conforming to ASTM C443. The gasket shall have a 40 plus or minus five hardness when measured by ASTM D2240, Type A durometer.
 3. "Throat rings" shall be made of HDPE and have a maximum thickness of 2 inches. No concrete throat rings shall be used.
 - a. The internal diameter shall match that of the ring and cover's opening. HDPE "throat rings" are to be used in conjunction with a UV stabilized internal polyethylene liner for the purpose of providing an infiltration/inflow (I/I) barrier.
 - b. The I/I Barrier shall be a No Flow in Flow Dish.
 - c. Note of Clarification: A minimum of two and a maximum of six "throat rings" may be used at each adjusted manhole. "Throat rings" are limited to a minimum of two and a maximum of four rings for new manhole construction. Throat rings shall be a maximum thickness of two (2) inches
 4. Frames and Covers
 - a. Provide cast iron frames and covers conforming to ASTM A48, Class 35B. The manhole cover shall have the word "Sanitary Sewer" cast on to it. The letter shall be 1 1/2" in size. Castings shall be given one coat of coal tar pitch varnish before shipment from the foundry.
 - b. Manhole frame shall have a minimum 30-inch diameter clear opening.
 - c. Manholes frames and covers shall be designed for AASHTO M-306 loading.
 - d. Pressure type manhole covers shall contain no holes or openings except as required for bolts.
 5. Pipe Connections to Manhole
 - a. Resilient connectors between manhole structure and pipe shall meet the requirements of ASTM C923. The connection shall be made watertight with rubber gasket assembly such as A-LOK, or KOR-N-SEAL.
 6. Vent Pipes
 - a. Provide PVC vent pipes for manholes where indicated on drawings conforming to ASTM D2665.

- B. Dimensions: The manhole shall be a circular cylinder, reduced at the top to a circular manway not smaller than 30" inside diameter. Manholes shall be produced in half-foot increments in length +/- 2". Nominal inside diameters shall be 48", 60", and 72" as shown in the design details. Tolerance on the inside diameter shall be +/- 1%.
- C. Configuration: The manway reducing cone section shall be centered on the manhole barrel and must provide a bearing surface on which a standard ring and cover may be supported and adjusted to grade. The reducer shall be joined to the barrel section at the factory with resin and glass fiber reinforcement, thus providing required monolithic design to prevent infiltration and/or exfiltration through the manhole.
- D. Loading: The manhole shall be manufactured in one class of load rating. This class shall be H-20 wheel load (minimum 16,000 pounds dynamic wheel load).
- E. Manufacturer and Certification: The manholes shall be L.F. Manufacturing, Inc. (LFM) Fiberglass Manholes or approved equal that conforms to ASTM D. 3753-81, Standard Specifications for Fiberglass Reinforced Polyester Manholes and all noted applicable documents. The manufacturer shall submit written certification that their product meets the requirements of ASTM D. 3753-81 with test results of specified manholes included.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Manhole Installation
 1. Manhole shall be constructed to the dimensions shown on the Drawings and as specified. Work shall be protected against flooding and floatation.
 2. Bases of manholes shall be placed on a bed of 12-inch screened gravel as shown on the Drawings. Cast-in-place manholes shall be constructed in compliance with the requirements of Division 03 - Concrete and the details shown on the Drawings.
 3. Precast concrete barrel sections shall be set so as to be vertical and with sections in true alignment with a 1/4-inch maximum tolerance to be allowed. Joints of precast barrel sections shall be sealed with a rubber "O" ring set in a recess. Lift holes for handling barrel sections shall be filled with non-shrink grout and finished flush with the adjoining surfaces. Allow grout to set for 24 hours before backfilling. Backfilling shall be performed in a careful manner, bringing the fill up evenly on all sides. The Contractor shall install the precast sections in a manner that will result in a watertight joint.
 4. Fiberglass manholes and structures must be installed according to manufacturer's installation instructions. Correct manhole installation requires proper concrete foundation, good backfill and proper handling to prevent manhole damage and ensure long-term corrosion resistant service.
 5. Unless otherwise shown on the Drawings, manhole foundations shall consist of a reinforced concrete slab, 12-inch thick minimum, with #5 bars at 12-inch centers each way top and bottom. The foundation shall be a minimum of one foot larger than the outside diameter of the manhole.
 6. Grout manhole section into base.

7. Provide precast concrete rings between manhole section and cast-iron ring. Set manhole ring and cover to grade.
 8. Manhole frames and covers shall be set in a non-shrink grout bed.
- B. Pipe stubs for future extensions shall also be connected and the stub end closed by a suitable watertight plug, and mark with tape.
- C. Manholes constructed in advance of paving projects shall be constructed with the top of the concrete portion of the manhole 23-inches below the final finished grade. The ring and cover shall be placed on a built-up section of approved grade rings and sealers between rings and other materials.

3.02 TESTING

- A. Manholes shall be tested for leakage by hydrostatic exfiltration testing or vacuum testing. Manholes shall be tested after installation with all connections in place.
- B. Hydrostatic Testing. The maximum leakage for hydrostatic testing shall be 0.025 gallons per foot diameter per foot of manhole depth per hour. For concrete manholes a wetting period of 24 hours may be used prior to testing in order to allow saturation of the concrete. If the manhole fails the hydrostatic test, the manhole shall be repaired and retested until it passes the test.
- C. Vacuum Testing. All lift holes and exterior joints shall be plugged with a non-shrink grout. No grout shall be placed in horizontal joints prior to testing. All pipes entering the manhole shall be plugged. Stubouts, manhole boots, and pipe plugs shall be secured to prevent movement while the vacuum is drawn. A minimum 60-inch-lb torque wrench shall be used to tighten the external clamps that secure the test cover to the top of the manhole. The test head shall be placed at the inside of the top of the cone section, and the seal inflated in accordance with the manufacturer's recommendations. A vacuum of 10 inches of mercury shall be drawn, and the vacuum pump shut off. With all valves closed, the time for the vacuum to drop to 9 inches of mercury shall not be less than 2 minutes. If vacuum tests are used in lieu of hydrostatic tests, the test shall be done both before and after backfilling of the manhole has occurred. If the manhole fails a test, necessary repairs shall be made with a non-shrink grout while the vacuum is being drawn. The test shall be repeated. If the vacuum test is failed twice, the manhole shall be repaired, and a hydrostatic test shall be performed in accordance with paragraph 3.02.B of this Section. The manhole shall be retested as described above until a successful test is made.
- D. Acceptance: Any manhole which fails the initial test must be repaired per manufacturer's recommendations.
1. The manhole shall be retested as described above until a successful test is attained.
 2. After a successful test, the temporary plugs will be removed.
 3. To ensure that the plugs have been removed, Contractor shall only remove the plugs in the presence of the Inspector.

- E. Repairs to Existing Manhole: Any existing manhole/structure which fails to pass the vacuum test shall be closely examined by the Inspector and the Contractor to determine if the manhole can be repaired.
 - 1. Contractor shall either repair or remove and replace the manhole as directed.
 - 2. The manhole shall then be retested and as stated above.
 - 3. The Owner may elect to simply remove and replace the existing manhole with a new one at no additional cost to the owner.
 - 4. Any manhole excavated for repairs or excavated for tie in, shall be encased with a minimum of 12 inches thickness of flowable fill to one foot above the top of the cone section to allow for the concrete ring encasement.

3.03 CLEANING

- A. All new manholes shall be thoroughly cleaned of silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION

SECTION 33 31 20

SANITARY SEWER LATERAL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This item shall govern sanitary sewer laterals installed in accordance with these specifications and as directed by the Engineer. This item shall also consist of the installation of a two-way sewer cleanout at the property line.

1.02 RELATED WORK

- A. Section 31 23 33 – Trenching and Backfilling

1.03 SUBMITTALS

- A. Contractor shall submit manufacturer's product data, instructions, recommendations, shop drawings, and certifications.

1.04 REFERENCE STANDARDS

- A. Texas Commission of Environmental Quality (TCEQ)
 - 1. Chapter 217 Design Criteria for Domestic Wastewater Systems
- B. AASHTO – American Association of State Highway and Transportation Officials:
 - 1. AASHTO M306: Standard Specification for Drainage, Sewer, Utility, and Related Castings.

1.05 MEASUREMENT AND PAYMENT

- A. Sanitary sewer laterals shall be measured by the each. (6" dia)
- B. Sanitary sewer laterals shall be paid for at the contract bid price each complete in place for the type, and size constructed. Price shall be full compensation for furnishing all materials, including pipe, pipe fittings (to include wyes, tees, bends), pumping, bedding, trenching or boring, trench protection, hauling excess materials backfilling, tamping, surface restoration, concrete encasement, cutting pavement and surface structures of whatever type encountered and replacement with any type specified material and other incidentals required to complete the work.
 - 1. Payment for the installation of the one-way clean out shall be paid per each under the applicable line item.

PART 2 PRODUCTS

2.01 MATERIALS

- A. The materials for sanitary sewer laterals shall conform to the specification contained in Section 33 31 00 – Sanitary Sewer Piping.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Sanitary sewer laterals fittings and appurtenances shall conform to the material specifications and shall be installed by the Contractor as specified herein, or as directed by the Inspector or the Engineer and in accordance with Drawings.
- B. Designation of Lateral: A sewer pipe located between the sanitary sewer main and the customer's premise, is designated as a "sanitary sewer lateral."
- C. Lateral Installation: All lateral installations shall be performed in accordance with Specification Section 33 31 00 – Sanitary Sewer Piping and as described herein.
- D. For sanitary sewer mains that are 12 inch in diameter or smaller, all laterals shall be connected using the appropriate size tee/wye placed in line with the main line.
- E. For mains larger than 12 inch, insert-a-tee conforming to ASTM 3034 for high pressure gaskets, or approved equal, shall be used.
- F. Only one-way cleanouts are required on the termination point of a dead-end main.
- G. All PVC water main crossing sewer mains are to be SDR 18 PVC (ASTM 2241) with a minimum pressure rating of 235 psi.
- H. All sanitary sewer PVC pipe shall be green. White pipe is prohibited. Contractor will need to submit information to request an exemption to use white pipe such as letters from suppliers that pipe is not available. If white pipe is approved it must have appropriate markings and be wrapped with green poly wrap.
- I. Waterline crossings and where water and sewer mains are parallel and separation distance cannot be achieved as per 30 TAC 217.53, use extra stiff pipe SDR 26 PVC (ASTM D2241) with a minimum pressure rating of 150 psi.
- J. Connection to the customer's end of the lateral shall be performed using flexible coupling, or pre-approved equal.
- K. All flexible couplings shall be concrete-encased to prevent movement or breakage of the steel bands.
 - 1. All flexible couplings shall be concrete encased with a minimum 6 inches outside of coupling.
 - 2. All cleanouts at job sites shall have installed an approved heavy duty threaded sanitary sewer cap and cleanout box with cover as shown in detail.

END OF SECTION

SECTION 33 31 40

BYPASS PUMPING SMALL DIAMETER SANITARY SEWER MAINS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The work covered by this item consists of bypass pumping operations for existing sanitary sewers less than 24-inches in diameter in order to temporarily reroute sanitary sewer flows to prevent a sanitary sewage overflow (SSO) and to provide adequate and reliable sanitary sewer flow at all times during construction, while the tasked scope of work is executed.
1. The work also covered in this item is for the use of inflatable and mechanical pipe plugs.
 2. The use of inflatable/mechanical plugs in the water and sewer industry is the standard method to temporarily plug a pipe where permanent flow control devices are not available or are not operating as designed.
 3. An inherent danger exists with all inflatable products.
 4. If any conditions with this equipment exist that may jeopardize the safety of workers or others, do not use it.
 5. This item includes all requirements for implementing a temporary pumping system for the purpose of diverting sanitary sewage flow around any construction-related activity to an approved reintroduction point within the sanitary sewer system.
 6. The Contractor shall minimize the health, safety, and regulatory risks by taking all reasonable measures to avoid an SSO.
 7. All bypass systems shall comply with all the requirements of this section unless specifically noted otherwise.
 8. The Contractor shall be responsible for the design of the bypass pumping plan and system. Contractor's bypass pumping system design shall be developed based upon the requirements of the Contract Documents.
 9. Contractor's bypass pumping system design shall be developed based upon full pipe flow using a Manning Roughness coefficient of 0.013.
 10. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
 11. Contractor shall provide for temporary measures to convey sewage flows and avoid sewage spills should a storm event occur that generates sanitary sewer flows in excess of Contractor's bypass pumping system.

1.02 SUBMITTALS

- A. All submittals shall be in accordance with Engineer's requirements. All submittals shall be approved by the Engineer prior to delivery of materials and commencing any portion of the proposed scope of work.
- B. For all projects requiring bypass pumping, the Contractor shall prepare and submit a Bypass Pumping Plan (BPP).

1. The BPP shall be submitted a minimum of (2) two weeks prior to commencing any portion of the proposed scope of work and shall be approved by the Engineer prior to beginning Work.
 2. The BPP shall be signed and sealed by a professional engineer licensed in the State of Texas (Contractor's Engineer).
- C. Contractor shall submit manufacturer's product data, instructions, recommendations, shop drawings, and necessary certifications in order for the proposed BPP to be reviewed and approved.
- D. The following shall be submitted as part of the BPP:
1. A cover letter containing the following information;
 - a. The project name and job number.
 - b. The name and address of the Contractor.
 - c. Contact information of the Contractor's project manager, superintendent, foreman/supervisor, safety professional, etc.
 - d. Resumes for qualified pump personnel and supervisors
 - e. A description and location of the planned bypass pumping work to be performed; include data for stationary and pump and haul bypass systems as applicable.
 2. Emergency (24 hrs/day, 7 days/week) contact information for the bypass pumping subcontractor, if applicable. Make sure to include the name, cell phone number, and title of the person(s) onsite responsible for the bypass pumping operation.
 3. The name, phone number, title, signature, and PE seal of the Contractor's Engineer preparing the BPP.
 4. Copies of permits or other documents showing the Contractor has obtained all clearances necessary for installation and operation of the BPP.
 5. If Contractor elects to use a combination of stationary bypass pumping and pump and haul for his bypass system, Contractor's BPP shall identify the quantity of flows that will be pumped and pumped and hauled for each type of bypass system along with the points where flows will be removed and reintroduced into the sanitary sewer system.
 6. Certificate of Compliance that the BPP complies with all Owner and regulatory requirements and that all components have been designed by a professional engineer licensed in the State of Texas.
 7. The Contractor's Engineer shall review all components of the submitted BPP for adequacy to the Contractor's selected design flow conditions and ensure that all bypass pumping system components are of adequate size, strength, meet the reliability criteria specified herein.
 8. A description of the maximum amount of sanitary sewer flows to be bypassed by the Contractor's bypass pumping system and how the flow conditions will be monitored during system operations (including all flow measurement devices, calculations, equipment, or other sources of how data was obtained).
 9. Descriptions of all proposed bypass pumping components to be used.
 10. If applicable, describe all different bypass pumping phases.

