CITY OF LAREDO
ENGINEERING DEPARTMENT

PLANS AND SPECIFICATIONS FOR

Flores Ave. Drainage and Utility Improvements – Phase II

Honorable Pete Saenz, Mayor

Robert A. Eads, Co-Interim City Manager
Rosario C. Cabello, Co-Interim City Manager

Ramon E. Chavez, P.E.
City Engineer
1110 Houston Street
Laredo, Texas 78040
(956) 791-7346

October 2019
CITY OF LAREDO – FLORES AVENUE DRAINAGE AND
UTILITY IMPROVEMENTS – PHASE II

PROJECT MANUAL

10/25/2019

LOCKWOOD, ANDREWS & NEWNAM, INC.
FIRM REGISTRATION NO. 2614
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NOTICE TO BIDDERS

Sealed bids will be received at City Secretary’s Office, 1110 Houston Street, 3rd floor, City Hall Building, Laredo, Texas, until 4:00 P.M. on Thursday, February 13, 2020, and publicly opened, read, and taken under advisement on Friday, February 14, 2020, at 11:00 A.M. for the furnishing of all necessary materials, machinery, equipment, labor, superintendence, and all other services and appurtenances required for certain improvements for the City of Laredo, and shall include acknowledgement of any addenda submitted, and all other documents included in said bid call. Said bid shall be marked,

“Flores Avenue Drainage and Utility Improvements – Phase II”

The project consists of the installation of 24” and 30” RCP storm sewer, 8” PVC sanitary sewer, and 8”, 12”, and 16” PVC water line along Flores Avenue from Hidalgo Street to Victoria Street, including manholes, appurtenances, and other related improvements.

Construction contract time for the project is two hundred forty (240) calendar days.

Each bid and a bid guaranty in the form of a bidder’s bond having a minimum Best’s Rating A according to Best’s Key Rating Guide Latest Edition from a surety duly authorized and licensed in the State of Texas, certified check, or cashier’s check must be originals and must be submitted in a sealed envelope plainly marked with the name of the project as shown above, and the name and address of the Bidder. When submitted by mail, this envelope shall be placed in another envelope addressed as indicated in this Notice to Bidders and shall be marked as a bid for the project above referred.

Further, on federally funded projects only, contractor must comply with the Federal Labor Standards Provision, Davis Bacon Act, Equal Opportunity Clause, Wage Determination and HUD and Urban Development Federal Requirements especially as it regards payrolls and basic records.

Only the bids and bid guaranties actually in the hands of the designated official at the time set in this Notice to Bidders shall be considered. Bids submitted by telephone, telegraph, or fax, will not be considered.

Bidders are expressly advised to review Section C-3.10 of the General Conditions of the proposed Contract as to the causes which may lead to the disqualification of a bidder and/or the rejection of a bid proposal. Unless all bids are rejected, the Owner agrees to give Notice of Award of Contract to the successful bidder within ninety (90) days of the bid opening.
Bidders are expected to inspect the site of the work and inform themselves regarding all local conditions.

Bidders are advised to review the Key Points of Public Right-of-Way Ordinance on Legal Relations and Responsibilities to the Public Division C-7.15. The entire ordinance may be viewed at the following website under Building Services Department.
http://www.ci.laredo.tx.us/Building/

A pre-bid conference with prospective bidders will be held on Monday, January 27, 2020, at 2:00 P.M. at the City of Laredo Engineering Department Conference Room, located at 1110 Houston Street, 2nd Floor, Laredo, Texas 78040.

The Construction Documents and Specification may be reviewed or obtained free of charge at the office of the City Engineer, 1110 Houston Street, Laredo, Texas, or from the City of Laredo website www.cityoflaredo.com/bids.html.

Jose A. Valdez, Jr., City Secretary

Publication Dates:
Sunday, January 19, 2020
Sunday, January 26, 2020
SECTION A-2

INFORMATION TO BIDDERS

Sealed bids will be received at City Secretary’s Office, 1110 Houston Street, 3rd floor, City Hall Building, Laredo, Texas, for the furnishing of all necessary materials, machinery, equipment, labor, superintendence, and all other services and appurtenances required for certain improvements in the City of Laredo and shall include acknowledgment of addenda submitted, and all other documents included in said bid call. Said bids shall be marked,

Flores Ave. Drainage and Utility Improvements – Phase II
City of Laredo, Texas

The project consists of the installation of 24” and 30” RCP storm sewer, 8” PVC sanitary sewer, and 8”, 12”, and 16” PVC water line along Flores Avenue from Hidalgo Street to Victoria Street, including manholes, appurtenances, and other related improvements.

Construction contract time for the project is two hundred forty (240) calendar days.

Bids shall be based on a per unit of work basis and shall include dollar amounts for each specific unit in improvements listed including those items listed as alternatives as per the proposal sheet included in the specifications of this project.

Each proposal and a proposal guaranty must be originals and must be sealed in an envelope plainly marked with the name of the project as shown above, and the name and address of the Bidder. When submitted by mail, this envelope shall be placed in another envelope addressed as indicated in this Notice to Bidders and shall be marked as a bid for the project above referred.

Further, on federally funded projects, contractor must comply with the Federal Labor Standards Provision, Davis Bacon Act, Equal Opportunity Clause, Wage Determination and HUD and Urban Development Federal Requirements especially as it regards payrolls and basic records.

Only the bids and bid guaranties actually in the hands of the designated official at the time set in this Notice to Bidders shall be considered. Bids submitted by telephone, telegraph, or fax, will not be considered.