- a. Include bypass pump(s) size(s) and capacity, as well as the size(s) and capacity of the suction/discharge piping.
 - b. The description shall also include manhole(s)/structure(s) depth(s) and size(s) that will be used during the bypass pumping operation, sanitary sewer plugging method and type of plugs to be used, flowmeter installation locations, etc.
11. All plugs are required, submit a Plug Use Plan (PUP) according to the requirements of to this specification.
 - a. Contractor shall provide Owner with adequate prior notification to allow Owner to witness installation and removal of all plugs.
 - b. Description of procedure for locating and recovering any lost plug.
 12. Description of minimum equipment on hand should an emergency plan be implemented, i.e. spare pump, emergency generator.
 13. The date and time the bypass pumping is expected to begin and be completed. Indicate if bypass pumping will take place outside normal work hours which are between 8 am to 5 pm Mondays through Fridays (except for Owner observed holidays).
 14. The pump curves, showing operating range. This shall include the proposed system curve, addressing the pump operation in relation to the suction/discharge piping's alignment with respect to restriction and/or elevations.
 15. Suction and discharge piping material(s) and capacity to be used for the bypass pumping operation, including the material(s) for any bend(s) and/or valve(s) that will be used.
 16. Sound attenuated pumps are required at all sites.
 17. A sketch showing the location of the pump(s) and the route of the suction, discharge, and diversion piping.
 18. If Contractor elects to use locations outside of the easements obtained by Owner or locations that are not indicated for use on the BPP plan sheet, Contractor shall be solely responsible for obtaining the required easements and written documentation required for use of these locations, a copy shall be provided to Owner prior to Contractor's use.
 19. A sketch detailing proposed restoration of the suction and discharge points if the Contractor proposed to make openings in the existing pipes or structures.
 - a. If different than shown in contract documents, the new sketch shall be dimensioned and all-inclusive showing all Owner manholes that will be used for suction and discharge operations.
 - b. If any other structure will be used for suction and/or discharge operations, then the nearest manhole(s) shall be labeled.
 - c. The sketch shall include the name of any streets and/or major intersection in the area. All features possibly affected by the alignment of the BPP's components (driveways, vehicular traffic, residential or commercial dwellings (due to noise)) shall likewise be addressed.
 20. For pump and haul systems the sketch shall show the location of all system components along with the staging areas, haul routes, and an explanation of the expected cycle time of all aspects of the operation.

21. Clear photographs of the manhole(s) interior that will be used for the bypass pumping operation, including pole camera photographs of pipes where plugs will be installed.
 - a. All photographs will be labeled with the manhole number, date, and intended use of the manhole by the Contractor's BPP.
22. A Traffic Control Plan that pertains solely to the bypass pumping operations. This may differ than the project's traffic control plan for the overall scope of work.
 - a. The Traffic Control Plan shall include all required permits including street cut permits.
23. Contractor shall maintain pedestrian and vehicular traffic and comply with ADA regulations for access to all residential and commercial property unless written approval is otherwise obtained from the property owner allowing for reduced access.
24. An Emergency Plan detailing procedures to be followed in the event any portion of the bypass operation fails and causes either surcharging or an actual SSO. A sanitary sewer surcharge is herein defined as any flows entering the manhole or structure (above the crown of the pipe). Contractor is herein advised that:
 - a. The existing sanitary sewer system may surcharge during certain storm events. The Contractor's BPP must recognize this potential and accommodate it with sufficient bypass capacity, restoration of flow through the sanitary sewer system, or other measures acceptable to Owner during these flow events. These measures shall be included in the submitted BPP.
 - b. The Contractor's BPP cannot cause any surcharging that results in damage or SSOs.
 - c. Any damage or SSOs during bypass pumping operations resulting from Contractor's bypass system shall be deemed a failure of BPP, and the Contractor must re-propose an improvement to their BPP for review and approved. Contractor shall be fully responsible for all damages and costs related to the installation, operation, and maintenance of Contractor's bypass pumping operations including damages, clean up, fines, penalties, and other related costs.
 - d. Contractor to include minimum equipment on hand for implementing and emergency plan. (i.e. spare pump, emergency power source.)
25. Where bypass piping is installed within the floodplain of waterways subject to flooding, the Contractor shall submit an anchorage plan and calculations to ensure that piping is properly anchored.
26. The pipe shall be capable of remaining in place during a 100-year storm event.
27. Anchorage plan and calculations shall be designed and sealed by a professional engineer licensed in the State of Texas (Contractor's Engineer). This shall be the same PE that sealed the BPP Certificate of Compliance.
28. For pump and haul system, submit copy of Hauler's Transporter Registration as issued by TCEQ under 30 TAC Chapter 312, Subchapter G.
29. For pump and haul system, submit information on licensed disposal site to be used by the Contractor
30. Submit the checklist found at the end of this document confirming that all items required by this section are included in the BPP submittal.

31. For all projects requiring the use of pipe plugs on pipes the Contractor shall furnish a submittal containing manufacturer's product data, instructions, recommendations and a project PUP. The PUP shall be submitted and approved by the Owner engineer a minimum of (2) two weeks prior to commencing any portion of the proposed scope of work. The following shall be submitted with the PUP:
- a. A cover letter containing the following information;
 - (i) The project name and job number;
 - (ii) The name and address of the Contractor
 - (iii) Contact information of the Contractor's project manager, superintendent, foreman/supervisor, safety professional, etc.
 - (iv) Emergency (24 hrs/day, 7 days/week) contact information for the staff responsible for operating and maintaining the plug. Include the name, phone number, email address and the person(s) onsite who is responsible for the project.
 - (v) The name and contact information for the PUP preparer.
 - b. Plug Plan
 - (i) The plan shall show where on the project site the Contractor intends to use pipe plugs, including:
 - (ii) manhole numbers;
 - (iii) the upstream and downstream pipe diameters and pipe materials;
 - (iv) pipe slopes;
 - (v) pipe depth;
 - (vi) pipe flow direction;
 - (vii) known peak or surcharge flow data;
 - (viii) types of plugs to be used;
 - (ix) types of restraint used;
 - (x) type of radio transmitting device.
 - (xi) flow monitoring system plan
 - (xii) airline regulator and gauge location
 - c. Calculations
 - (i) Provide calculations of the maximum anticipated head pressure on the plug and the resultant tensile force required to restrain the plug prior to plug inflation and during plug removal.
 - (ii) Provide calculations of the required inflation pressure of the plug.
 - (iii) Calculations shall be sealed and signed by a professional engineer licensed in the state of Texas in civil or mechanical engineering, representing plug manufacturer.
 - d. Plug selection
 - (i) Detail the plug selection for each installation including given conditions, pipe size and anticipated pressure requirements. Include in plan sleeves that will be used.
 - e. Plug inspection:
 - (i) Provide a manufacturer's inspection form detailing recommendations for plug inspection of plug condition before and after use; form to be signed

by Contractor staff responsible for plug installation prior to and after plug installation.

- f. Monitoring plan
 - (i) Provide a monitoring plan for observing the plug inflation pressure gauge and hoses. Monitoring shall be for 24-hours per day during the plug use duration.
 - (ii) Provide a written response plan for when the plug loses pressure.
 - (iii) Provide a plug retrieval plan.
- g. Plug restraint details
 - (i) Provide means and methods for anchoring, support, and bracing appropriate for anticipated operating pressure conditions
 - (ii) Size restraint (cable or chain) based on calculated loads using a safety factor of 4.
 - (iii) Eye bolts to be $\frac{3}{4}$ inch min galvanized steel.
 - (iv) Provide multiple tie-off locations for chain or wire cable restraint, greater than or equal to calculated loads using a safety factor of 4 or greater. Tie off locations cannot be located on private property.
 - (v) Rope of any kind is not an acceptable material for plug restraint.
 - (vi) Manufacturer's Literature ff. Provide manufacturer's literature on proper plug use and safety precautions, including available on-line training.

1.03 REFERENCE STANDARDS

- A. Texas Commission of Environmental Quality
 - 1. TCEQ under 30 TAC Chapter 312, Subchapter G
- B. American Concrete Pipe Association
 - 1. Concrete Pipe Design Manual

1.04 MEASUREMENT AND PAYMENT

- A. Measurement for the work specified herein will be by lump sum and shall include pumps, pipe, plugs, transmitters and any other items required for successful bypass pumping.
- B. Payment of the "Lump Sum" bid for Bypass Pumping shall be in accordance with the following:
 - 1. Any effort required for multiple set-ups and operations shall be included in the lump sum price.
 - 2. When initial set-up and operation of the bypass pumping system begins (including a successful test), 20% of the "Lump Sum" cost will be paid as applicable to the bypass system used; stationary bypass pumping or pump and haul bypass systems.
 - 3. 60% of the "Lump Sum" cost will be paid over equal monthly payments (estimated from the BPP or other documentation approved by the Inspector) during the course of the bypass pumping operation as applicable to the bypass system used; stationary bypass pumping or pump and haul bypass systems.
 - 4. 20% of the remaining "Lump Sum" cost will be paid upon an acceptable removal and/or disassembly of all components of the BPP, including site cleanup as

applicable to the bypass system used; stationary bypass pumping or pump and haul bypass systems.

5. For multi-bypass pumping setups, payment will be proportional to the overall amount of the established bid line item.
6. Any damages, repairs, etc., to private or public property will not be considered for any additional payment.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. The Contractor shall provide all necessary pumping equipment, piping and all other necessary appurtenances in order to maintain a reliable sanitary sewer flow in the sanitary sewer system (including any temporary manholes) at all times during construction for stationary pumping and pump and haul bypass pumping systems. For 8" to 12" sanitary sewer mains which flow level is less than one half of the pipe diameter a float monitoring system or radio transmitter will not be required. All materials, equipment, etc., must be in good condition, and shall not have visible damage such as cracks, holes, foreign material, blisters, etc. Subsurface information contained within the above report or indicated on the drawings was obtained by the Owner solely for use by the Owner's Representative in establishing design criteria for the project. The accuracy and completeness of the information is not guaranteed, and it is not to be construed as part of the Project Specifications governing construction of the project. The Contractor shall perform additional geotechnical investigation as he deems necessary for his construction activities. There shall not be any additional payment or extension of contract time to the Contractor for additional geotechnical investigations and resulting additional work that may be required to complete the project.
- B. Plugs: Plugs must be selected and installed according to the size of the line to be plugged.
 1. Plugs shall be secured and anchored to prevent plug movement or escape into the adjoining sanitary sewers should the plug fail.
 2. All plugs shall be equipped with a radio transmitter that will be used to locate any plug that has escaped in the adjacent system.
 3. The radio transmitter shall be designed for environment that it will be installed.
 4. The Contractor shall also provide and keep on site the matching radio receiver that will be used to locate any plug that is lost in the adjacent system.
 5. Plugs will be in good condition and reviewed by the Contractor for defects that might lead to failure prior to being installed.
 6. The Contractor shall provide and sign a Plug Inspection form verifying plugs have been inspected.
 7. All plugs shall include a non-corrosive/non-plastic name plate permanently anchored to both ends of the plug.
 8. Name plate shall include Job No. permanently stamped, engraved or welded on the name plate with a minimum of 1 inch tall legible lettering.
 9. Airline regulator and gauge shall be located outside excavation and shall be secured and anchored. Location shall be shown on the PUP.

10. An additional plug (for each size of plug used) must be onsite and ready to be installed in the event a plug fails or becomes dislodged. Plug(s) will be reviewed by the Inspector and/or Engineer for defects that might lead to failure prior to being installed.
11. Contractor shall immediately locate and remove any plug that has shifted its position, slipped within the pipe, dislodged, moved, or otherwise provided an indication that its suitability for use in plugging may be suspect or compromised.
12. Contractor shall immediately notify Owner of any plug that has provided an indication that its suitability for use in plugging may be suspect or compromised and allow Owner to observe plug removal and replacement.
13. It is also imperative that the Contractor notify the Inspector at the completion of the work. In order to verify that all plugs have been removed from the system, Contractor shall only do so in the presence of the Inspector.
14. The Contractor shall provide all necessary equipment, plugs, hoses, gauges and necessary appurtenances to install the plug, maintain the plug during use and remove the plug at completion.
15. All plugs must be in good condition, and shall not have visible damage such as cracks, holes, tears, cuts, punctures, abrasions, loose or damaged fittings, cracks in castings and excessive wear.
16. All plugs 24-inches and larger shall have an air release valve for rupture protection.
17. All plugs shall be equipped with a radio transmitter locating device that is activated by the plug losing air pressure. The locating transmitter device shall be effective to a depth of 65 feet, and have a battery life of 1,000 hours when operated in pulse mode after activation.
18. All plugs shall have a protective sleeve.
19. If the plug is damaged, do not use the plug and remove it from the job site.
20. Contractor must be aware of the limitations associated with plugs.

C. Stationary Bypass Pumping Systems

1. High-Density Polyethylene (HDPE) is the preferred pipe material for all bypass piping.
2. HDPE pipe must be assembled and joined using fused couplings, fused flanges or fusion welding in order to avoid joint leakage. Owner shall be notified in sufficient time to allow them to inspect the pipe joints during assembly. Owner shall be notified a minimum of 48 hours in advance of all fusing/joining operations.
3. HDPE fusion welding must be performed by personnel certified as fusion technician(s) by the manufacturer of HDPE pipe and/or fusing equipment. Owner shall examine welds prior to use in BPP operation.
4. BPP shall indicate the proposed DR of the pipe to be used.
5. Rigid suction hose that is in good condition and does not leak may be allowed for withdrawal of flows from the suction point into the bypass pumps.
6. Pipe material other than HDPE shall be submitted to the Engineer for approval. Neither "Irrigation type" pipe nor glued PVC pipe will be permitted.
7. Any hoses or pipes that leak shall be removed and replaced with non-leaking hoses or pipes.

8. Pumps must be fully automatic self-priming units that do not require the use of foot valves or vacuum pumps to prime the system.
9. No electric pumps will be allowed; all pumps must be diesel powered. Contractor shall provide suitable spill control and containment measures to avoid environmental contamination by pumps, fuels, or lubricants.
10. All pumps shall be open impeller solids handling type pumps, capable of passing a minimum of 3-inch diameter solids.
11. Contractor shall have one backup pump, equal in capacity to the largest pump in the system, connected into the bypass pumping system, and ready for operation in case any of the primary pumps fail.
12. The backup pump shall not be used in Contractor's calculations for determining the pumping capacity requirements for the stated flow conditions above.
13. Sound-attenuated pump enclosures shall be required on all projects where the bypass pumps are required.
14. Contractor shall provide sufficient sound attention measures to comply with City of Brownsville noise limitation requirements.

D. Pump and Haul Bypass Pumping Systems

1. Pump and haul bypass pumping systems shall use good-quality vacuum trucks, equipment, and materials from manufacturers commonly engaged in the manufacture, service, and repair of these types of sanitary sewer service trucks and equipment.
2. All equipment shall be designed and manufactured for sanitary sewer service, shall function acceptably, be reliable, and free from leaks or other deleterious environmental impacts.
3. All equipment proposed for use in pump and haul bypass pumping shall have been maintained per the manufacture's recommendations.
4. Equipment service records shall be made available at Owner request.
5. Any hoses or pipes that leak shall be removed and replaced with non-leaking hoses or pipes.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. During construction, it will be the Contractor's responsibility to maintain a safe and secure environment at all times.
- B. All provisions and/or requirements of the BPP must be followed throughout the course of any bypass flow operations.
- C. Contractor must notify the Owner's Inspections Department 72 hours prior to commencing the bypass pumping operations.
- D. Owner requires the Contractor to manage the flow of wastewater in a planned and proactive manner.

- E. Contractor shall be fully responsible for all damages and costs related to the installation, modification of existing manholes/structures, operation, and maintenance of Contractor's bypass pumping operations including damages, clean up, fines, penalties, and other related costs.
- F. Bypass pumping systems shall be stationary systems consisting of portable pumps, piping, and appurtenances unless a "pump and haul" bypass system is accepted by Owner.
- G. Pump and haul bypass systems can use a relay system of vacuum trucks using a pump and haul approach to bypass sewage flows.
- H. Where pump and haul bypass systems are allowed the Contractor may elect to submit using a pump and haul bypass system for these locations or to use a stationary bypass system.
- I. The Contractor shall have full time (24-hour), onsite qualified pump personnel including supervision for monitoring the entire bypass installation while it is in operation.
- J. The entire length of bypass piping shall be walked and inspected hourly to monitor for leaks.
- K. High-level alarm notification to cell phones shall not eliminate this requirement.
- L. Where bypass pumping systems exceed 1,500 feet in length or cannot be completely observed from the bypass pump location, at least one attendant shall be assigned to the pump operation, and one additional attendant shall be assigned to walk and monitor the pipeline.
- M. Prior to installing any plugs, the Contractor and Owner shall inspect the existing pipe using a pole camera, for imperfections that might cause damage to the plug, cause the plug to not seal or function properly, or compromise the integrity of the pipe when the plug is inflated.
- N. If debris is present in the existing line to be plugged, it shall be removed prior to plug installation.
- O. The results of this inspection shall directly impact the planned plugging location(s). Contractor shall allow the Engineer an opportunity to confirm that the location of plug(s) is acceptable.
- P. The Contractor shall monitor on daily basis the radio transmitter battery and radio signal strengths. If either are found to be below the manufacturer's requirements the radio transmitter shall be immediately replaced.
- Q. Lines inserted into any manholes or structures shall be constructed with elbows, or be otherwise angled, to direct discharge along the most efficient path for entry into the downstream line without causing unnecessary turbulence of flow.
- R. The termination point of the discharge piping shall extend to the crown of the pipe housed within the manhole or structure receiving the bypassed flows.

- S. Contractor shall provide continuous supply on-site fuel storage sufficient for 24- hour operation of the bypass pumping installation.
- T. Contractor shall protect all components of the bypass operations from vandalism and vehicular damage by making the site secure.
- U. Contractor shall minimize sanitary sewer odors by using lids, shroud covers, or any method accepted by the Inspector or Engineer.
- V. Contractor shall be solely responsible for any and all damages to private and/or public property caused by, or during, the installation, operation, and/or removal of the bypass pumping system. Contractor shall be fully responsible for all damages and costs related to the installation, operation, and maintenance of Contractor's bypass pumping operations including damages, clean up, fines, penalties, and other related costs.
- W. Once all work is completed and the bypass pumping operation is no longer required, the Contractor must disinfect and drain the entire BPP system in accordance with approved submittal. All excavations for bypassing operations shall be backfilled, compacted and pavement restored as directed by the Engineer.
- X. Owner will not be responsible for additional traffic control measures that might be required by City of Brownsville, Cameron County, TxDOT, or any other public entity having jurisdiction of the project location.
- Y. Flow Tracking a. Contractor shall continuously track all flows being bypassed. Flow monitoring data shall be provided to Owner Inspector on a daily basis.
- Z. Plug Installation
 - 1. Safety
 - a. The Contractor shall be solely responsible for the safe and effective use of plugs, including the proper combination of inflatable/mechanical plugs to block the sewer flow at both the upstream and downstream ends of a sewer bypass.
 - b. Inflatable plugs should be used only after receiving training as recommended by the manufacturer.
 - c. An inherent danger exists with all inflatable products. If any conditions with this equipment exist that may jeopardize the safety of workers or others, corrective actions should be taken prior to the equipment use.
 - 2. Plugs
 - a. Plugs must be selected and installed in accordance with the manufacturers recommendations.
 - b. Plugs shall be tested prior to use. See Plug testing of this Specification.
 - c. Plugs must be selected and installed according to the size of the line to be plugged.
 - d. Spare plugs – Provide spare plugs on-site ready to be installed in the event a plug fails or becomes dislodged.
 - e. Plugs must be removed from the system upon completion of the work. In order to verify that all plugs have been removed from the system, Contractor shall only do so in the presence of the Inspector.

- f. Damages – The Contractor will be responsible for damages due to plugs being left in place or dislodged, including but not limited to:
 - (i) Damages to Owner infrastructure or private property.
 - (ii) Costs associated with sanitary sewer overflows including: regulatory fines; sewage and debris cleanup; debris disposal at an appropriate landfill; disinfection of all surfaces which have come in contact with the sewage.
 - (iii) All costs associated with locating and retrieving lost or dislodged plugs.
 - (iv) A lost plug shall require Contractor to pay a minimum of a \$25,000 fine for each plug lost. These costs will not be considered for any additional payment.
 - (v) If the plug is damaged, it shall be immediately removed from the job-site.
- AA. If sewage accidentally drains into the drainage system or is spilled within the project, the Contractor shall immediately stop the overflow, notify the Owner, and take the necessary action to clean and disinfect the spillage using an HTH, or approved equal, chemical.

3.02 TESTING

- A. Testing and quality control will be required for stationary bypass pumping and pump and haul bypass systems as indicated below. For 8" to 12" sanitary sewer mains which flow level is less than one half of the pipe diameter a 24 hour by pass test will not be required. A one-to-two-hour test will be required at the discretion of the inspector.
- B. Contractor shall obtain and keep copies of all required permits on site prior to beginning Testing and throughout performance of the Work.
- C. Contractor must prove to the Owner that the equipment, materials and all operational aspects and/or appurtenances related to the BPP are in good condition prior to commencing the bypass pumping operation.
- D. Failure to do so will result in the Contractor not being permitted to continue with any construction work requiring bypass pumping operations.
- E. Contractor must notify the Owner's Inspections Department 48 hours prior to commencing any testing.
- F. Any flows surcharging the sanitary sewer system during the test and/or during actual bypass periods will deem the BPP to be unacceptable and must be revised and resubmitted for approval.
- G. There will be no separate pay item if this condition occurs during the timeframe in which bypass pumping test and/or operations are underway during the project. No testing of the bypass pumping operation shall be conducted between Thursday and Sunday, unless approved by Owner Inspections Management.
- H. If bypass pumping will take place outside normal work hours which are between 8 am to 5 pm Mondays through Fridays (except for Owner observed holidays), Contractor

shall reimburse Owner for the overtime costs required by his bypass pumping testing outside of Owner normal work hours.

I. Stationary Bypass Pumping Systems

1. Discharge piping, joints and all accessories will be required to be hydrostatic tested.
2. Owner Inspector must be notified 48 hours prior to any test commencing.
3. All piping, joints, and accessories shall be able to withstand at least twice the maximum system pressure or a minimum of 50 psi, whichever is greater. For any bypass operations proposed a test run of at least (2) two hours must be satisfactorily performed, prior to commencing any construction work.
4. The Owner Inspector must acknowledge the start of the (2) two hour test.
5. Without the Inspectors' recognition that the (2) two hour test has been initiated, the test will be deemed invalid.
6. Contractor shall provide both a strobe light type high level alarm, as well as alarm notification to their cell phones, as well as other appointed personnel to be identified by Owner, and ensure adequate alarm notification is attained prior to actual startup of the test period.
7. During the testing period, the Contractor shall install a Float Monitoring System in the upstream manhole from the suction location and/or pipe to confirm that the bypass pumping flow data shown in their BPP remains applicable.
8. The float monitoring system shall remain in the manhole and/or pipe for the duration of the bypass operation.
9. The data collected during the test and duration of the bypass operation shall be provided to the Owner Inspector for evaluation and recording on a daily basis and at the Inspector's request.
10. It will be required of the Contractor to have personnel remain onsite at the flow monitoring system in order to continuously record (every 30 minutes) the flows during both the test and actual bypass pumping periods.
11. Contractor shall submit a copy of Testing Float Monitoring System Data log to Owner upon successful completion of test within 3 business days to Owner, failure to do so may result in the test being deemed invalid.
12. Data log shall be in column format with each line entry indicating the time, elapsed time of test, level of flow indicated in manholes, total flow being pumped by the BPP system, and any comments pertaining to the test.
13. Any failure of equipment, or activities associated with the bypass pumping operations contributing to either a surcharge or SSO, shall be deemed a failed test.
14. The test shall then be stopped and any necessary cleanup or reporting efforts performed.
15. The BPP will need to be revised, resubmitted and approved prior to the test initiating again. The Owner inspector will need to be notified 48 hours prior to any and all re-tests of the bypass pumping operations.
16. Any effort by Owner or other third parties to mitigate damages resulting from any surcharging or SSOs shall be the direct and sole responsibility of the Contractor. This includes any related fines, penalties, or damages to public or private property.
17. Plug Testing

- a. Plugs shall be tested prior to use. The inflatable plug shall be placed inside of a structurally sound pipe or conduit and inflated to its operating pressure and monitored for 24 hours to observe it holds the required pressure. This testing shall be performed in accordance with the manufacturer's recommendations. Inflating a plug when it is not constrained or overinflating the plug creates a risk of being injured by pieces of the plug exploding if it fails.
- J. Pump and Haul Bypass Pumping Systems
1. Contractor shall perform a full scale demonstration test of his proposed pump and haul bypass system to prove that his system can be successfully used for bypass pumping at the proposed locations.
 2. Contractor's test shall use all of the equipment and staff that will operate the bypass pumping system during performance of the Work.
 3. Traffic control systems required during the Work shall be utilized during the test.
 4. Withdrawals and discharges of flow shall be from or into the manhole locations identified in the Contractor's BPP except for pump and haul system.
 5. This requirement is intended to demonstrate Owner facility and all manifests shall kept and submitted to Owner.
 6. Disposal pump and haul flow in a nearby manhole is not acceptable.

END OF SECTION

SECTION 33 31 50

ABANDONMENT OF SANITARY SEWER MAINS AND MANHOLES/STRUCTURES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This item shall govern the abandonment of sanitary sewer mains and manholes specified in the contract documents.

1.02 SUBMITTALS

- A. Contractor shall submit manufacturer's product data, instructions, grouting plan to include grouting pressure, grout tubes and vent tube locations and number per section, and recommendations prior to start of grouting.
- B. Conform to requirements of Section 01 33 00 - Submittal Procedures.

1.03 REFERENCE STANDARDS

- A. Texas Commission of Environmental Quality (TCEQ)
 - 1. Chapter 217 Design Criteria for Domestic Wastewater Systems
 - 2. Chapter 213 Edwards Aquifer
- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM C 150 - Standard Specification for Portland Cement.
 - 2. ASTM C 494 - Standard Specification for Chemical Admixture for Concrete.
 - 3. ASTM C 618 - Standard Specification for Fly Ash and Raw or Calcinated Natural Pozzolan for use as Mineral Admixture in Portland Cement Concrete.
 - 4. ASTM C 937 - Standard Specification for Grout Fluidifier for Pre-placed Aggregate Concrete.
 - 5. ASTM C 940 - Standard Test Method for Expansion and Bleeding of Freshly Mixed Grout for Replaced Aggregate Concrete in the Laboratory.
 - 6. ASTM C 1017 - Standard Specification for Chemical Admixture for Use in Producing Flowing Concrete.
 - 7. ASTM C 1107 - Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)

1.04 MEASUREMENT AND PAYMENT

- A. Grouting of abandoned sewer lines shall be measured by linear foot. Grouting of abandoned manholes shall be measured on the basis of each one complete in place.
- B. Payment for abandoning sewer lines shall be made on the contract unit price per linear foot complete in place and per each abandoned manhole complete in place. Said price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work. Debris and build-up accumulated within existing sanitary sewer siphons and other segments of pipeline shall be removed as

necessary to complete abandonment of sanitary sewer line and any cost associated with the removal of debris and build-up shall be subsidiary to the work performed.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials for abandonment of sanitary sewer pipe and manholes.
 - 1. Sanitary Sewer Pipe: A cement-based grout shall be used to fill the void of the existing sanitary sewer main.
 - 2. The grouting material must have strength of at least 100 psi and shall have flow characteristics appropriate for filling a sanitary sewer main. The grout mix designed, and method of installation shall be approved by the Engineer prior to beginning operation.
 - 3. Material for Abandoning Manholes: The sanitary sewer manhole shall be filled to the top of the remaining concrete structure with the same material used to abandon the sanitary sewer main and comply with the manhole abandonment detail.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Sanitary sewer mains and all abandoned sanitary sewer manholes and structures are to be filled with a cementitious low strength material.
 - 1. The sanitary sewer facility shall be abandoned in accordance with the specifications outlined herein and in conformity with the limits shown in the contract documents.
 - 2. Abandoning of sanitary sewer lines and manholes/structures shall not occur until all existing sanitary sewer services have been transferred to another line and directed by the Owner.
 - 3. Lines shall be cleaned and televised before grouting and checked for laterals.
 - 4. Point repairs should be completed prior to abandonment.
 - 5. All debris and build up in existing pipe and structure shall be removed prior to grouting.
 - 6. Abandonment of sanitary sewer lines shall be accomplished by installing the grout material with sufficient pressure and in numerous locations.
 - 7. The method of installation shall be able to meet the requirement of completely filling the existing sanitary sewer main and any voids adjacent to it.
 - 8. The sanitary sewer manhole shall be filled to the top of the remaining concrete structure with the same material used to abandon the sanitary sewer main.
 - 9. The method shall adequately provide for the removal and legal disposal of existing sewer materials in the system.
 - 10. The method shall provide for the release of air.
 - 11. When intermediate points are required to be constructed for the abandonment of the system, they shall be a part of the abandonment project process.
 - 12. Mains to be abandoned shall be grouted only if required by the contract documents and payment as per these specifications is provided.

13. The concrete structure of the manhole shall be removed to a depth of 2 feet under proposed subgrade or finished ground elevation.
14. Manhole rings and covers shall be removed and delivered to a facility within the limits of City of Brownsville as designated by the Owner.

END OF SECTION

SECTION 33 40 00
STORMWATER UTILITIES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor materials, equipment and incidentals required and install, test, complete and ready for operation all storm drainage systems as shown on the Drawings and as specified herein.

1.02 RELATED WORK

- A. Section 31 23 33 – Trenching and Backfilling
- B. Section 31 41 33 – Trench and Excavation Safety Protection

1.03 SUBMITTALS

- A. The following shall be submitted in accordance with Section 01 33 00 – Submittal Procedures:
 - 1. Certified copies of test reports demonstrating conformance to applicable pipe specifications.
 - 2. Pipe for Culverts and Storm Drains

1.04 REFERENCE STANDARDS

- A. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only.
 - 1. American Association of State Highway and Transportation Officials (AASHTO)
 - 2. American Society for Testing and Materials (ASTM)
 - a. ASTM C 14 – Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.
 - b. ASTM C 76 – Standard Specification for Reinforced Concrete Culvert Storm Drain and Sewer Pipe.
 - c. ASTM C 231 – Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
 - d. ASTM C 270 – Standard Specification for Mortar for Unit Masonry.
 - e. ASTM C 443 – Standard Specification for Joints for Circular Concrete Sewer and Culvert Pip, Using Rubber Gaskets.
 - f. ASTM C 478 – Standard Specification for Precast Reinforced Concrete Manhole Sections.
 - g. ASTM D 1056 – Standard Specification for Flexible Cellular Materials – Sponge or Expanded Rubber.
 - h. ASTM D 1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-Existing and Resilient Bituminous Types).

- i. ASTM D 1752 – Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- j. ASTM D 1784 – Standard Specification for Rigid Poly (Vinyl Chloride)(PVC) Compounds and Chlorinated Poly (Vinyl Chloride)(CPVC) Compounds.
- k. ASTM D 2922 – Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage: Materials delivered to Site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Gasket materials and plastic materials shall be protected from exposure to the direct sunlight over extended periods.
- B. Handling: Materials shall be handled in such a manner as to ensure delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

1.06 MEASUREMENT AND PAYMENT

- A. All storm drainage system, including manholes, junction boxes, and inlet structures satisfactorily completed in accordance with the plans and specifications will be measured and paid for based on the unit price each.
- B. Storm sewer piping will be measured by the foot. Measurement will be made between the ends of the pipe barrel along the flow line, not including safety end treatments. Safety end treatments, if used, will be measured in accordance with TxDOT Standard Specification Item 467, "Safety End Treatment." Measurement of spurs, branches, or new connecting pipe will be made from the intersection of the flow line with the outside surface of the pipe into which it connects. Where inlets, headwalls, catch basins, manholes, junction chambers, or other structures are included in lines of pipe, the length of pipe tying into the structure wall will be included for measurement, but no other portion of the structure length or width will be included. For multiple pipes, the measured length will be the sum of the lengths of the barrels
- C. These price are full compensation for concrete, reinforcing steel, brick, mortar, aluminum and cast iron castings, frames, grates, rings and covers, excavation, and backfill and for all other materials, tools, equipment, labor, and incidentals The work performed and materials furnished in accordance with this specification will be paid for as follows:
 - 1. Complete Inlets. Payment for inlets will be made at the unit price bid for "Inlet (Complete)," of the type specified.
 - a. Inlet (Complete) 4' x 6' - per each
 - b. Inlet (Complete) 1' x 2' - per each

2. Reinforced Concrete Pipe. The work performed and materials furnished in accordance with this item and provided will be paid for at the unit price bid for "Reinforced Concrete Pipe," "Reinforced Concrete Pipe (Arch)," or "Reinforced Concrete Pipe (Elliptical)" of the size and D-load specified or of the size and class specified. This price is full compensation for constructing, furnishing, transporting, placing, and joining pipes; shaping the bed; cutting pipes on skew or slope; connecting to new or existing structures; breaking back, removing, and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends on skew or slope; and equipment, labor, tools, and incidentals.
 - a. Reinforced Concrete Pipe - per linear foot (Class IV) (varying dia.)