The City reserves the right to award the contract on the basis of the alternative which appears most advantageous to the City, to reject any or all bids, to waive objections based on failure to comply with formalities, and to allow the correction of obvious or patent errors. Bidders are expressly advised to review Section C-3 of the General Conditions of the proposed contract as to the causes which may lead to the disqualification of a bidder and/or the rejection of a bid proposal. Unless all bids are rejected, Owner agrees to give Notice of Award of contract to the successful bidder within ninety (90) days from the date of the bid opening.
Bidders for the construction work must submit a satisfactory cashier’s or certified check, or bidder’s bond having a minimum Best’s Rating A according to Best’s Key Rating Guide Latest Edition from a surety duly authorized and licensed in the State of Texas, payable without recourse to the order of the City of Laredo, Texas, in an amount not less than five percent (5%) of the total bid based on the bid which check or bond shall be submitted as a guarantee that the bidder will enter into a contract, and execute performance and payment bonds within ten (10) days after Notice of Award of contract is given to him for contracts in excess of $50,000.00. Bids without the required check or bond will NOT be considered.

The successful bidder for the construction of the improvements must furnish a Certificate of Insurance, and a satisfactory Performance Bond in the amount of 100% of the total contract price, and a satisfactory Payment Bond in such amount, duly executed by such bidder as principal and by a corporate surety duly authorized so to act under the laws of the State of Texas. The successful bidder will be required to provide Performance and Payment Bonds issued by an insurance company which meets the minimum State requirements and is licensed in the State of Texas, and has a Best’s Key according to Best’s Key Rating Guide Latest Edition as follows:

<table>
<thead>
<tr>
<th>Construction Contract</th>
<th>Minimum Best’s Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>50,001 - 250,000</td>
<td>A</td>
</tr>
<tr>
<td>250,000 - 1,000,000</td>
<td>A</td>
</tr>
<tr>
<td>Over 1,000,000</td>
<td>A</td>
</tr>
</tbody>
</table>

All lump sum and unit prices must be stated in both script and figures.

Bidders are expected to inspect the site of the work and to inform themselves regarding all local conditions.

The Instructions to Bidders, Forms of Bid, Form of Contract, Plans, Specifications, Form of Bid Bond, Performance and Payment Bonds and other contractual documents may be examined free of charge at the City of Laredo Engineering Department, 1110 Houston Street, Laredo, Texas 78040.

Copies of the plans and specifications may be reviewed free of charge at the office of the City Engineer, 1110 Houston Street, Laredo, Texas, or copies may be obtained upon deposit of $____ for each set of documents. The entire amount of deposit will be refunded if the plans and specifications are returned in good order after the bid opening.

Bid proposals over $50,000.00 shall comply with all conditions of the bid documents.

In the event the base bid amount is $50,000.00 or LESS than $50,000.00, a Payment Bond and Performance Bond will NOT BE REQUIRED. A Bid Guarantee in the form of a Cashier’s or Certified Check or Bid Bond and the Certificate of Insurance however, WILL BE REQUIRED. Under the above conditions, the successful bidder for the Sidewalk Improvements Phase 1 Tilden Ave./Eistetter St. Area - (19 Blocks) District 4 project is hereby advised that the total contract price will be paid in ONE PAYMENT upon completion and acceptance of the project by the City of Laredo.
Cashier’s checks are not to be released until a contract for the project has been approved by City Council and signed by the City Manager.

Any other division or section of this project’s specifications having reference to Bid Guarantee, Cashier’s or Certified Check, Bid Bond, Payment Bond, or Performance Bond, or having mention at all, to the requirements of bonds, is hereby amended to concur with the above conditions ONLY when the base bid is LESS THAN $50,000.00.

Bidders are advised to contact the City Engineering Department at 1110 Houston Street, Laredo, Texas, 78040, telephone number (956) 791-7346, for visits to project site, and for any additional information required on the project.

Contractor’s attention is directed to Special Provision 000-6233, “Important Notice to Contractors” and “Statement of Materials and Other Charges” which will be included in all projects, beginning with the September 1991 letting. These establish the procedures whereby the Contractor will be permitted to obtain an exemption from the sales tax on certain materials. See Comptroller’s Rule 2.291 and Texas Tax Code Chapter 151, as mended by House Bill Number 11, Acts 1991, 72nd Legislature, First called Session. The Contractor will be required to separate the charges for materials from all other charges and will be furnished an Exemption Certificate of each contract the Department. Also, the Contractor must issue resale certificates to suppliers. Sales tax permit applications and information regarding resale certificates may also be obtained by calling the State Comptroller’s toll free number 1-800-252-5555.
SECTION A-3

ADVICE TO BIDDERS

Project: Flores Ave. Drainage and Utility Improvements – Phase II

The Contractor’s attention is directed to the State of Texas Comptroller of Public Accounts Limited Sales Excise and Use Tax Rules and Regulations, Paragraph 3 of Ruling No. 9. Repairmen and Contractors (amended April 3, 1972). Reference Article 20.01 (T). Upon compliance with certain conditions, this ruling provides for exemption from this tax of materials incorporated into work done for an exempt agency under a Contract. The City is an exempt agency.

Any Bidder may elect to exclude this sales tax from his bid. If the Bidder submitting the lowest acceptable bid for performing the work on this project elects to comply with the above ruling on any bid item included in this Contract by obtaining any necessary permit or permits from the State Comptroller allowing the purchase of material for incorporation into this project without having to pay the Limited Sales, Excise and Use Tax at the time of purchase, he shall upon Award of Contract submit a statement in satisfactory form in which his bid prices to the City for materials are listed separately from all other charges, either by bid item or by total as required by the comptroller. This statement shall be included in and made part of the Contract.

The City will make no further allowance for and will make no price adjustment above or below the originally bid unit price on account of this tax. It shall be the Contractor’s sole responsibility, if he elects to exclude the sales tax from his bid, to comply with the aforementioned Ruling No. 9 and with any other applicable rules, regulation, or laws pertaining to the Texas Limited Sales, Excise and Use Tax which may now or at any time during the performance of this Contract be in effect, and the City shall have no responsibility for any sales or use tax which the Contractor may be required to pass as a result of his failure or the City’s failure to comply with said rules, regulations or laws, or as the result of the performance of the Contract or any part thereof by the Contractor.