PART 2 PRODUCTS

2.01 PIPE FOR CULVERTS AND STORM DRAINS

- A. Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.
 1. Concrete Pipe - ASTM C 76, Class IV unless otherwise noted on drawings.

2.02 MISCELLANEOUS MATERIALS

- A. Concrete: Unless otherwise specified, concrete and reinforced concrete shall conform to the requirements for Class A concrete
- B. Mortar: Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C270, Type M, except the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar. Water shall be clean and free of harmful acids, alkalies, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.
- C. Frame, Cover and Grate: Frame, cover and grate shall be cast gray iron, ASTM A48, Class 35B; cast ductile iron, or ASTM A536, Grade 80-55-06. Service type, shape, size, and waterway openings for grates and curb inlets shall be as indicated on the Drawings. The manhole cover shall have the word "STORM DRAIN" cast on to it. The letter size shall be as shown on drawings.
- D. Joints:
 1. Flexible Watertight Joints
 - a. Materials: Flexible watertight joints shall be made with plastic or rubber-type gaskets for concrete pipe. The design of joints and the physical requirements for plastic gaskets shall conform to AASHTO M198, and rubber-type gaskets shall conform to ASTM C443. Gaskets shall have not more than one factory-fabricated splice, except that two factory-fabricated splices of the rubber-type gasket are permitted if the nominal diameter of the pipe being gasketed exceeds 54 inches.

- b. Test Requirements: Watertight joints shall be tested and shall meet test requirements of paragraph, Hydrostatic Test on Watertight Joints. Rubber gaskets shall comply with the oil resistant gasket requirements of ASTM C443. Certified copies of test results shall be delivered to the Owner before gaskets or jointing materials are installed. Alternate types of watertight joint may be furnished if specifically approved.

PART 3 EXECUTION

3.01 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

- A. Excavation of trenches and for appurtenances and backfilling for culverts and storm drains shall be in accordance with the applicable sections of Division 31 - Earthwork, and the requirements specified below.
 1. Trenching: The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 12 inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheeting and bracing where required shall be placed within the trench width as specified. Care shall be taken not to overexcavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures shall be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Owner.
 2. Removal of Rock: Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 8 inches or 2-inch for each foot of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe.
 3. Removal of Unstable Material: Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Owner, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in paragraph, Backfilling. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the Owner.

3.02 BEDDING

- A. The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.
 1. Concrete Pipe: When no bedding class is specified or detailed on the drawings, concrete pipe shall be bedded carefully in a soil foundation accurately shaped and rounded to conform to the lowest one-fourth of the outside portion of circular pipe or to the lower curved portion of pipe arch for the entire length of the pipe or pipe arch. When necessary, the bedding shall be tamped. Bell holes and

depressions for joints shall be only of such length, depth, and width as required for properly making the particular type of joint.

3.03 PLACING PIPE

- A. Each pipe shall be carefully examined before being laid and defective or damaged pipe shall not be used. Plastic pipe shall be protected from exposure to the direct sunlight prior to laying as needed to maintain adequate pipe stiffness and meet installation deflection requirements. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Lifting lugs in vertically elongated metal pipe shall be placed in the same vertical plane as the major axis of the pipe. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. Deflection of installed plastic pipe shall not exceed 3.0 percent of the nominal inside diameter. After backfilling has been completed, the Owner may perform a deflection test on the entire length of installed plastic pipeline using a mandrel or other suitable device. Any plastic pipe showing deflections in excess of 3.0 percent shall be removed and replaced at the Contractor's expense. All pipe in place shall be inspected before backfilling, and those pipes damaged during placement shall be removed and replaced.
1. Concrete, Clay, PVC, Ribbed PVC, and Ductile Iron Pipe: Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

3.04 JOINTS

- A. Concrete Pipe
1. Cement-Mortar Tongue-and-Groove Joint: The first pipe shall be bedded carefully to the established grade line with the groove upstream. A shallow excavation shall be made underneath the pipe at the joint and filled with mortar to provide a bed for the pipe.
 2. Flexible Watertight Joints: Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pushed home. If, while the joint is being made the gasket becomes visibly dislocated the pipe shall be removed and the joint remade.

3.05 DRAINAGE STRUCTURES

- A. Manholes and Inlets: Construction shall be of cast-in-place reinforced concrete complete with frames and covers or gratings.

1. Walls and Headwalls: Construction shall be as indicated on Drawings and specified below.
2. Refer to Department of Public Works, Standard Construction Details City of Brownsville.

3.06 BACKFILLING

- A. Backfilling Pipe in Trenches: After the pipe has been properly bedded, select material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 6 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation of at least 12 inches above the top of the pipe. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 12 inches. All sheeting and bracing shall be removed as excavation is backfilled that will prevent injury, caving of the excavation or damage to the structure. Untreated sheeting shall not be left in place beneath structures or pavements.
- B. Backfilling Pipe in Fill Sections: For pipe placed in fill sections, backfill material and the placement and compaction procedures shall be as specified elsewhere in this paragraph. The fill material shall be uniformly spread in layers longitudinally on both sides of the pipe, not exceeding 6 inches in compacted depth, and shall be compacted by rolling parallel with pipe or by mechanical tamping or ramming. Prior to commencing normal filling operations, the crown width of the fill at a height of 12 inches above the top of the pipe shall extend a distance of not less than twice the outside pipe diameter on each side of the pipe or 12 feet, whichever is less. After the backfill has reached at least 12 inches above the top of the pipe, the remainder of the fill shall be placed and thoroughly compacted in layers not exceeding 8 inches.
- C. Movement of Construction Machinery: In compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced at the expense of the Contractor.
- D. Compaction: Compact backfill materials in accordance with Division 31 - Earthwork.
- E. Determination of Density: Tests shall be performed in sufficient number to ensure that specified density is being obtained. Laboratory tests for moisture-density relations shall be made in accordance with ASTM D1557 except that mechanical tampers may be used provided the results are correlated with those obtained with the specified hand tamper. Field density tests shall be determined in accordance with ASTM 2167 or ASTM D2922.

3.07 PIPELINE TESTING

- A. Lines shall be tested for leakage by exfiltration tests. Prior to testing for leakage the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to permit inspection. Visible leaks encountered shall be corrected regardless of leakage test results. When the water table is two feet or more above the top of the pipe at the upper end of the pipeline section to be tested, infiltration shall be measured using a suitable weir or other device acceptable to the Owner. An exfiltration test shall be made by filling the line to be tested with water so that a head of at least 2 feet is provided above both the water table and the top of the pipe at the upper end of the pipeline to be tested. The filled line shall be allowed to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, the head shall be reestablished. The amount of water required to maintain this water level during a 2-hour test period shall be measured. Leakage as measured by the exfiltration test shall not exceed 250 gallons per inch in diameter per mile of pipeline per day 0.2 gallons per inch in diameter per 100 feet of pipeline per hour. When leakage exceeds the maximum amount specified, satisfactory correction shall be made and retesting accomplished. Testing, correcting, and retesting shall be made at no additional cost to the Owner.
- B. Frequency of Testing:
1. Compaction test (optimum moisture curve) and gradation and Atterberg limits for soil classification. (Tests required: One each, for each type of soil or combination of materials.)
 2. In-Place Moisture-Density Tests:
 - a. Under paved areas. Tests required: Two tests shall be taken at random on every other compacted lift for every 200 linear foot of trench.
 - b. Under grassed or non-traffic areas. Tests required: One per 200 linear feet of trench on every third compacted lift.

END OF SECTION

SECTION 34 41 10

SIGNS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install retroreflective and non-retroreflective signs constructed of aluminum substrate to the dimensions specified and install signs of varying sizes and legends as shown on the plans or as specified by the Engineer.

1.02 REFERENCE STANDARDS

- A. ASTM Standards
 1. ASTM B 209 Specification for Aluminum and Aluminum Alloy Sheet and Plate
 2. ASTM D 523 Standard Method for Test for Specular Gloss
 3. ASTM D 4956 Standard Specification for Retroreflective Sheeting for Traffic Control
 4. ASTM E 284 Standard Definition of Terms Relating to Appearance of Materials
 5. ASTM E 308 Computing the Colors of Objects by Using the CIE System
 6. ASTM E 810 Standard Test Method for Coefficient of Retroreflection of Retroreflective Sheeting
 7. ASTM E 1164 Standard Practice for Obtaining Spectrophotometric Data for Object-Color Evaluation.
- B. CIE Publication Number 39-2, Recommendation for Surface Colors for Visual Signaling
- C. FP-92 Standard Specifications for Construction of Roads and Bridges on Federal Highway Project

1.03 MEASUREMENT AND PAYMENT

- A. Measurement shall be based on the number of satisfactorily installed signs.
- B. The accepted quantities shall be paid at the contract unit price for the sign type applicable in the bid list which shall be full compensation, furnishing of all materials, labor, tools, equipment, and supplies to construct signs of varying sizes and legends as shown on the plans or as specified by the Traffic Design Engineer.
 1. R1-1 Stop (30") – per each
 2. R6-2 One Way (18" X 24") – per each
 3. R7-1 No Parking Anytime (18" X 24") – per each

PART 2 PRODUCTS

2.01 MATERIALS

- A. Substrate. This shall be aluminum alloy 5052-H38 and otherwise in conformance with ASTM B-209 and have gold chromate finish. The size, shape and thickness of the sign

blanks are as indicated on the standard detail sheet in the plans or as specified by the Engineer.

1. Metal working. The aluminum shall be free of burrs and pits on both sides, including edges and holes, and shall be made ready for applications of the sheeting.
2. Surface Preparation. The aluminum shall be thoroughly cleaned and degreased with solvent and alkaline emulsions cleaner by immersion, spray, or vapor degreasing and dried prior to application of the gold chromate sheeting coat.

The aluminum shall be new and corrosion-free with holes drilled or punched, corners rounded to the radii shown in the standard detail sheet, and all edges smoothed prior to application of sheeting. The heavy or medium chromate coating shall conform in color and corrosion resistance to that imparted by the Alodine 1200F treatment.

3. Size. The dimensions of substrate applications for regulatory, warning, and guide signs shall be as specified by the Engineer and as shown on the plans

B. Background, Legends, Symbols, and Colors. These shall be in accordance with the Standard Highway Sign Designs (SHSD) for Texas and with the Texas Manual of Uniform Traffic Control Devices (TMUTCD).

1. Retroreflective Materials. Retroreflective materials shall comply with "Standard Specifications for construction of Roads and Bridges on Federal Highway Projects", FP-85 and Federal Specifications L-S-300C. The Contractor shall furnish a certification that the materials comply with the requirements of FP- 85 and L-S-300C.
 - a. Retroreflective Sheeting. Type III (High Intensity): The materials as listed in these specifications shall comply with FP-85, Section 718 and L-S-300C. Colors shall be as specified in specifications for Standard Highway Sign Colors (FHWA, HTO-21).
 - b. Retroreflective Sheeting. Type IX (Diamond Grade Fluorescent yellow green, VIP Reflective Sheeting): The materials shall comply with ASTM 4956. Designed to provide higher nighttime sign brightness in the legibility distance and brightness at high entrance angles. The minimum fluorescence luminance factor (YF) for new sheeting shall be 35%.
2. Electronically Cuttable Film. Electronically cuttable film shall consist of flexible, transparent, durable acrylic colored films coated with a transparent pressure sensitive adhesive protected by a clear removable liner. These films are designed to be applied to retroreflective materials for the creation of traffic control signs and devices by either cutting by knife over roll (sprocket fed or friction fed) and flat bed electronic cutting machines. The films shall be available in standard traffic colors, be dimensionally stable, and be designed to optimally cut, weed, lift, and transfer. Use of electronic cuttable films will not require the release of any volatile organic compounds. When electronic cuttable film is applied to retroreflective sheeting, the resulting color of the composite sheeting will conform to Federal Specification FP-92, Section 718.01 and ASTM D 4956 or to the using agency specification for the appropriate retroreflective sheeting to which it is applied. Only signage utilizing electronically cuttable film will be allowed. Silk screened sign faces will not be accepted.

- a. Color Test. Conformance to color requirements shall be determined by instrumental method in accordance with ASTM E 1164 on sheeting applied to aluminum test panels. The values shall be determined on a HunterLab Labscan 6000 0/45 Spectrocolorimeter with option CMR 559 [or approved equal 0/45 (45/0) instrument with circumferential viewing (illumination)]. Computations shall be done in accordance with ASTM E 308 for the 2° observer.
- b. Coefficient of Retroreflection R^{\wedge} . When electronic cuttable film is applied to retroreflective sheeting, the composite will conform to the percentage retained of the minimum coefficient of retroreflection specified by the using agency and the manufacturer for the retroreflective sheeting when the retroreflective sheeting is screen processed. The coefficient of retroreflection shall be determined in accordance with ASTM E 810. Coefficients of retroreflection R^{\wedge} shall be specified in units of candelas as per foot candle per square foot (candelas per lux per square meter). The observation angles shall be 0.2 and 0.5 degrees unless otherwise specified. The entrance angles shall be -4 and 30 degrees unless otherwise specified. The electronic cuttable film shall have and 85° specular gloss of not less than 50 when tested in accordance with ASTM D 523.
- c. Processing and Cuttability. The electronic cuttable film shall permit cutting, weeding, masking with transfer tape, lifting, and application to retroreflective sheeting when used in accordance with manufacturer's recommendations at temperatures between 65° and 95° F and relative humidifies between 30% and 70%. The film shall lay flat with minimal edge curl and be dimensionally stable.
- d. Adhesive Liner. The protective liner attached to the adhesive shall be removable by peeling without soaking in water or other solutions, without breaking, tearing, or removing any adhesive from the electronic cuttable film. The liner shall have a controlled release from the adhesive coated film sufficient to allow cutting without the film popping off from the liner while still allowing the liner to easily be peeled from the film.
- e. Film. Film with punched edges for use on sprocket fed knife over roll cutters shall be edge scored and weeded to remove film in the punched area as a means of eliminating adhesive build up on the sprockets.
- f. Resistance to Accelerated Outdoor Weathering. When electronic cuttable film is applied to retroreflective sheeting, the surface of the film shall be weather resistant and show no appreciable cracking, blistering, crazing, or dimensional change after 2 years unprotected outdoor exposure, facing the equator and inclined 45° from the vertical. Following weather exposure, panels shall be washed in a 5% HCl solution for 45 seconds, rinsed thoroughly with clean water, blotted dry with a soft cloth and brought to equilibrium at standard conditions. After cleaning, the coefficient of retroreflection shall not be less than the value specified by the using agency for the retroreflective sheeting when the retroreflective sheeting is screen processed. Show no appreciable evidence of cracking, scaling, pitting, blistering, edge lifting or curling or more than 1/32 inch shrinkage or expansion. Show good color fastness or better when tested. The electronic cuttable film shall not be removable from the retroreflective sheeting without damage.