Bidders are cautioned that materials which are not permanently incorporated into the work are not eligible for exemption and are not to be included in the statements as “Materials” (example: fuel, lubricants, tools, forming materials, etc.).
SECTION A-4

INFORMATION TO CONTRACTORS

PROJECT: Flores Ave. Drainage and Utility Improvements – Phase II

The Contractor’s attention is directed to Special Provision 000-6233, “Important Notice to Contractors”, and “Statement of Materials and Other Charges” which will be included in all projects, beginning with the September, 1991 letting. These establish the procedures whereby the Contractor will be permitted to obtain an exemption from the sales tax on certain materials. See Comptroller’s Rule 3.291 and Texas Tax Code, Chapter 151, as amended by House Bill Number 11, acts 1991, 72nd Legislature, First Called Session. The Contractor will be required to separate the charges for materials from all other charges and will be furnished an Exemption Certificate for each contract by the Department. Also the Contractor must issue resale certificates to suppliers. Sales tax permit applications and information regarding resale certificates may be obtained by calling the State Comptrollers’ toll fee number 1-800-252-5555.

Issued 10/29/91
SPECIAL PROVISION
No. 000-6233
IMPORTANT NOTICE TO CONTRACTORS

The Contractor’s attention is directed to Rule 3.291, paragraphs (a) (1), defining separated contracts, subsection (b) (3) discussing separated contracts, and subsection (c) discussing exempt contracts. Reference: Texas Tax Code, Chapter 151.

Contractors should note those organizations in subsection (c) that the rule shows as being exempt no longer qualify for the exemption. The rule states that contractors improving realty for organizations listed in Texas Tax Code 151.309 and 151.310 are exempt from tax. THIS IS NO LONGER TRUE EFFECTIVE WITH CONTRACTS SIGNED ON OR AFTER AUGUST 15, 1991.

Only those contracts with school districts and nonprofit hospitals qualify for the exemption discussed in subsection (c) of Rule 3.291.

The Comptroller is amending the rule to reflect this change.

If the low bidder elects to operate under a separated contract as defined by Rule 3.291, by obtaining the necessary permits from the State Comptroller’s office allowing the purchase of materials for incorporation in this project without having to pay the Limited Sales and Use Tax at the time of purchase, the low bidder shall identify separately from all other charges the total agreed contract price for materials incorporated into the project. This form shall be filled out by the low bidder in each of the two bound copies of the contract. Total materials shall only include materials physically incorporated into the realty.

If the Contractor operates under a “separated contract”, the Department will furnish the Contractor with an exemption certificate for the applicable materials.

In order to comply with the requirements of Rule 3.291, as mentioned above, it will be necessary for the Contractor to obtain a sales tax permit.

It will also be necessary that the contractor issue resale certificates to his suppliers.
Sales tax application for a sales tax permit and information regarding resale certificates may be obtained by writing to:

Comptroller of Public Accounts  
Capital Station  
Austin, Texas 78774  

The Contractor may also receive information or request sales tax permit applications by calling the State Comptrollers’ toll free number 1-800-252-5555.  

Subcontractors are eligible for sales tax exemption if the subcontract is made in such manner that the charges for materials is separated from all other charges. The procedure described above will effect a satisfactory separation. When subcontractors are handled in this manner, the Contractor must issue a resale certificate to the subcontractor and the subcontractor, in turn, must issue a resale certificate to his supplier.
STATEMENT OF MATERIALS AND OTHER CHARGES

PROJECT: Flores Ave. Drainage and Utility Improvements – Phase II

MATERIALS INCORPORATED INTO THE PROJECT: $___________

ALL OTHER CHARGES: $___________

*TOTAL: $___________

*This total must agree with the total figure shown in the Item and Quantity Sheets in the bound contract.

For purposes of complying with the Texas Tax Code, the Contractor agrees that the charges for any material incorporated into the project in excess of the estimated quantity provided for herein will be no less than the invoice price for such material to the Contractor.

NOTE: ONLY THE COPY OF THIS FORM IN THE BOUND CONTRACTS IS TO BE FILLED OUT.
SECTION A-5

BID PROPOSAL

To: The City of Laredo, Texas

Honorable Pete Saenz, Mayor

From: ________________________________
Contractor

Address: ________________________________
Phone: ________________________________
Fax: ________________________________

Project: Flores Ave. Drainage and Utility Improvements – Phase II

Pursuant to Notice to Bidders, the undersigned bidder hereby proposes to furnish the labor, materials, and equipment in accordance with the plans and specifications, general conditions of the agreement, special provisions of the Agreement, and Addenda, if any. The bidder binds himself upon acceptance of his proposal to execute a contract and bonds accompanying form of performing and completing the said work within the time stated as required by the detailed specifications at the following unit prices. The quantities shown below are based on the Engineer’s estimate of quantities and it is agreed that the quantities may be increased or diminished, and may be considered necessary in the opinion of the City of Laredo, Texas to complete the work fully as planned and contemplated, and that all quantities of work, either increased or decreased, are to be performed at the unit prices set forth below (except as provided in the General Conditions of the Agreement or the specifications, the contract documents).

Acknowledgment of Addenda: (Please initial and date):

Addendum No. 1: ________________________________
Addendum No. 2: ________________________________
Addendum No. 3: ________________________________
Addendum No. 4: ________________________________
Addendum No. 5: ________________________________

Acknowledgment of other documents: (Please initial and date):
Wage Determination: ________________________________
Labor Provisions: ________________________________
Affirmative Action Program: ________________________________
Project: Flores Ave. Drainage and Utility Improvements – Phase II

Form of Non-Collusive Affidavit

AFFIDAVIT

STATE OF TEXAS {}
COUNTY OF WEBB {}

being first duly sworn, deposes and says

That he is __________________________________________
(a Partner of Officer of the firm of, etc.)

the party making the foregoing proposal or bid, that such proposal or bid is genuine and not collusive or sham; that said Bidder has not colluded, conspired, connived or agreed, directly or indirectly, with any Bidder or Person, to put in a sham bid or to refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid price or affiant or of any other Bidder or to fix any overhead, profit or cost element of said bid price, or of that of any other Bidder, or to secure any advantage against the City of Laredo or any person interested in the proposed Contract; and that all statements in said proposal or bid are true.