- g. Sign Face. The sign face, made of electronic film and retroreflective sheeting shall comply with the appearance, specification, and good workmanship designated by the using agency for sign faces constructed of screen processed retroreflective sheeting of the same type.
3. Non-Retroreflective Sheeting. All letters, numerals, and symbols shall be as prescribed in this specification.
 4. Application Methods. The method of application of sheeting, letters, numbers, and symbols shall be precisely as prescribed in writing by the manufacturer.
 - a. Legend Spacing and Layout. Spacing and layout for all traffic control signs shall conform to the SHSD.
 - b. Tolerance for Horizontal Alignment. Letters, numerals, and symbols shall be horizontally aligned to a tolerance of 1/16 inch. Test of each sign board shall be as follows:
 - (i) Place a metal straight edge along the bottom of a series of letters forming each line of the sign. In each line, letters shall not vary more than 1/16 inch from that line.
 - c. Tolerance for Vertical Alignment. Letters, numerals, and symbols shall be vertically aligned to a tolerance of 1/16 on each letter in each line:
 - (i) Place a metal straight edge along the bottom edge of a series of letters forming each line of the sign. Place a square along the straight edge and test the trueness of the vertical faces of individual letters. Letters shall be normal to the square within 1/16 inch.
- C. Sign Posts. Steel post shall conform to the standard specification for hot rolled carbon sheet steel, structural quality, ASTM designation A570, Grade 50. Average minimum yield strength after cold forming is 60,000 psi. The cross section of the post shall be square tube formed steel, carefully rolled to size and shall be welded directly in the corner by high frequency resistance welding or equivalent process and externally scarified to agree with corner radii. Sign posts shall be hot dipped galvanized conforming to ASTM A653, G90.
1. Sizes. Perforated sign posts, anchors and sleeves shall be of the 2" X 2".
 2. Holes shall be $7/16 \pm 1/64$ inches in diameter on one inch centers on all four sides down the entire length of the post. On square tubing, holes shall be on centerline of each side in true alignment and opposite each other directly and diagonally. The length of each post shall have a permissible length tolerance of $\pm 1/4$ ".
 3. The finished posts shall be straight and have a smooth, uniform finish. It shall be possible to telescope all consecutive sizes of square tubes freely and for not less than ten feet of their length without the necessity of matching any particular face to any other face. All holes and ends shall be free from burrs and ends shall be cut square.
 4. Installation. The square end of the post shall not be modified or pointed.
 - a. Flange. When sign post installation is required over building basements, bridges and cavities, a galvanized cast iron pipe flange shall be used. The base shall be 8 inches in diameter with six 5/16 inch holes drilled equidistant around the circumference, 5/8 inch from the outer edge. The neck of the flange shall be 3 inches in diameter, drilled and threaded to receive a 2-inch diameter galvanized post.

- b. Hardware. All ground mounted signs shall be attached to posts using $\frac{3}{8}$ " aluminum drive rivets. Stainless steel banding material, brackets and clips will be used for signs installed on light standards or mast arms.
 - c. Construction. Anchors shall be anchored in a minimum of one cubic foot of class "C" concrete, 28 inches deep, with a 6-inch long, $\frac{3}{8}$ inch diameter pin inserted through the pre-drilled hole 3 inches from the bottom of the pole. Where the pole installation requires surface mounting, an 8-inch flange with a 2-inch threaded collar shall be used. The pole shall be galvanized, two inches in diameter and threaded to fit the flange. Sign placement and orientation shall be as specified in the construction plans.
- D. Anti-Vandalism and Maker's Mark Decals. The anti-vandalism decal shall be installed on the back bottom left corner of the sign. Decals will be supplied by the City. Each sign shall be permanently marked on the lower right corner of the back side with the month and year of installation, and name of manufacturer.

2.02 EQUIPMENT

- A. Provide machinery, tools, and equipment necessary for proper execution of the work.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Construction shall be high quality with no visible defects in the finished product. Fabrication shall be in accordance with these specifications. Street name signs shall always be supplied and installed at each project intersection whether signs previously existed at the location or not.
- B. Unsignalized Intersection. At unsignalized intersections, ground-mounted street name signs of 9-inch heights with 6-inch letters and 1- $\frac{1}{2}$ inch block numbers are required.
- C. Signalized Intersection.
 1. Ground Mounted Street Signs. If a signalized intersection has either mast arms or span-wire on which overhead street name signs can be attached, no ground mounted streets name signs are required at that intersection.
 2. Overhead Street Signs. Signs shall be bolted or strapped to the mast arm or span wire. Attachments to mast arms shall be by means of a $\frac{5}{8}$ inch stainless steel strap and a stainless-steel flared strap bracket.
 - a. Signs Outside Central Business District. Overhead street name signs installed outside of the Central Business District shall be 15 inches high with 6 $\frac{1}{2}$ inch letters and 4 $\frac{1}{2}$ inch block numbers.
 - b. Signs Within Central Business District. Overhead street name signs installed inside the Central Business District shall be 18 inches high with 8-inch letters and 4 $\frac{1}{2}$ inch block numbers. Overhead street name signs shall be installed on all approaches.
 3. Existing Signs. The removal of existing signs shall be coordinated with the Traffic Division to assure required signage is in place during all construction phases. When

existing signs are to be removed, they will be unbolted from their post by hand and delivered to the City.

END OF SECTION

APPENDIX A:

**GEOTECHNICAL ENGINEERING STUDY FOR
PROPOSED DOWNTOWN WATER AND
WASTEWATER PROJECT 1**



GEOTECHNICAL ENGINEERING STUDY

FOR

**PROPOSED DOWNTOWN WATER AND WASTEWATER PROJECT 1
BROWNSVILLE, CAMERON COUNTY, TEXAS**

Project No. ABA23-006-00
June 2, 2023

P 956.682.5332
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TBPE Firm F-3257
TBAE Firm BR 3427

Mr. Luis A. Cuellar, P.E.
Vice President/South Texas Municipal Market Lead
CP&Y, Inc. dba STV Infrastructure
12500 San Pedro Avenue, Suite 450
San Antonio, Texas 78216

**RE: Geotechnical Engineering Study
Proposed Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas**

Dear Mr. Cuellar:

RABA KISTNER, Inc. (RKI) is pleased to submit the report of our Geotechnical Engineering Study for the above-referenced project. This study was performed in accordance with **RKI** Proposal No. PBA22-052-00, dated October 11, 2022. Written authorization to proceed with this study was received by our office via electronic-mail attachment from Mr. Javier A. Esquivel, P.E., with CP&Y, Inc. dba STV Infrastructure (CLIENT), on Tuesday, March 21, 2023, by means of the *Standard Agreement For Professional Services Between CP&Y, Inc. DBA STV Infrastructure and Subconsultant*, dated March 16, 2023. The purpose of this study was to drill borings along the existing street alignments, to determine subsurface conditions, and to provide pavement design and construction guidelines for the existing street and alley alignments to be rehabilitated/reconstructed, as well as geotechnical information for the design and installation of the proposed wastewater lines.

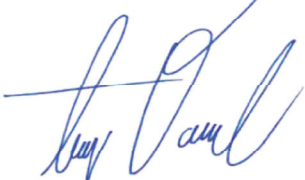
The following report contains our pavement design recommendations and considerations based on our current understanding of the traffic data. If any of these parameters changes, there may be alternatives for value engineering of the pavement systems, and **RKI** recommends that a meeting be held with CP&Y, Inc. dba STV Infrastructure (CLIENT) and the design team to evaluate these alternatives.



We appreciate the opportunity to be of professional service to you on this project. Should you have any questions about the information presented in this report, please call. We look forward to assisting CP&Y, Inc. dba STV Infrastructure during the construction of the project by conducting the construction materials engineering and testing services (quality assurance program).

Very truly yours,

RABA KISTNER, INC.



Adamari Davila, EIT
Graduate Engineer



Katrin M. Leonard, P.E.
Vice President



Jun. 2, 2023

AD/KML

Attachments

Copies Submitted: Above (1)

GEOTECHNICAL ENGINEERING STUDY

For

**PROPOSED DOWNTOWN WATER AND WASTEWATER PROJECT 1
FROM E. 7th STREET TO INTERNATIONAL BOULEVARD
BROWNSVILLE, CAMERON COUNTY, TEXAS**

Prepared for

CP&Y, INC. DBA STV INFRASTRUCTURE
San Antonio, Texas

Prepared by

RABA KISTNER, INC.
McAllen, Texas

PROJECT NO. ABA23-006-00

June 2, 2023

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Important Information About Your Geotechnical Engineering Report

We understand that the street and alley alignments will meet the pavement thickness requirements provided in the plans titled “City of Brownsville Downtown Wastewater Improvements”, dated May 23, 2023, and provided to our office via electronic-mail attachment by Mr. John Clint, P.E., Vice President Operations Manager with Halff Associates, Inc., the project’s engineering firm, on Wednesday, May 24, 2023. Please refer to the table below for the required thicknesses stated in the aforementioned document.

Pavement Section	FBM* (in.)	HMAC* (in.)
Street Alignments	12	3
Alley Alignments	10	3

*Pavement Section Minimum Thickness Required by the City of Brownsville.

Where: FBM = Flexible Base Material
HMAC = Hot-Mix Asphaltic Concrete Surface Course

At the time of our field operations, the subject site can generally be described as existing deteriorated asphalt-paved, street alignments that are relatively level. Surface drainage is visually estimated to be poor to fair.

LIMITATIONS

This engineering report has been prepared in accordance with accepted Geotechnical Engineering practices in the region of South Texas for the use of CP&Y, Inc. dba STV Infrastructure (CLIENT) and its representatives for design purposes. This report may not contain sufficient information for purposes of other parties or other uses and is not intended for use in determining construction means and methods.

The recommendations submitted in this report are based on the data obtained from thirteen borings drilled along the proposed street alignments, our understanding of the project information provided to us by the CLIENT, and the assumption that site grading will result in only minor changes in the topography existing at the time of our study. If the project information described in this report is incorrect, is altered, or if new information is available, we should be retained to review and modify our recommendations.

This report may not reflect the actual variations of the subsurface conditions within the subject site. The nature and extent of variations across the subject site may not become evident until construction commences. The construction process itself may also alter subsurface conditions. If variations appear evident at the time of construction, it may be necessary to reevaluate our recommendations after performing on-site observations and tests to establish the engineering impact of the variations.

The scope of our Geotechnical Engineering Study does not include an environmental assessment of the air, soil, rock, or water conditions either on or adjacent to the subject site. No environmental opinions are presented in this report. **RKI**’s scope of work does not include the investigation, detection, or design

related to the prevention of any biological pollutants. The term “biological pollutants” includes, but is not limited to, mold, fungi, spores, bacteria, and viruses, and the byproduct of any such biological organisms. A Phase 2 Environmental Site Assessment is recommended due to a strong fuel odor encountered in Boring P-5 at the time of our drilling operations.

If final grade elevations are significantly different from the grades existing at the time of our study (more than plus or minus 1 ft), our office should be informed about these changes. If needed and/or desired, we will reexamine our analyses and make supplemental recommendations.

BORINGS AND LABORATORY TESTS

The subsurface conditions along the subject site were evaluated by thirteen borings drilled within the street alignments, as shown in the following table.

Proposed Improvement	Number of Borings	Depth, ft. *	Boring Identification
Pavement Rehabilitation and Water/Wastewater Utility Lines	13	20	P-1 through P-4, and P-6 through P-14

* below the pavement surface elevation existing at the time of our study.

The borings (designated as “P-”) were drilled on April 19, 2023 and April 20, 2023, at the locations shown on the Boring Location Map, Figure 1. The boring locations are approximate and were located in the field by an **RKI** representative, based on the site plan titled “Phase 1 Proposed Utilities”, provided to our office via electronic-mail attachment by the CLIENT on Thursday, September 19, 2022. It should be noted that the drilling operations of Boring P-5 was stopped at a depth of 5 inches below the pavement surface elevation existing at the time of our study, due to a strong fuel odor and wood fragments encountered in the boring. The borings were drilled utilizing straight flight augers and were backfilled with the auger cuttings following completion of the drilling operations. The upper two inches of each boring were topped off with a cold asphalt mix, and flushed with the adjacent pavement surface. During the drilling activities, the following Split-Spoon (with Standard Penetration Test, SPT) and Shelby-Tube (ST) samples were collected.

The SPT samples were obtained in accordance with accepted standard practices and the penetration test results are presented as “blows per foot” on the boring logs. Representative portions of the samples were sealed in containers to reduce moisture loss, labeled, packaged, and transported to our laboratory for subsequent testing and classification.

In the field and laboratory, each sample was evaluated and visually classified by a member of our Geotechnical Engineering staff in general accordance with the Unified Soil Classification System (USCS). The geotechnical engineering properties of the strata were evaluated by the following laboratory tests: natural moisture content, Atterberg limits, sulfate content determinations, and percent passing a No. 200 sieve determinations.

With the exception of the sulfate content tests, the results of the field and laboratory tests are presented in graphical or numerical form on the boring logs illustrated on Figures 2 through 15. A key to the classification of terms and symbols used on the logs is presented on Figure 16. The results of the laboratory and field testing are also tabulated on Figure 17 for ease of reference.

SPT results are noted as “blows per ft” on the boring logs and on Figure 17, where “blows per ft” refers to the number of blows by a falling 140-lb (pound) hammer required for 1 ft of penetration into the subsurface materials.

Samples will be retained in our laboratory for 30 days after submittal of this report. Other arrangements may be provided at the written request of the CLIENT.

GENERAL SITE CONDITIONS

SITE GEOLOGY

Based on our cursory review of the Geologic Atlas of Texas, (McAllen-Brownsville Sheet, dated 1976), published by the Bureau of Economic Geology at the University of Texas at Austin, the subject site appears to be located within Alluvium (floodplain) deposits consisting of clays, silts, sands, and gravel deposits of the Quaternary epoch (Holocene period).

According to the Soil Survey of Cameron County, Texas, published by the United States Department of Agriculture - Soil Conservation Service, in cooperation with the Texas Agricultural Experiment Station, the project site appears to be located within the Rio Grande-Matamoros soil association consisting of nearly level to gently sloping, well drained and moderately well drained silt loams and silty clays. The corresponding soil symbols appear to be the following:

Soil Symbol	Soil Name
RU	Rio Grande – Urban land complex
LG	Laredo-Urban land complex

STRATIGRAPHY

It should be noted that the borings were drilled along existing asphalt-paved, street alignments. The existing hot mix asphaltic concrete (HMAC) thicknesses were measured to range from about 2 to 8 inches, while the flexible base material (FBM) thicknesses underlying the HMAC were measured to range from about 3-1/2 to 11 inches.

The subsurface stratigraphy at this site can be describes as intermixed layers of lean clay, lean clay with sand, sandy lean clay, fat clay, silty clay, silty clayey sand, and silty sand. Each stratum has been designated by grouping soils that possess similar physical and engineering characteristics. As previously mentioned, a strong fuel odor and wood fragments were encountered in Boring P-5 at a depth about 5 inches below

the pavement surface elevation existing at the time of our study. Hence, a Phase 2 Environmental Site Assessment is recommended at this site.

The boring logs should be consulted for more specific stratigraphic information. Unless noted on the boring logs, the lines designating the changes between various strata represent approximate boundaries. The transition between materials may be gradual or may occur between recovered samples. The stratification given on the boring logs, or described herein, is for use by **RKI** in its analyses and should not be used as the basis of design or construction cost estimates without realizing that there can be variation from that shown or described.

The boring logs and related information depict subsurface conditions only at the specific locations and times where sampling was conducted. The passage of time may result in changes in conditions, interpreted to exist, at or between the locations where sampling was conducted.

GROUNDWATER

Groundwater was observed at the site at the following boring locations:

Boring Identification	Groundwater Depth, ft. *
P-1	DRY
P-2	9-1/2
P-3	11
P-4	9
P-5	DRY
P-6	12-1/2
P-7	10-1/2
P-8	15
P-9	15
P-10	DRY
P-11	DRY
P-12	15
P-13	15
P-14	10

* below the pavement surface elevation existing at the time of our study.

Please note that the groundwater level in the borings may not have stabilized. Hence, there is a potential for groundwater to exist beneath this site at shallower depths on a transient basis following periods of precipitation. Fluctuations in groundwater levels occur due to variations in rainfall, surface water run-off, or other factors not evident at the time of exploration. The construction process itself may also cause variations in the groundwater level.

UTILITY CONSTRUCTION CONSIDERATIONS

SITE DRAINAGE

Drainage is an important key to the successful performance of any utility line. Good surface drainage should be established prior to and maintained after construction to help prevent water from ponding within or adjacent to the proposed utility line alignments, and to facilitate rapid drainage away from the utility line alignments.

DEWATERING

Groundwater was encountered in the borings at a depth as shallow as 9 ft below the pavement surface elevation existing at the time of our study.

Based on the subsurface conditions encountered in the borings, and the typical fluctuations in groundwater levels in this region, groundwater may be encountered during the excavation activities. Excavations below the groundwater table generally require lowering the piezometric level to permit construction in a relatively dry state. This should be performed to control seepage into the excavations and to reduce artesian water pressures below the bottom of the excavations. Deep wells and/or well point systems, as well as sumps and pumps after completion of the excavations are commonly used. The implementation of one and/or more of these methods should be anticipated for the installation of the waterline. A minimum groundwater drawdown of at least 5 ft below the bottom of the utility lines should be anticipated by the General Contractor in order to allow the construction operations to proceed on the bottom of the excavation. The design of dewatering systems is beyond the scope of this study. The General Contractor should be prepared to control excess water encountered in the excavations due to perched water pockets, seepage, and/or rainfall. Proper construction procedures and equipment will be critical for proper performance of the dewatered excavations. Additionally, protection of personnel entering the excavations and providing a dry, stable subgrade upon which to construct foundations will be crucial.

TRENCH BACKFILL

The trench bottoms should be uniform and level so that the pipe barrel will have full support along its full length. The pipe bedding materials from the trench bottom to the bottom of the pipe (or to a minimum distance above or below the top of the pipe if recommended by the pipe manufacturer) should consist of a minimum of 6 inches of compacted granular materials (preferably well-graded crushed rock and gravel or well-graded sand materials, such as GW, SW, SP, or mixtures of the same per the American Society for Testing and Materials (ASTM) D2487 and meeting the pipe manufacturer's recommendations. The backfill

material above the bedding material should be placed and compacted in accordance with the following paragraphs.

In non-roadway areas and areas where no future construction will occur, the backfill material from the bottom of the trench excavation up to the proposed finished terrain elevation should be placed in maximum 12-inch uniform thickness lifts, moisture-conditioned to within the range of three percentage points below the optimum moisture content to three percentage points above the optimum moisture content and compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D698 laboratory compaction procedures.

In roadway areas or areas that will support future structure (i.e. pavement), the backfill material from the bottom of the trench excavation up to 30 inches below the proposed finished subgrade elevation should be placed in maximum 8-inch uniform thickness lifts, moisture-conditioned to within the range of three percentage points below the optimum moisture content to three percentage points above the optimum moisture content and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D698 laboratory compaction procedures.

Furthermore, in roadway areas or areas that will support future structure, the backfill material from 30 inches below the proposed finished subgrade elevation up to the proposed finished grade elevation should be placed in maximum 8-inch uniform thickness lifts, moisture-conditioned to within the range of three percentage points below the optimum moisture content to three percentage points above the optimum moisture content and compacted to a minimum of 98 percent of the maximum dry density as determined by ASTM D698 laboratory compaction procedures.

SELECT FILL

If utilized, materials used as select fill for final site grading preferably should be crushed stone or gravel aggregate. We recommend that materials specified for use as select fill meet the TxDOT 2014 Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges, Item 247, Flexible Base, Type A through Type E, Grades 1, 2, 3, and 5.

Alternatively, the following soils, as classified according to the USCS, may be considered satisfactory for use as select fill materials at this site: SC, GC, CL, and combinations of these soils. In addition to the USCS classification, alternative select fill materials shall have a maximum liquid limit of 40 percent, a plasticity index between 7 and 18 percent, and a maximum particle size not exceeding 4 inches or one-half the loose lift thickness, whichever is smaller. In addition, if these materials are utilized, grain size analyses and Atterberg Limits must be performed during placement at a minimum rate of one test each per 5,000 cubic yards of material due to the high degree of variability associated with pit-run materials.

If the above listed alternative materials are being considered for bidding purposes, the materials should be submitted to the Geotechnical Engineer for pre-approval at a minimum of 10 working days or more prior to the bid date. Failure to do so will be the responsibility of the General Contractor. The General Contractor will also be responsible for ensuring that the properties of all delivered alternate select fill materials are similar to those of the pre-approved submittal. It should also be noted that when using alternative fill materials, difficulties may be experienced with respect to moisture control during and

subsequent to fill placement, as well as with erosion, particularly when exposed to inclement weather. This may result in sloughing of beam trenches and/or pumping of the fill materials.

Soils classified as CH, MH, ML, SM, GM, OH, OL, and Pt under the USCS and not meeting the alternative select fill material requirements, are **not** considered suitable for use as select fill materials at this site.

Select fill should be placed in loose lifts **not** exceeding 8 in. in thickness and compacted to at least 98 percent of maximum dry density as determined by ASTM D698. The moisture content of the fill should be maintained within the range of two percentage points below the optimum moisture content to two percentage points above the optimum moisture content until the final lift of fill is permanently covered.

The select fill should be properly compacted in accordance with these recommendations and tested by **RKCI** personnel for compaction as specified.

TRENCH EXCAVATION SLOPING/BENCHING

Excavations that extend to or below a depth of 5 ft below construction grade shall require the General Contractor to develop a trench safety plan to protect personnel entering the trench or trench vicinity. The development of the trench safety plan, which may require the collection of specific geotechnical data and could include designs for sloping and benching of various types of shoring, is beyond the scope of this study. Any such designs and safety plans shall be developed and prepared in accordance with current Occupational Safety and Health Administration (OSHA) guidelines and other applicable industry standards.

To assist in preparing an excavation safety plan, we have classified the soils encountered along this site based on the data collected during this study. The on-site soils encountered above the groundwater levels within this site classified as Type "B" soils under current OSHA regulations pertaining to excavations. This classification is based on the observed cohesive nature of the soil, the unconfined compressive strength values obtained during field drilling operations, and the anticipated vibration from nearby traffic. In excavations penetrating these soils, the sloping and benching schemes specified for Type "B" soils under the OSHA regulations require that the excavation sidewalls be sloped no steeper than 1:1 (horizontal:vertical). The on-site sand soils and the soils encountered below the groundwater levels within this site are classified as Type "C" soils under current OSHA regulations pertaining to excavations. In excavations penetrating these soils, the sloping and benching schemes specified for Type "C" soils under the OSHA regulations require that the excavation sidewalls be sloped no steeper than 1-1/2:1 (horizontal:vertical).

EXCAVATION EQUIPMENT

The boring logs are not intended for use in determining construction means and methods and may therefore be misleading if used for that purpose. We recommend that General Contractors and their subcontractors interested in bidding on the work perform their own tests in the form of test pits to determine the quantities of the different materials to be excavated, as well as the preferred excavation methods and equipment for this site.

ADDITIONAL UTILITY WORK CONSIDERATIONS

Our experience indicates that significant settlement of backfill can occur in utility trenches, particularly when trenches are deep, when backfill materials are placed in thick lifts with insufficient compaction, and when water can access and infiltrate the trench backfill materials. The potential for water to access the backfill is increased where water can infiltrate flexible base materials due to insufficient penetration of curbs, and at sites where geological features can influence water migration into utility trenches. It is our belief that another factor which can significantly impact settlement is the migration of fines within the backfill into the open voids in the underlying free-draining bedding material.

To reduce the potential for settlement in utility trenches, we recommend that consideration be given to the following:

- Backfill materials should be placed and compacted in controlled lifts appropriate for the type of backfill and the type of compaction equipment being utilized and backfilling procedures should be tested and documented.
- Consideration should be given to wrapping free-draining bedding materials with a geotextile fabric (similar to Mirafi 140N or CONTECH C-Drain Geocomposite) to reduce the infiltration and loss of fines from backfill material into the interstitial voids in bedding materials; and
- Locating the water-bearing utilities, roof drainage outlets and irrigation spray heads outside of the select fill and perimeter drain boundaries.

PAVEMENT RECOMMENDATIONS

Flexible pavement recommendations for a 20-year design period are presented in this report. Drainage conditions will have a significant impact on long-term performance, particularly where permeable base materials are utilized in the pavement section. Drainage considerations are discussed in more detail in a subsequent section of this report.

SUBGRADE CONDITIONS

Based on our review of the borings drilled along the existing alignments, a single generalized subgrade condition has been assumed for this site. The predominant non-plastic to moderately plastic subgrade soils was modeled in developing the pavement sections for this project. On the basis of our past experience with similar subsurface conditions in this area, a design California Bearing Ratio (CBR) value of 3 was assigned to evaluate the pavement components.

SULFATE CORROSION POTENTIAL

The potential of soluble sulfates in the subgrade soils within the study area was preliminary evaluated by conducting laboratory sulfate content tests. These tests were conducted on soil specimens obtained at Boring P-4, P-9, and P-11 from depths of about 2 ft below the pavement surface elevations existing at the time of our study. The laboratory test results indicate sulfate content values ranging from about 120 to 340 parts per million (ppm). On the basis of the laboratory sulfate content test results, the tested on-site

soils appear to not have a potential to cause sulfate-induced heave. Typically, the concentration of soluble sulfate on soils becomes a concern when the concentration reaches about 3,000 ppm and higher. The sulfate concentration in soils may vary over short distances, and as such, additional testing is recommended at the time of construction to confirm the concentration of sulfates in the exposed subgrade soils within the street alignment.

DESIGN INFORMATION

We understand that the street and alley alignments will meet the pavement thickness requirements provided in the plans titled “City of Brownsville Downtown Wastewater Improvements”, dated May 23, 2023, and provided to our office via electronic-mail attachment by Mr. John Clint, P.E., Vice President Operations Manager with Halff Associates, Inc., the project’s engineering firm, on Wednesday, May 24, 2023.

Pavement Section	PS (in.)	FBM* (in.)	HMAC* (in.)
Street Alignments	12	12	3
Alley Alignments	12	10	3

*Pavement Section Minimum Thickness Required by the City of Brownsville.

Where: PS = Prepared Subgrade
 FBM = Flexible Base Material
 HMAC = Hot-Mix Asphaltic Concrete Surface Course

On the basis of an assumed CBR value, the traffic capacity presented on the following table was estimated by calculating the number of Equivalent Single Axle Loads (ESAL’s) that could be supported by the street and alley alignments. These calculations were made following the American Association of State Highway and Transportation Officials (AASHTO). The pavement design and analyses performed are based directly on the 1993 and 1997 editions of the “Guide for the Design of Pavement Structures” by AASHTO.

Pavement Section	PS (in)	FBM* (in.)	HMAC* (in.)	Estimated ESAL’s
Street Alignments	12	12	3	1,000,000
Alley Alignments	12	10	3	600,000

*Pavement Section Minimum Thickness Required by the City of Brownsville.

The estimated ESAL’s presented above equates to about 55 and 30 tractor-trailer trucks per day for 20-year design period, for the street and alley alignments, respectively.

PAVEMENT MAINTENANCE

Regular and frequent pavement maintenance is critical in maintaining pavement performance over a period of several years and right after construction is completed. All cracks that develop in asphalt pavements should be regularly sealed. Areas of moderate to severe fatigue cracking (also known as alligator cracking) should be sawcut and removed. The underlying base should be checked for contamination or loss of support and any insufficiencies fixed or removed and the entire area patched. Other jurisdictional maintenance techniques should be followed as required.

CONSTRUCTION TRAFFIC

Construction traffic on prepared subgrade or granular base should be restricted as much as possible until the protective flexible surface pavement is applied. Significant damage to the underlying layers resulting in weakening may occur if heavily loaded vehicles are allowed to use these areas prior to the complete construction of the pavement section.

PAVEMENT CONSTRUCTION CONSIDERATIONS

SUBGRADE PREPARATION

Areas to support pavements should be stripped of all existing pavement constituents, vegetation, and/or organic topsoil down to a minimum depth of 12 inches and extend a minimum of 2 ft beyond the pavement perimeters. Upon completion of site stripping activities, the exposed subgrade should be thoroughly proofrolled to locate weak and yielding areas. A minimum of 5 passes of a fully-loaded dump truck or a similar heavily-loaded piece of construction equipment should be used for planning purposes. Proofrolling operations should be observed by the Geotechnical Engineer or their representative to document subgrade condition and preparation. Weak or yielding areas identified during proofrolling activities should be treated with hydrated lime or Portland cement or removed and replaced with suitable, compacted select fill in accordance with the recommendations presented under the *Select Fill* subsection of this section of the report. The weak or soft areas may be mixed with hydrated lime or Portland cement down to a minimum depth of 8 inches to aid in drying the soils and develop a firm working surface. Proofrolling operations and any excavation/backfill activities should be observed by **RKI** representatives to document subgrade preparation.

Upon completion of the proofrolling operations and just prior to lime treatment, the exposed subgrade should be moisture conditioned by scarifying to a minimum depth of 8 in. and recompacting to a minimum of 98 percent of the maximum density determined from the ASTM D698, Compaction Test. The moisture content of the subgrade should be maintained within the range of three percentage points below the optimum moisture content to three percentage points above the optimum moisture content until permanently covered.

DRAINAGE CONSIDERATIONS

As with any soil-supported structure, the satisfactory performance of a pavement system is contingent on the provision of adequate surface and subsurface drainage. Insufficient drainage which allows

saturation of the pavement subgrade and/or the supporting granular pavement materials will greatly reduce the performance and service life of the pavement systems.

Surface and subsurface drainage considerations crucial to the performance of pavements at this site include (but are not limited to) the following:

- 1) Any known natural or man-made subsurface seepage at the site which may occur at sufficiently shallow depths as to influence moisture contents within the subgrades should be intercepted by drainage ditches or below grade French drains.
- 2) Final site grading should eliminate isolated depressions adjacent to curbs, which may allow surface water to pond and infiltrate into the underlying soils. Curbs should completely penetrate flexible base materials and should be installed to sufficient depth to reduce infiltration of water beneath the curbs.
- 3) Pavement surfaces should be maintained to help minimize surface ponding and to provide rapid sealing of any developing cracks. These measures will help reduce infiltration of surface water downward through the pavement section.

ON-SITE SOIL FILL

The pavement recommendations presented in this report were prepared assuming that on-site soils will be used for site grading in the proposed pavement areas. If used, we recommend that on-site soils be placed in loose lifts not exceeding 8 in. in thickness and compacted to a minimum of 98 percent of the maximum dry density as determined from ASTM D968. The moisture content of the subgrade should be maintained within the range of two percentage points below the optimum moisture content to two percentage points above the optimum moisture content until permanently covered. We recommend that on-site fill materials be free of roots, vegetation, and/or other organic or degradable material. We also recommend that the maximum particle size not exceed 4 in. or one half the lift thickness, whichever is smaller.

SELECT FILL

If implemented, select fill materials utilized for achieving finished subgrade elevations in pavement areas should be in accordance with the *Select Fill* subsection recommendations provided in the *Utility Construction Considerations* section of this report.

FLEXIBLE BASE COURSE

The flexible base course should consist of material conforming to TxDOT 2014 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, Item 247, Flexible Base, Type A through Type E, Grades 1, 2, 3, and 5.

The flexible base course should be placed in lifts with a maximum compacted thickness of 8 in. and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557. The moisture content of the base course materials should be maintained within the range of three percentage

points below the optimum moisture content to three percentage points above the optimum moisture content until permanently covered.

If the existing asphaltic concrete surface course and flexible base materials are being considered to be reused as flexible base materials, such materials should be processed and treated in such a way as to comply with the TxDOT 2014 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, Item 251, Reworking Base Courses.

ASPHALTIC CONCRETE SURFACE COURSE

The asphaltic concrete surface course should conform to TxDOT 2014 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, Item 341, Dense-Graded Hot-Mix Asphalt, Type C or D. The asphaltic concrete should be compacted to a minimum of 92 percent of the maximum theoretical specific gravity (Rice) of the mixture determined according to Test Method Tex-227-F. Pavement specimens, which shall be either cores or sections of asphaltic pavement, will be tested according to Test Method Tex-207-F. The nuclear-density gauge or other methods which correlate satisfactorily with results obtained from project roadway specimens may be used when approved by the Engineer. Unless otherwise shown on the plans, the Contractor shall be responsible for obtaining the required roadway specimens at their expense and in a manner and at locations selected by the Engineer.