________________________________________
Signature of (Print and Sign)

Bidder, if the Bidder is an individual
Partner, if the Bidder is a Partnership
Officer, if the Bidder is a Corporation

Subscribed and sworn before me this ______ day of ____________, 20__.

________________________________________
Notary Public

My Commission expires

________________________________________
INFORMATION FROM BIDDERS
MUST BE COMPLETED AND SUBMITTED WITH BID PROPOSAL

Project: Flores Ave. Drainage and Utility Improvements – Phase II

Statement of Qualifications: (Similar Projects Completed by Bidder)

1. Name of Project: _____________________________
   Value of Contract: _____________________________
   Date Completed: ______________________________

2. Name of Project: _____________________________
   Value of Contract: _____________________________
   Date Completed: ______________________________

3. Name of Project: _____________________________
   Value of Contract: _____________________________
   Date Completed: ______________________________

Experience Data: (Include name and experience record of the Superintendent)

Financial Status: A confidential financial statement will be submitted by the apparent successful low Bidder only if the Owner deems it necessary.

NOTE: TO BE SUBMITTED UPON REQUEST
IS NOT AN ACCEPTABLE ANSWER.
Project: Flores Ave. Drainage and Utility Improvements – Phase II

Proposed Progress Schedules:

Data on Equipment to be used on the Work: (Include the number of machines, the type, capacity, age and conditions and location)

Subcontractors: (Submit a list of proposed Subcontractors. List sources, types and manufacturers of proposed materials)

NOTE: TO BE SUBMITTED UPON REQUEST

IS NOT AN ACCEPTABLE ANSWER.
## CITY OF LAREDO
ENGINEERING DEPARTMENT
BID SCHEDULE

**PROJECT:** Flores Ave. Drainage and Utility Improvements – Phase II

<table>
<thead>
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<th>ITEM NO.</th>
<th>UNIT QTY.</th>
<th>UNIT</th>
<th>DESCRIPTION OF ITEM WITH UNIT PRICE WRITTEN IN WORDS</th>
<th>UNIT PRICE</th>
<th>AMOUNT</th>
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<td><strong>STORM SEWER ITEMS</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1</td>
<td>326</td>
<td>LF</td>
<td>18-INCH RCP STORM SEWER, BY OPEN CUT, COMPLETE IN PLACE (D-304):</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>395</td>
<td>LF</td>
<td>24-INCH RCP STORM SEWER, BY OPEN CUT, COMPLETE IN PLACE (D-304):</td>
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<td></td>
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<tr>
<td>3</td>
<td>740</td>
<td>LF</td>
<td>30-INCH RCP STORM SEWER, BY OPEN CUT, COMPLETE IN PLACE (D-304):</td>
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<tr>
<td>4</td>
<td>117</td>
<td>LF</td>
<td>REMOVE EXISTING STORM SEWER (8&quot; TO 12&quot;), INCLUDING ALL ASSOCIATED LABOR, DISPOSAL, AND MATERIAL COSTS (D-304):</td>
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<td>339</td>
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<td></td>
<td></td>
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</tbody>
</table>


<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>QTY.</th>
<th>UNIT</th>
<th>DESCRIPTION OF ITEM WITH UNIT PRICE WRITTEN IN WORDS</th>
<th>UNIT PRICE</th>
<th>AMOUNT</th>
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<td></td>
</tr>
<tr>
<td>7</td>
<td>310</td>
<td>LF</td>
<td>ABANDON EXISTING STORM SEWER (18&quot; TO 24&quot;), INCLUDING ALL ASSOCIATED LABOR, DISPOSAL, AND MATERIAL COSTS (D-304):</td>
<td></td>
<td></td>
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<tr>
<td>8</td>
<td>22</td>
<td>EA</td>
<td>TYPE &quot;A&quot; INLET, COMPLETE IN PLACE (D-312):</td>
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<td></td>
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<tr>
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<td>1</td>
<td>EA</td>
<td>6-FOOT CONCRETE STORMDRAIN MANHOLE, GREATER THAN 8 FEET DEPTH, COMPLETE IN PLACE (D-312):</td>
<td></td>
<td></td>
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<tr>
<td>10</td>
<td>9</td>
<td>EA</td>
<td>5-FOOT CONCRETE MANHOLE, UP TO 8 FEET DEPTH, COMPLETE IN PLACE (D-312):</td>
<td></td>
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<td>11</td>
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**TOTAL FOR STORM SEWER ITEMS**

**SANITARY SEWER ITEMS**

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<td>8-INCH PVC SANITARY SEWER, UP TO 10 FEET DEPTH, COMPLETE IN PLACE (D-202):</td>
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<td>15</td>
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<td>8-INCH PVC SANITARY SEWER (MIN. 150 PSI PRESSURE RATED), UP TO 10 FEET DEPTH, COMPLETE IN PLACE (D-202):</td>
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<td>ABANDON 8-INCH SANITARY SEWER, INCLUDING ALL ASSOCIATED LABOR, DISPOSAL, AND MATERIAL COSTS (D-236):</td>
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<td>DIVERSION PUMPING, INCLUDING ALL ASSOCIATED LABOR, EQUIPMENT, AND MATERIAL COSTS (D-234):</td>
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**TOTAL FOR SANITARY SEWER ITEMS**

**WATER LINE ITEMS**

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<td>6-INCH PVC WATER LINE, BY OPEN CUT, COMPLETE IN PLACE (D-104):</td>
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<td>16-INCH BUTTERFLY VALVE W/ BOX, COMPLETE IN PLACE (D-108):</td>
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<td>8-INCH GATE VALVE W/ BOX, COMPLETE IN PLACE (D-110):</td>
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<td>FIRE HYDRANT ASSEMBLY, INCLUDING GATE VALVE W/ BOX, DUCTILE IRON PIPE, AND FITTINGS BETWEEN MAIN LINE AND FIRE HYDRANT, COMPLETE IN PLACE (D-112):</td>
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<td>8&quot; DUCTILE IRON 11.25 DEGREE FITTING, COMPLETE IN PLACE (D-130):</td>
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<td>8&quot; DUCTILE IRON 22.5 DEGREE FITTING, COMPLETE IN PLACE (D-130):</td>
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<td>16&quot; DUCTILE IRON 45 DEGREE FITTINGS, COMPLETE IN PLACE (D-130):</td>
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<td>16&quot;X16&quot; DUCTILE IRON CROSS, COMPLETE IN PLACE (D-130):</td>
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<td>16&quot;X16&quot; DUCTILE IRON TEE, COMPLETE IN PLACE (D-130):</td>
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<td>16” PLUG, COMPLETE IN PLACE (D-130):</td>
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<td>CUT, PLUG AND ABANDON 12-INCH THRU 16-INCH WATER LINE, INCLUDING ALL ASSOCIATED LABOR, DISPOSAL, AND MATERIAL COSTS (D-140):</td>
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<td>TXDOT TYPE 10 PEDESTRIAN RAMP, COMPLETE IN PLACE (D-430):</td>
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<td>REMOVE AND REPLACE EXISTING PEDESTRIAN RAMP IN KIND, COMPLETE IN PLACE (D-430):</td>
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<td>ROADWAY EXCAVATION, INCLUDING ALL ASSOCIATED LABOR, DISPOSAL, AND MATERIAL COSTS (D-502):</td>
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<td>53</td>
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<td>REMOVE AND REPLACE CONCRETE CURB AND GUTTER, COMPLETE IN PLACE (D-SP506):</td>
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<td>PRIME COAT (0.25 GAL/SY), COMPLETE IN PLACE (D-516):</td>
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<td>CONCRETE VALLEY GUTTER, COMPLETE IN PLACE (D-540):</td>
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<td>BLUE PAVEMENT MARKER TYPE II-B-B (D-706):</td>
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<td>REFLECTORIZED TYPE 1 THERMOPLASTIC PAVEMENT MARKINGS, SOLID, 24 INCHES IN WIDTH, 90 MILS IN THICKNESS, WHITE IN COLOR (D-706):</td>
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<td>CONCRETE CURB PAINTING, SOLID, RED IN COLOR (D-SP706):</td>
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<td>REMOVE AND RELOCATE EXISTING TRAFFIC SIGNS (D-710):</td>
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<td>RESURFACING SIDEWALK, COMPLETE IN PLACE (D-830):</td>
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**TOTAL FOR STREET IMPROVEMENT ITEMS**

**MISCELLANEOUS ITEMS**

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<td>2-INCH PVC ELECTRICAL CONDUIT, COMPLETE IN PLACE (D-422):</td>
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<td>4-INCH PVC ELECTRICAL CONDUIT, COMPLETE IN PLACE (D-422):</td>
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<td>REMOVE AND SALVAGE PARKING METERS, INCLUDING ALL ASSOCIATED LABOR AND MATERIAL COSTS (D-542):</td>
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<td>71</td>
<td>22</td>
<td>EA</td>
<td>EXISTING CURB INLET PROTECTION INCLUDING ALL ASSOCIATED LABOR, MATERIAL, AND DISPOSAL COSTS (D-630):</td>
<td></td>
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<tr>
<td>72</td>
<td>22</td>
<td>EA</td>
<td>PROPOSED CURB INLET PROTECTION INCLUDING ALL ASSOCIATED LABOR, MATERIAL, AND DISPOSAL COSTS (D-630):</td>
<td></td>
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<tr>
<td>73</td>
<td>32</td>
<td>EA</td>
<td>TXDOT TYPE D GROUND BOX, COMPLETE IN PLACE (D-SP714):</td>
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<td></td>
</tr>
<tr>
<td>ITEM NO.</td>
<td>UNIT QTY.</td>
<td>UNIT</td>
<td>DESCRIPTION OF ITEM WITH UNIT PRICE WRITTEN IN WORDS</td>
<td>UNIT PRICE</td>
<td>AMOUNT</td>
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<tr>
<td>74</td>
<td>22</td>
<td>EA</td>
<td>TXDOT TYPE E GROUND BOX, COMPLETE IN PLACE (D-SP714):</td>
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<td>75</td>
<td>6,450</td>
<td>LF</td>
<td>TRENCH SAFETY SYSTEMS FOR ALL DEPTHS (D-802):</td>
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<tr>
<td>76</td>
<td>1</td>
<td>LS</td>
<td>MOBILIZATION (NOT TO EXCEED 5% OF TOTAL CONTRACT VALUE)</td>
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<td></td>
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<td></td>
<td>INCLUDING, BUT NOT LIMITED TO, THE MOVEMENT OF EQUIPMENT,</td>
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<td></td>
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<td></td>
<td>PERSONNEL, MATERIALS, SUPPLIES, ETC., TO THE PROJECT SITE AND THE ESTABLISHMENT OF OFFICE AND OTHER FACILITIES AS SPECIFIED OR DEEMED NECESSARY PRIOR TO BEGINNING THE WORK (C-12):</td>
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<td>77</td>
<td>1</td>
<td>EA</td>
<td>CASH ALLOWANCE FOR THE INSTALLATION OF TRAFFIC CONDUIT &amp; REPLACEMENT OF TRAFFIC SIGNAL CABLE; BIDDERS MAY NOT CHANGE THIS AMOUNT (C-14)</td>
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<td></td>
<td>TEN THOUSAND DOLLARS AND ZERO CENTS</td>
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<td>$ 10,000.00</td>
<td>$ 10,000.00</td>
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<tr>
<td>78</td>
<td>1</td>
<td>EA</td>
<td>CASH ALLOWANCE FOR RELOCATION OF EXISTING UTILITIES, WHEN APPROVED BY THE CITY; BIDDERS MAY NOT CHANGE THIS AMOUNT (C-14)</td>
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<td>FIFTY THOUSAND DOLLARS AND ZERO CENTS</td>
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<td>$ 50,000.00</td>
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<td>ITEM NO.</td>
<td>UNIT QTY.</td>
<td>UNIT</td>
<td>DESCRIPTION OF ITEM WITH UNIT PRICE WRITTEN IN WORDS</td>
<td>UNIT PRICE</td>
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<td>79</td>
<td>1</td>
<td>EA</td>
<td>CONTINGENCY ALLOWANCE FOR ADDITIONAL WORK TO BE DONE ON STORM SEWER, AS APPROVED BY THE CITY; BIDDERS MAY NOT CHANGE THIS AMOUNT (C-14) FIFTY THOUSAND DOLLARS AND ZERO CENTS</td>
<td>$ 50,000.00</td>
<td>$ 50,000.00</td>
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<tr>
<td>80</td>
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<td>EA</td>
<td>CONTINGENCY ALLOWANCE FOR ADDITIONAL WORK TO BE DONE ON SANITARY SEWER, AS APPROVED BY THE CITY; BIDDERS MAY NOT CHANGE THIS AMOUNT (C-14) FIFTY THOUSAND DOLLARS AND ZERO CENTS</td>
<td>$ 50,000.00</td>
<td>$ 50,000.00</td>
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<tr>
<td>81</td>
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<td>EA</td>
<td>CONTINGENCY ALLOWANCE FOR ADDITIONAL WORK TO BE DONE ON WATER LINE, AS APPROVED BY THE CITY; BIDDERS MAY NOT CHANGE THIS AMOUNT (C-14) FIFTY THOUSAND DOLLARS AND ZERO CENTS</td>
<td>$ 50,000.00</td>
<td>$ 50,000.00</td>
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TOTAL FOR MISCELLANEOUS ITEMS