CONSTRUCTION RELATED SERVICES

CONSTRUCTION MATERIALS ENGINEERING AND TESTING SERVICES

As presented in the attachment to this report, *Important Information About Your Geotechnical Engineering Report*, subsurface conditions can vary across a project site. The conditions described in this report are based on interpolations derived from a limited number of data points. Variations will be encountered during construction, and only the geotechnical design engineer will be able to determine if these conditions are different than those assumed for design.

Construction problems resulting from variations or anomalies in subsurface conditions are among the most prevalent on construction projects and often lead to delays, changes, cost overruns, and disputes. These variations and anomalies can best be addressed if the geotechnical engineer of record, **RABA KISTNER, Inc.**, is retained to perform the construction materials engineering and testing services during the construction of the project. This is because:

- **RKI** has an intimate understanding of the geotechnical engineering report's findings and recommendations. **RKI** understands how the report should be interpreted and can provide such interpretations on site, on the CLIENT's behalf.
- **RKI** knows what subsurface conditions are anticipated at the site.
- **RKI** is familiar with the goals of the CLIENT and the project's design professionals, having worked with them in the development of the project's geotechnical workscope. This enables **RKI** to suggest remedial measures (when needed) which help meet others' requirements.

- **RKI** has a vested interest in client satisfaction, and thus assigns qualified personnel whose principal concern is client satisfaction. This concern is exhibited by the manner in which contractors' work is tested, evaluated and reported, and in selection of alternative approaches when such may become necessary.
- **RKI** cannot be held accountable for problems which result due to misinterpretation of our findings or recommendations when we are not on hand to provide the interpretation which is required.

BUDGETING FOR CONSTRUCTION TESTING

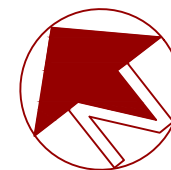
Appropriate budgets need to be developed for the required construction materials engineering and testing services. At the appropriate time before construction, we advise that **RKI** and the project designers meet and jointly develop the testing budgets, as well as review the testing specifications as it pertains to this project.

Once the construction testing budget and scope of work are finalized, we encourage a preconstruction meeting with the selected General Contractor to review the scope of work to make sure it is consistent with the construction means and methods proposed by the contractor. **RKI** looks forward to the opportunity to provide continued support on this project, and would welcome the opportunity to meet with the Project Team to develop both a scope and budget for these services.

* * * * *

ATTACHMENTS

C:\Active Projects\McAllen\2023\BA23\BA23-006-00 Prop. WW Utility Lines and Street Improvements\Drawings\Figure 1 - 11x17.dwg



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**BORING LOCATION MAP
PROP. DOWNTOWN WATER
AND WASTEWATER PROJECT 1**
FROM E. 7TH STREET TO INTERNATIONAL BOULEVARD
BROWNSVILLE, CAMERON COUNTY, TEXAS

REVISIONS:

No.	DATE	DESCRIPTION

PROJECT No.:
ABA23-006-00

ISSUE DATE:	05-12-2023
DRAWN BY:	DV
CHECKED BY:	AD
REVIEWED BY:	SC

FIGURE:
1

LOG OF BORING NO. P-2

Prop. Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas



DRILLING METHOD: Straight Flight Auger

LOCATION: See Figure 1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	SHEAR STRENGTH, TONS/FT ²						PLASTICITY INDEX	% -200	
						0.5	1.0	1.5	2.0	2.5	3.0			3.5
			SURFACE ELEVATION: Existing Grade, ft											
			Hot-Mix Asphaltic Concrete (HMAC) - 3 in.											
			Flexible Base Material (FBM) - 11 in.											
19			SILTY CLAY (CL-ML) very stiff to firm to stiff, brown, with asphalt fragments	6									86	
5				10										
10			SILTY SAND (SM) loose to medium dense, brown	5										
10			During the drilling operations, groundwater was encountered at a depth of about 9.5 ft. Upon completion of the drilling operations, groundwater was measured at a depth of about 10 ft.	9									50	
15				6										
20			Boring terminated at a depth of about 20 ft.	13										
25														

NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED: 20.0 ft	DEPTH TO WATER: 9.5 ft	PROJ. No.: ABA23-006-00
DATE DRILLED: 4/19/2023	DATE MEASURED: 4/19/2023	FIGURE: 3

LOG OF BORING NO. P-3

Prop. Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas



DRILLING METHOD: Straight Flight Auger

LOCATION: See Figure 1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	SHEAR STRENGTH, TONS/FT ²				PLASTICITY INDEX	% -200	
						0.5	1.0	1.5	2.0			2.5
SURFACE ELEVATION: Existing Grade, ft												
			Hot-Mix Asphaltic Concrete (HMAC) - 3-1/2 in.									
			Flexible Base Material (FBM) - 5-1/2 in.	4								
			LEAN CLAY with SAND (CL) soft, brown, with traces of roots	3								
5			FAT CLAY (CH) very soft to very stiff, brown, with asphalt fragments	2						34		
			During the drilling operations, groundwater was encountered at a depth of about 15 ft. Upon completion of the drilling operations, groundwater was measured at a depth of about 11 ft.	18							97	
				18								
15			SILTY SAND (SM) very loose to loose, brown	4								
20			Boring terminated at a depth of about 20 ft.	10								

NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED: 20.0 ft	DEPTH TO WATER: 11 ft	PROJ. No.: ABA23-006-00
DATE DRILLED: 4/20/2023	DATE MEASURED: 4/20/2023	FIGURE: 4

LOG OF BORING NO. P-5

Prop. Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas



DRILLING METHOD: Straight Flight Auger

LOCATION: See Figure 1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	SHEAR STRENGTH, TONS/FT ²								PLASTICITY INDEX	%-200
						0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0		
			SURFACE ELEVATION: Existing Grade, ft Hot-Mix Asphaltic Concrete (HMAC) - 3 in. During the drilling operations, a strong fuel odor and wood fragents were encountered at a depth of about 5 inches Boring terminated at a depth of about 0.4 ft. NOTES: Upon completion of the drilling operations, the boring was observed dry.												
5															
10															
15															
20															
25															

NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED: 0.4 ft	DEPTH TO WATER: DRY	PROJ. No.: ABA23-006-00
DATE DRILLED: 4/20/2023	DATE MEASURED: 4/20/2023	FIGURE: 6

LOG OF BORING NO. P-6

Prop. Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas



DRILLING METHOD: Straight Flight Auger

LOCATION: See Figure 1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	SHEAR STRENGTH, TONS/FT ²						PLASTICITY INDEX	% -200
						0.5	1.0	1.5	2.0	2.5	3.0		
SURFACE ELEVATION: Existing Grade, ft													
			Hot-Mix Asphaltic Concrete (HMAC) - 2 in.										
			Flexible Base Material (FBM) - 10 in.										
			LEAN CLAY with SAND (CL) soft to firm to soft, brown	4				1.2				11	
				6				1.5				82	
5				3				1.2				8	
			FAT CLAY (CH) stiff, brown	13				1.8				98	
10								1.2					
			During the drilling operations, groundwater was encountered at a depth of about 12.5 ft.										
15				12				1.2					
				10				1.5					
20			Boring terminated at a depth of about 20 ft.										

NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED: 20.0 ft	DEPTH TO WATER: 12.5 ft	PROJ. No.: ABA23-006-00
DATE DRILLED: 4/20/2023	DATE MEASURED: 4/20/2023	FIGURE: 7

LOG OF BORING NO. P-8

Prop. Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas



DRILLING METHOD: Straight Flight Auger

LOCATION: See Figure 1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	SHEAR STRENGTH, TONS/FT ²						PLASTICITY INDEX	% -200
						0.5	1.0	1.5	2.0	2.5	3.0		
SURFACE ELEVATION: Existing Grade, ft													
			Hot-Mix Asphaltic Concrete (HMAC) - 2-1/4 in.										
			Flexible Base Material (FBM) - 8-1/2 in.										
			SANDY LEAN CLAY (CL) very stiff, brown	16			●						62
			LEAN CLAY (CL) stiff to firm, brown	11			●	—	×				23
5				5			●						90
			SILTY CLAY (CL-ML) firm, brown	7			×	●					5
10				7				●					
			FAT CLAY (CH) very stiff, brown	17				●					
			During the drilling operations, groundwater was encountered at a depth of about 15 ft. Upon completion of the drilling operations, groundwater was measured at a depth of about 16 ft.										
15				19				●					
20			Boring terminated at a depth of about 20 ft.										
25													

NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED: 20.0 ft DATE DRILLED: 4/19/2023	DEPTH TO WATER: 15 ft DATE MEASURED: 4/19/2023	PROJ. No.: ABA23-006-00 FIGURE: 9
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LOG OF BORING NO. P-9

Prop. Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas



DRILLING METHOD: Straight Flight Auger

LOCATION: See Figure 1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	SHEAR STRENGTH, TONS/FT ²						PLASTICITY INDEX	%-200
						0.5	1.0	1.5	2.0	2.5	3.0		
SURFACE ELEVATION: Existing Grade, ft													
			Hot-Mix Asphaltic Concrete (HMAC) - 3-1/2 in.										
			Flexible Base Material (FBM) - 6-1/2 in.										
			LEAN CLAY with SAND (CL) stiff to soft to stiff, brown	10									78
5				4									
			FAT CLAY (CH) firm to very stiff, brown	9									15
				8									95
10				16									24
15			During the drilling operations, groundwater was encountered at a depth of about 15 ft. Upon completion of the drilling operations, groundwater was measured at a depth of about 15 ft.										
				18									
20			Boring terminated at a depth of about 20 ft.										
25													

NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED: 20.0 ft DATE DRILLED: 4/20/2023	DEPTH TO WATER: 15 ft DATE MEASURED: 4/20/2023	PROJ. No.: ABA23-006-00 FIGURE: 10
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LOG OF BORING NO. P-10

Prop. Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas



DRILLING METHOD: Straight Flight Auger

LOCATION: See Figure 1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	SHEAR STRENGTH, TONS/FT ²						PLASTICITY INDEX	%-200
						0.5	1.0	1.5	2.0	2.5	3.0		
SURFACE ELEVATION: Existing Grade, ft													
			Hot-Mix Asphaltic Concrete (HMAC) - 3-1/2 in.										
			Flexible Base Material (FBM) - 3-1/2 in.	15								NP	
			SILTY SAND (SM) medium dense, brown										
			LEAN CLAY (CL) stiff to very stiff to stiff, brown	10								88	
5													
				10								24	
				17								97	
				11									
				14									
20			Boring terminated at a depth of about 20 ft.										
			NOTES: Upon completion of the drilling operations, the boring was observed dry.										
25													
DEPTH DRILLED: 20.0 ft				DEPTH TO WATER: DRY				PROJ. No.: ABA23-006-00					
DATE DRILLED: 4/19/2023				DATE MEASURED: 4/19/2023				FIGURE: 11					

NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

LOG OF BORING NO. P-11

Prop. Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas



DRILLING METHOD: Straight Flight Auger

LOCATION: See Figure 1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	SHEAR STRENGTH, TONS/FT ²						PLASTICITY INDEX	% -200
						0.5	1.0	1.5	2.0	2.5	3.0		
SURFACE ELEVATION: Existing Grade, ft													
			Hot-Mix Asphaltic Concrete (HMAC) - 3 in.										
			Flexible Base Material (FBM) - 5 in.										
			SANDY LEAN CLAY (CL) stiff to soft, brown	14									69
			- with asphalt fragments below a depth of 2.5 ft	4									13
5			LEAN CLAY (CL) firm to stiff, brown	7									86
				11									11
10				11									
15													
20			Boring terminated at a depth of about 20 ft.	15									
			NOTES: Upon completion of the drilling operations, the boring was observed dry.										
DEPTH DRILLED: 20.0 ft				DEPTH TO WATER: DRY				PROJ. No.: ABA23-006-00					
DATE DRILLED: 4/19/2023				DATE MEASURED: 4/19/2023				FIGURE: 12					

NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

LOG OF BORING NO. P-12

Prop. Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas



DRILLING METHOD: Straight Flight Auger

LOCATION: See Figure 1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	SHEAR STRENGTH, TONS/FT ²							PLASTICITY INDEX	% -200	
						0.5	1.0	1.5	2.0	2.5	3.0	3.5			4.0
			SURFACE ELEVATION: Existing Grade, ft												
			Hot-Mix Asphaltic Concrete (HMAC) - 8 in.												
			Flexible Base Material (FBM) - 5 in.												
5			LEAN CLAY (CL) stiff to firm, brown, with gravel fragments	10			●	×	---	---				16	
				11					●						91
				6					●						
10			SILTY SAND (SM) loose, brown			●		×						1	
				7						●					88
15			SILTY SAND (SM) loose to medium dense, brown	6						●					
			During the drilling operations, groundwater was encountered at a depth of about 15 ft. Upon completion of the drilling operations, groundwater was measured at a depth of about 15 ft.												
20			Boring terminated at a depth of about 20 ft.	12						●					
25															

NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED: 20.0 ft	DEPTH TO WATER: 15 ft	PROJ. No.: ABA23-006-00
DATE DRILLED: 4/20/2023	DATE MEASURED: 4/20/2023	FIGURE: 13

LOG OF BORING NO. P-13

Prop. Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas



DRILLING METHOD: Straight Flight Auger

LOCATION: See Figure 1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	SHEAR STRENGTH, TONS/FT ²						PLASTICITY INDEX	% -200
						0.5	1.0	1.5	2.0	2.5	3.0		
SURFACE ELEVATION: Existing Grade, ft													
			Hot-Mix Asphaltic Concrete (HMAC) - 3 in.										
			Flexible Base Material (FBM) - 5-1/2 in.										
			LEAN CLAY (CL) stiff, brown	12									90
						10	20	30	40	50	60	70	80
													16
5			LEAN CLAY with SAND (CL) firm, brown	5									81
			SILTY SAND (SM) medium dense, brown	12									NP
10				12									
15			During the drilling operations, groundwater was encountered at a depth of about 15 ft. Upon completion of the drilling operations, groundwater was measured at a depth of about 15 ft.	3									
20			Boring terminated at a depth of about 20 ft.	17									
25													

NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED: 20.0 ft	DEPTH TO WATER: 15 ft	PROJ. No.: ABA23-006-00
DATE DRILLED: 4/20/2023	DATE MEASURED: 4/20/2023	FIGURE: 14

LOG OF BORING NO. P-14

Prop. Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas



DRILLING METHOD: Straight Flight Auger

LOCATION: See Figure 1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	SHEAR STRENGTH, TONS/FT ²						PLASTICITY INDEX	%-200
						0.5	1.0	1.5	2.0	2.5	3.0		
SURFACE ELEVATION: Existing Grade, ft													
			Hot-Mix Asphaltic Concrete (HMAC) - 2 in.										
			Flexible Base Material (FBM) - 7 in.										
			LEAN CLAY (CL) stiff to very stiff to soft, brown	9								9	
5				16									92
				18									
				4									
10			SILTY SAND (SM) loose, brown	8								3	
During the drilling operations, groundwater was encountered at a depth of about 10 ft. Upon completion of the drilling operations, groundwater was measured at a depth of about 15.7 ft.													
15			LEAN CLAY (CL) stiff to vry stiff, brown	10									74
				16									
20			Boring terminated at a depth of about 20 ft.										
25													

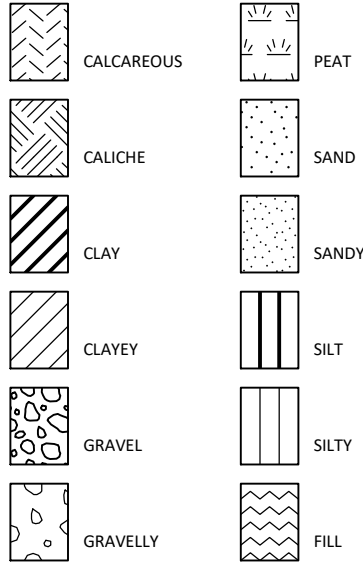
NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED: 20.0 ft	DEPTH TO WATER: 10 ft	PROJ. No.: ABA23-006-00
DATE DRILLED: 4/20/2023	DATE MEASURED: 4/20/2023	FIGURE: 15