TOTAL BASE BID AMOUNT (INCLUDING ALLOWANCES):

TOTAL BASE BID WRITTEN IN WORDS:
ALTERNATES:
ALTERNATIVE #1
Provide stamped concrete pavement as described in Section 432 Stamped Concrete.

Deduct the following:

<table>
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<tr>
<th>ITEM NO.</th>
<th>UNIT QTY.</th>
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<th>DESCRIPTION OF ITEM WITH UNIT PRICE WRITTEN IN WORDS</th>
<th>UNIT PRICE</th>
<th>AMOUNT</th>
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<tbody>
<tr>
<td>54</td>
<td>4,900</td>
<td>SY</td>
<td>FLEXIBLE BASE (18-INCHES), COMPLETE IN PLACE (D-510):</td>
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<td>55</td>
<td>4,900</td>
<td>SY</td>
<td>PRIME COAT (0.25 GAL/SY), COMPLETE IN PLACE (D-516):</td>
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<tr>
<td>56</td>
<td>4,900</td>
<td>SY</td>
<td>ASPHALT CONCRETE PAVEMENT TYPE C (4-INCHES), COMPLETE IN PLACE (D-520):</td>
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DEDUCT AMOUNT IN FIGURES: $ ___________________________________________
DEDUCT AMOUNT IN WORDS: ________________________________________________

Add the following:

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<th>ITEM NO.</th>
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<th>DESCRIPTION OF ITEM WITH UNIT PRICE WRITTEN IN WORDS</th>
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<th>AMOUNT</th>
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<tbody>
<tr>
<td>82</td>
<td>4,900</td>
<td>SY</td>
<td>STAMPED CONCRETE PAVEMENT (7-INCHES), COMPLETE IN PLACE (D-432):</td>
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</tr>
<tr>
<td>83</td>
<td>4,900</td>
<td>SY</td>
<td>FLEXIBLE BASE (4-INCHES), COMPLETE IN PLACE (D-510):</td>
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</tr>
</tbody>
</table>
ADD AMOUNT IN FIGURES: $ ________________________________
ADD AMOUNT IN WORDS: ____________________________________

TOTAL BASE BID WITH ALTERNATE 1: $ ________________________________
TOTAL BASE BID WITH ALTERNATE 1: WRITTEN IN WORDS: ____________________________________

Contractor

Signature                  Title

Address                  City/State     Zip Code

Telephone Number: (__) ______________________________________
Fax Number: (__) ______________________________________
Date: __________________

NOTE: ALL BID ITEMS WILL BE PAID FOR WHEN COMPLETE IN PLACE, TESTED, AND ACCEPTED BY THE OWNER.
BID BOND

Project: Flores Ave. Drainage and Utility Improvements – Phase II

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned

___________________________________________________

as Principal, and ________________________________ as

Surety, are hereby held and firmly bound unto

___________________________________________________

as Owner in the penal sum of ____________________________

for payment of which, well and truly to be made, we hereby jointly and severally bid
ourselves, our heirs, executors, administrators, successors and assigns.

Signed, this ______ day of ______________________, 20__.

The condition of the above obligation is such that whereas the Principal has submitted to

___________________________________________________ a certain Bid,

attached hereto and hereby made a part hereof to enter into a Contract in writing for the

___________________________________________________

NOW, THEREFORE,

(a) If said Bid shall be rejected, or in the alternate,

(b) If said Bid shall be accepted and the Principal shall execute and deliver a

Contract in the Form of Contract attached hereto (properly completed in

accordance with said Bid) and shall furnish a bond for his faithful

performance of said Contract, and for the payment of all persons

performing labor or furnishing materials in connection therewith, and shall

in all other respects perform the Agreement created by the acceptance of

said Bid,

then this obligation shall be void, otherwise the same shall remain in force and effect; it

being expressly understood and agreed that the liability of the Surety for any and all

claims hereunder shall, in no event, exceed the penal amount of this obligation as herein

stated.
The Surety, for value received, hereby stipulates and agrees that he obligations of said Surety, and its bonds shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth herein.

______________________________  (L.S.)
Principal (Print and Sign)

______________________________
Surety

By: ____________________________
SECTION A-6

CHECKLIST FOR BIDDERS

Project: Flores Ave. Drainage and Utility Improvements – Phase II

All information required by the terms of the Bid Documents must be furnished. **MISTAKES OR OMISSIONS CAN BE COSTLY AND CAN RESULT IN THE REJECTION OF YOUR BID.** Important items for you to check are included in but not limited to, those listed below. This checklist is furnished only to assist you in submitting a proper bid. Check as you read. **DO NOT INCLUDE THIS CHECKLIST WITH YOUR BID.**

[ ] Have you acknowledged receipt of all addenda to the plans and specifications?

[ ] Is your bid properly signed? (Refer to Bid Documents)

[ ] If a bid guarantee is required, is it included in your bid? (A late bid guarantee is treated the same as a late bid)

[ ] Is your bid guarantee in the proper amount? (Usually 5% of total bid price)

[ ] Your bid guarantee must be in the form of a Bidder’s Bond, a Certified Check or Cashier’s Check.

[ ] If your bid guarantee is in the form of a Bidder’s Bond, is the bond properly signed by both the bidder and surety and are all required seals affixed?

[ ] Is the surety company qualified and licensed by the State of Texas as required by the provisions of the bid documents?

[ ] Is the name in which you submitted the bid the same on your bid proposal as on the Bidder’s Bond?

[ ] If required have you entered a unit price for each bid item?

[ ] If required have you entered the unit price or lump sum price in both words and figures? (Unit Price or Lump Sum price in words govern)

[ ] Are decimals in unit prices in the proper places? Are your figures legible?

[ ] Are the extensions of your unit prices, and your total bid price correct?

[ ] Is proposal being submitted complete together with Information from Bidders?

[ ] Are all erasures or corrections initialized by the person signing the bid or by an authorized representative of the person signing the bid.
[ ] Do not restrict your bid by altering any provisions of the Bid Document or by attaching any documents to the Proposal that takes exception to the Bid Documents.

[ ] Have you included all pages of the Proposal with your bid? Are all blanks in the Proposal properly completed (equipment brands, alternate materials, etc.)?

[ ] Is the envelope containing your bid properly identified that it is a sealed bid and does it contain the correct project name and bid opening date?

[ ] Will your bid arrive on time? Late bids will not be considered. Generally, bids must be received by the City Secretary, City Hall on the date and time specified in the Notice to Bidders. (Other times or dates will be clearly specified in the Notice).

[ ] On Federally Funded Projects, contractor must submit certified weekly payrolls with a copy to City Engineering Files.
SECTION A-7
CONSTRUCTION CONTRACT

Agenda Item:

STATE OF TEXAS
COUNTY OF WEBB

THIS AGREEMENT, made this ________ day of ____________ 20__, by and between the City of Laredo, Texas, acting by and through its duly authorized City Manager hereinafter termed the Owner, and ____________________, of the City of ________________, County of ________________, State of ______________, his/their executors, administrators, heirs, successors, or assigns, hereinafter termed the Contractor.

WHEREAS, the Owner desired to enter into Contract for the ________________________________ in accordance with the provisions of the Invitation for Bids, the Specifications and Plans titled as above, and published by City of Laredo, Texas, 1110 Houston Street, (mailing address: P.O. Box 579), Laredo, Texas 78040 all of which are a part thereof; and,

WHEREAS, the Contractor has been engaged in and now does such work and represents that he is fully equipped, competent and capable to perform the above desired and outlined work, and is ready and willing to perform the work in accordance with the provisions of the Invitation for Bids, the Specifications and Plans, titled, "______________________________".

WITNESS:

THAT for and in consideration of the payments and agreements hereinafter mentioned to be made and performed by the Owner, the Contractor hereby agrees at the unit price set forth in his Bid, made a part thereof totaling the sum of ______________________($_________________) based on the Engineer's estimate of quantities, payable in the manner set out in Division C, Section 9, General Provisions of the contractual Documents to commence and complete the ________________________________ in the City of Laredo, Tx, in accordance with Instructions to Bidders, Special Provisions, General Provisions, Technical Provisions, and all other requirements of the contractual Documents, and in accordance with the Specifications and Plans (including all maps, plats, blueprints, and other drawings and printed or written explanatory matter thereof) prepared by the Owner's Engineer, a part thereof and collectively, together with this Agreement constitute the entire Contract; and the Contractor agrees to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, bonds, insurance and other accessories and services, and whatever else may be necessary to complete the said construction in accordance with said specifications, plans, and other contractual documents including such proposal.
Project: Flores Ave. Drainage and Utility Improvements – Phase II

Said Contractor further agrees to begin the work on or before the tenth day following the date set by the Owner in the written notice to proceed and to complete the work within _________________.

The Contractor further agrees to pay the sum of $__________ for each consecutive day there-in-after as herein provided in Division B, Section 1.

And the Owner in consideration of the full and true performance of the said work by said Contractor hereby agrees to and binds itself to pay the said Contractor the unit price set forth in the attached Bid, and in the manner provided in the Specifications.

IN WITNESS WHEREOF, the OWNER AND THE CONTRACTOR have hereunto set their hand this _____ day of ____________, 20__, WITNESS:

Contractor/Firm (Signature)  
______________________  
Signature  
__________________________  
(Print)  
Title: ______________________  
__________________________  
(Print)  
Address  
__________________________  
City/State/Zip Code  
__________________________  
Telephone Number:  
__________________________  
Fax Number  
__________________________  
E-mail address  
__________________________  

ATTEST:  CITY OF LAREDO, TEXAS  
__________________________  
Jose A. Valdez, Jr., City Secretary  
Robert A. Eads, Co-Interim City Manager  

APPROVED AS TO FORM:  
__________________________  
Kristina Laurel Hale, City Attorney  
Rosario C. Cabello, Co-Interim City Manager
SECTION A-8
PERFORMANCE BOND

(As required by Chapter 2253, Texas Government Code)