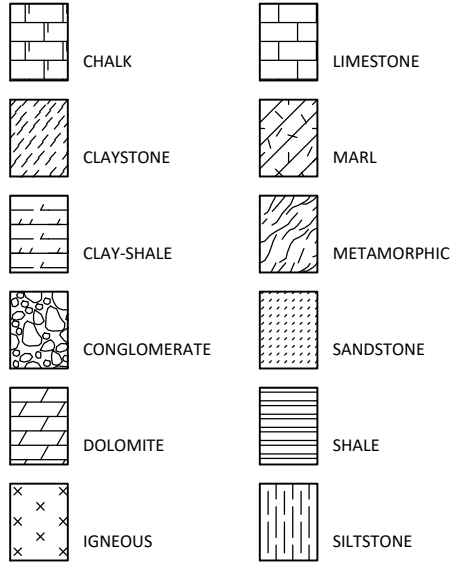
KEY TO TERMS AND SYMBOLS

MATERIAL TYPES

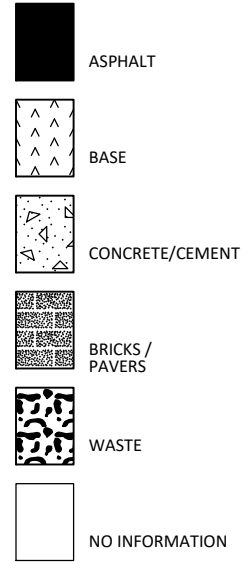
SOIL TERMS



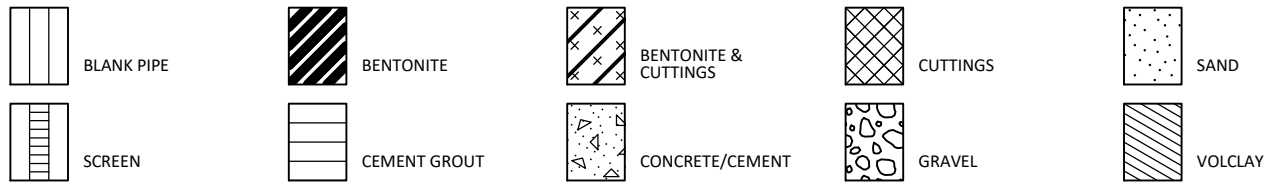
ROCK TERMS



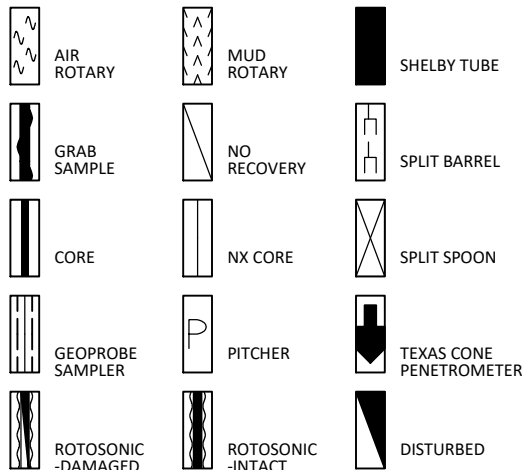
OTHER



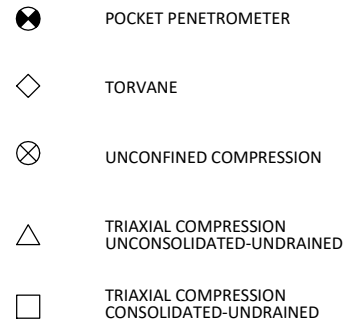
WELL CONSTRUCTION AND PLUGGING MATERIALS



SAMPLE TYPES



STRENGTH TEST TYPES



NOTE: VALUES SYMBOLIZED ON BORING LOGS REPRESENT SHEAR STRENGTHS UNLESS OTHERWISE NOTED

PROJECT NO. ABA23-006-00

KEY TO TERMS AND SYMBOLS (CONT'D)

TERMINOLOGY

Terms used in this report to describe soils with regard to their consistency or conditions are in general accordance with the discussion presented in Article 45 of SOILS MECHANICS IN ENGINEERING PRACTICE, Terzaghi and Peck, John Wiley & Sons, Inc., 1967, using the most reliable information available from the field and laboratory investigations. Terms used for describing soils according to their texture or grain size distribution are in accordance with the UNIFIED SOIL CLASSIFICATION SYSTEM, as described in American Society for Testing and Materials D2487-06 and D2488-00, Volume 04.08, Soil and Rock; Dimension Stone; Geosynthetics; 2005.

The depths shown on the boring logs are not exact, and have been estimated to the nearest half-foot. Depth measurements may be presented in a manner that implies greater precision in depth measurement, i.e 6.71 meters. The reader should understand and interpret this information only within the stated half-foot tolerance on depth measurements.

RELATIVE DENSITY

COHESIVE STRENGTH

PLASTICITY

<u>Penetration Resistance Blows per ft</u>	<u>Relative Density</u>	<u>Resistance Blows per ft</u>	<u>Consistency</u>	<u>Cohesion TSF</u>	<u>Plasticity Index</u>	<u>Degree of Plasticity</u>
0 - 4	Very Loose	0 - 2	Very Soft	0 - 0.125	0 - 5	None
4 - 10	Loose	2 - 4	Soft	0.125 - 0.25	5 - 10	Low
10 - 30	Medium Dense	4 - 8	Firm	0.25 - 0.5	10 - 20	Moderate
30 - 50	Dense	8 - 15	Stiff	0.5 - 1.0	20 - 40	Plastic
> 50	Very Dense	15 - 30	Very Stiff	1.0 - 2.0	> 40	Highly Plastic
		> 30	Hard	> 2.0		

ABBREVIATIONS

B = Benzene	Qam, Qas, Qal = Quaternary Alluvium	Kef = Eagle Ford Shale
T = Toluene	Qat = Low Terrace Deposits	Kbu = Buda Limestone
E = Ethylbenzene	Qbc = Beaumont Formation	Kdr = Del Rio Clay
X = Total Xylenes	Qt = Fluvial Terrace Deposits	Kft = Fort Terrett Member
BTEX = Total BTEX	Qao = Seymour Formation	Kgt = Georgetown Formation
TPH = Total Petroleum Hydrocarbons	Qle = Leona Formation	Kep = Person Formation
ND = Not Detected	Q-Tu = Uvalde Gravel	Kek = Kainer Formation
NA = Not Analyzed	Ewi = Wilcox Formation	Kes = Escondido Formation
NR = Not Recorded/No Recovery	Emi = Midway Group	Kew = Walnut Formation
OVA = Organic Vapor Analyzer	Mc = Catahoula Formation	Kgr = Glen Rose Formation
ppm = Parts Per Million	EI = Laredo Formation	Kgru = Upper Glen Rose Formation
	Kknm = Navarro Group and Marlbrook Marl	Kgrl = Lower Glen Rose Formation
	Kpg = Pecan Gap Chalk	Kh = Hensell Sand
	Kau = Austin Chalk	

PROJECT NO. ABA23-006-00

KEY TO TERMS AND SYMBOLS (CONT'D)

TERMINOLOGY

SOIL STRUCTURE

Slickensided	Having planes of weakness that appear slick and glossy.
Fissured	Containing shrinkage or relief cracks, often filled with fine sand or silt; usually more or less vertical.
Pocket	Inclusion of material of different texture that is smaller than the diameter of the sample.
Parting	Inclusion less than 1/8 inch thick extending through the sample.
Seam	Inclusion 1/8 inch to 3 inches thick extending through the sample.
Layer	Inclusion greater than 3 inches thick extending through the sample.
Laminated	Soil sample composed of alternating partings or seams of different soil type.
Interlayered	Soil sample composed of alternating layers of different soil type.
Intermixed	Soil sample composed of pockets of different soil type and layered or laminated structure is not evident.
Calcareous	Having appreciable quantities of carbonate.
Carbonate	Having more than 50% carbonate content.

SAMPLING METHODS

RELATIVELY UNDISTURBED SAMPLING

Cohesive soil samples are to be collected using three-inch thin-walled tubes in general accordance with the Standard Practice for Thin-Walled Tube Sampling of Soils (ASTM D1587) and granular soil samples are to be collected using two-inch split-barrel samplers in general accordance with the Standard Method for Penetration Test and Split-Barrel Sampling of Soils (ASTM D1586). Cohesive soil samples may be extruded on-site when appropriate handling and storage techniques maintain sample integrity and moisture content.

STANDARD PENETRATION TEST (SPT)

A 2-in.-OD, 1-3/8-in.-ID split spoon sampler is driven 1.5 ft into undisturbed soil with a 140-pound hammer free falling 30 in. After the sampler is seated 6 in. into undisturbed soil, the number of blows required to drive the sampler the last 12 in. is the Standard Penetration Resistance or "N" value, which is recorded as blows per foot as described below.

SPLIT-BARREL SAMPLER DRIVING RECORD

<u>Blows Per Foot</u>	<u>Description</u>
25	25 blows drove sampler 12 inches, after initial 6 inches of seating.
50/7"	50 blows drove sampler 7 inches, after initial 6 inches of seating.
Ref/3"	50 blows drove sampler 3 inches during initial 6-inch seating interval.

NOTE: To avoid damage to sampling tools, driving is limited to 50 blows during or after seating interval.

RESULTS OF SOIL SAMPLE ANALYSES

PROJECT NAME: Prop. Downtown Water and Wastewater Project 1
 From E. 7th Street to International Boulevard
 Brownsville, Cameron County, Texas

FILE NAME: ABA23-006-00.GPJ

5/24/2023

Boring No.	Sample Depth (ft)	Blows per ft	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	USCS	Dry Unit Weight (pcf)	% -200 Sieve	Shear Strength (tsf)	Strength Test
P-1	0.8 to 2.3	7	19	35	18	17	CL				
	2.5 to 4.0	6	20						72		
	5.0 to 6.5	15	30	79	30	49	CH				
	7.0 to 9.0		30						97	1.25	PP
	10.0 to 11.5	15	28								
	15.0 to 16.5	18	27								
	18.5 to 20.0	17	26								
P-2	1.2 to 2.7	19	25						86		
	2.7 to 4.2	6	19	26	19	7	CL-ML				
	5.0 to 6.5	10	21								
	7.5 to 9.0	5	26								
	10.0 to 11.5	9	32						50		
	15.0 to 16.5	6	33								
	18.5 to 20.0	13	29								
P-3	0.8 to 2.3	4	24								
	2.5 to 4.0	3	21								
	5.0 to 6.5	2	30	60	26	34	CH				
	7.5 to 9.0	18	25						97		
	10.0 to 11.5	18	25								
	15.0 to 16.5	4	31								
	18.5 to 20.0	10	32								
P-4	1.1 to 2.6	9	12						27		
	2.6 to 4.1	9	8	NP	NP	NP	SM				
	5.0 to 6.5	7	16						19		
	7.5 to 9.0	8	26	50	24	26	CH				
	10.0 to 11.5	9	32								
	15.0 to 16.5	13	30								
	18.5 to 20.0	7	34								
P-6	1.1 to 2.6	4	26	33	22	11	CL				
	2.5 to 4.0	6	28						82		
	5.0 to 6.5	3	28	31	23	8	CL				
	7.5 to 9.0	13	32						98		
	10.0 to 12.0		32							1.15	PP
	15.0 to 16.5	12	26								
	18.5 to 20.0	10	30								
P-7	1.0 to 2.2	50/8"	8	25	19	6	SC-SM		25		
	2.5 to 4.0	12	10								
	5.0 to 6.5	10	6	NP	NP	NP	SM				
	7.5 to 9.0	8	9						16		

PP = Pocket Penetrometer TV = Torvane UC = Unconfined Compression FV = Field Vane UU = Unconsolidated Undrained Triaxial

CU = Consolidated Undrained Triaxial

CNBD = Could Not Be Determined

PROJECT NO. ABA23-006-00

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FIGURE 17a

RESULTS OF SOIL SAMPLE ANALYSES

PROJECT NAME: Prop. Downtown Water and Wastewater Project 1
From E. 7th Street to International Boulevard
Brownsville, Cameron County, Texas

FILE NAME: ABA23-006-00.GPJ

5/24/2023

Boring No.	Sample Depth (ft)	Blows per ft	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	USCS	Dry Unit Weight (pcf)	% -200 Sieve	Shear Strength (tsf)	Strength Test
P-7	10.0 to 11.5	5	28	43	20	23	CL				
	15.0 to 16.5	8	30								
	18.5 to 20.0	9	29								
P-8	0.9 to 2.4	16	18						62		
	2.5 to 4.0	11	20	44	21	23	CL		90		
	5.0 to 6.5	5	24								
	7.5 to 9.0	7	28	28	23	5	CL-ML				
	10.0 to 11.5	7	29								
	15.0 to 16.5	17	26								
	18.5 to 20.0	19	26								
P-9	0.8 to 2.3	10	16						78		
	2.5 to 4.0	4	27								
	5.0 to 6.5	9	21	33	18	15	CL				
	7.5 to 9.0	8	29						95		
	10.0 to 11.5	16	26	51	27	24	CH				
P-10	15.0 to 17.0		25							1.50	PP
	18.5 to 20.0	18	23								
	0.6 to 2.1	15	3	NP	NP	NP	SM				
	2.5 to 4.0	10	23						88		
	5.0 to 7.0		28							1.65	PP
	7.5 to 9.0	10	27	45	21	24	CL				
	10.0 to 11.5	17	27						97		
P-11	15.0 to 16.5	11	24								
	18.5 to 20.0	14	23								
	0.7 to 2.2	14	15						69		
	2.5 to 4.0	4	19	34	21	13	CL				
	5.0 to 6.5	7	15						86		
	7.5 to 9.0	11	27	34	23	11	CL				
	10.0 to 11.5	11	31								
P-12	15.0 to 17.0		25							1.15	PP
	18.5 to 20.0	15	26								
	1.1 to 2.6	10	15	38	22	16	CL				
	2.6 to 4.1	11	28						91		
	5.0 to 6.5	6	28								
	7.0 to 9.0		8	21	20	1	SM				
	10.0 to 11.5	7	37						88		
P-13	15.0 to 16.5	6	27								
	18.5 to 20.0	12	29								
	0.7 to 2.2	12	21						90		

PP = Pocket Penetrometer TV = Torvane UC = Unconfined Compression FV = Field Vane UU = Unconsolidated Undrained Triaxial

CU = Consolidated Undrained Triaxial

CNBD = Could Not Be Determined

PROJECT NO. ABA23-006-00

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RESULTS OF SOIL SAMPLE ANALYSES

PROJECT NAME: Prop. Downtown Water and Wastewater Project 1
 From E. 7th Street to International Boulevard
 Brownsville, Cameron County, Texas

FILE NAME: ABA23-006-00.GPJ

5/24/2023

Boring No.	Sample Depth (ft)	Blows per ft	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	USCS	Dry Unit Weight (pcf)	% -200 Sieve	Shear Strength (tsf)	Strength Test
P-13	2.0 to 4.0		26	38	22	16	CL			0.60	PP
	5.0 to 6.5	5	24						81		
	7.5 to 9.0	12	17	NP	NP	NP	SM				
	10.0 to 11.5	12	16								
	15.0 to 16.5	3	26								
	18.5 to 20.0	17	28								
P-14	0.8 to 2.3	9	24	31	22	9	CL				
	2.5 to 4.0	16	33						92		
	5.0 to 6.5	18	25								
	7.5 to 9.0	4	27								
	10.0 to 11.5	8	34	29	26	3	SM				
	15.0 to 16.5	10	33						74		
	18.5 to 20.0	16	24								

PP = Pocket Penetrometer TV = Torvane UC = Unconfined Compression FV = Field Vane UU = Unconsolidated Undrained Triaxial

CU = Consolidated Undrained Triaxial

CNBD = Could Not Be Determined

PROJECT NO. ABA23-006-00

RABAKISTNER

FIGURE 17c

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply this report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an

assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help

others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBC-Member geotechnical engineer for more information.



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APPENDIX B:
POTENTIAL FIBER OPTIC CONFLICTS MAP