THE STATE OF TEXAS {}
COUNTY OF WEBB {}

KNOW ALL MEN BY THESE PRESENTS: That we (1) ____________________________
__________________________________________ a (2) ____________________________
__________________________________________ of hereafter called Principal and (3) ________
__________________________________________ of ____________, State of ______
__________________________________________, hereinafter called the Surety, are held and firmly bound unto (4) ___
__________________________________________ of ________________________________
hereinafter called Owner, in the penal sum of ________________________________
__________________________________________ ($_________________________)

Dollars in lawful money of the United Stated, to be paid in (5)

WEBB COUNTY, TEXAS

____________________ for the payment of which sum well and truly to be made, we bind
ourselves, our heirs, executors, administrators and successors, jointly and severally,
firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION is such that Whereas, the Principal entered
into a certain Contract with (6) ____________________________
the Owner, dated the ______________ day of ________________________ a copy
of which is hereto attached and made a part hereof for the Construction of:

__________________________________________

__________________________________________

(herinafter called the “Work”)

These notes refer to the numbers in body of Contract above:

Date of Bond must not be prior to Date of Contract.

(1) Correct name of Contractor.
(2) A Corporation, or Partnership or an Individual, as case may be.
(3) Correct name of Surety.
(4) Correct name of Owner.
(5) County and State.
(6) Owner.

NOW THEREFORE, if the Principals shall well, truly and faithfully perform the work in accordance with the Plans, Specifications and Contract Documents during the original term thereof, and any extensions thereof which may be granted by the Owner with or without notice to the Surety, 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 if any legal action be filed upon this Bond, venue shall lie WEBB County, State of Texas, and 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 the 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.

IN WITNESS WHEREOF, this Instrument is executed in six counterparts, each one of which shall be deemed an original, this the ______ day of ____________________.

ATTEST:

(Principal) Secretary (Print and Sign)  PRINCIPAL (Print and Sign)

By: ______________________________

(SEAL)  Address (State and Zip Code)

Witness as to Principal (Print and Sign)  Telephone Number

Address (State and Zip Code)
ATTEST:

______________________________                         SURETY: (Surety)
Secretary (Print and Sign)

______________________________                         By:
(SEAL)                                          (Print and Sign)

______________________________                         ________________________________
(Surety) Secretary                     Address (State and Zip Code)

______________________________                         ________________________________
(SEAL)                                          Telephone No. (Area Code)

______________________________                         ________________________________
Witness as to Surety (Print and Sign)       Address (State and Zip Code)
PAYMENT BOND
(As required by Chapter 2253, Texas Government Code)

THE STATE OF {}
COUNTY OF {}

KNOW ALL MEN BY THESE PRESENTS: That we (1) ____________________________
_____________________________ (2) ____________________________
of ____________________________ hereinafter called Principal and (3) ______
of ____________________________, State of ________, hereinafter called
the Surety, are held and firmly bound unto (4) ____________________________ of
_____________________________ hereinafter called Owner, and unto all
Persons, Firms, and Corporations who may furnish materials for, or perform labor upon
the building or improvements hereinafter referred to in the penal sum of ____________________________
_____________________________ ($______________________ )
Dollars in lawful money of the United Stated, to be paid in (5) WEBB COUNTY,
TEXAS for the payment of which sum well and truly to be made, we bind ourselves, our
heirs, executors, administrators and successors, jointly and severally, firmly by these
presents.

THE CONDITIONS OF THIS OBLIGATION is such that Whereas, the Principal entered
into a certain Contract with (6) ______
the Owner, dated the __________________ day of ________________________ a copy
of which is hereto attached and made a part hereof for the construction of:

______________________________________________________

(herinafter called the “Work”)

These footnotes refer to the numbers in body of contract above:

Date of Bond must not be prior to Date of Contract.

(1) Correct name of Contractor.
(2) A Corporation, or Partnership or an Individual, as case may be.
(3) Correct name of Surety.
(4) Correct name of Owner.
(5) County and State.
(6) Owner.
NOW THEREFORE, if the Principals shall well, truly and faithfully perform the work in accordance with the Plans, Specifications and Contract Documents during the original term thereof, and any extensions thereof which may be granted by the Owner with or without notice to the Surety, and if he shall satisfy all claims and demands incurred under such Contract, then this obligation shall be null and void; otherwise to remain in full force and effect.

This Bond is made and entered into solely for the protection of all claimants supplying labor and material in the prosecution of the work provided for in said Contract, and all such claimants shall have a direct right of action under the Bond as provided in Section 2253.073, Texas Government Code.

PROVIDED FURTHER, that if any legal action be filed upon this Bond, venue shall lie WEBB County, State of Texas, and that no change, extension of time, alteration or addition to the terms of the Contract or to the 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 the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in six counterparts, each one of which shall be deemed an original, this the ________ day of ____________.

ATTEST:

(Principal) Secretary  PRINCIPAL (Print and Sign)
(Print and Sign)  By: __________________________

(SEAL)  Address (State and Zip Code)

Witness as to Principal (Print and Sign)  Telephone Number

(SEAL)  Surety
ATTEST:

(Surety Secretary) (Print and Sign)        By:______________________________
(SEAL)                                     (Print and Sign)

______________________________
Address (State and Zip Code)

______________________________
Telephone Number

NOTE: If Contractor is Partnership, all Partners should execute Bond.
<table>
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<tr>
<th>Business (Print)</th>
<th>Individual Principal (Print and Sign)</th>
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<tbody>
<tr>
<td>Address (State and Zip Code)</td>
<td>Business Address</td>
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<tr>
<td>Telephone Number (Area Code)</td>
<td>Telephone Number (Area Code)</td>
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<tr>
<td>ATTEST:</td>
<td>Corporate Principal</td>
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<tr>
<td>(Print and Sign)</td>
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<tr>
<td>(State and Zip Code)</td>
<td>Business Address Name</td>
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<td>Telephone Number (Area Code)</td>
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<td>Address (State and Zip Code)</td>
<td>(Affix Corporate Seal)</td>
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<td>By:</td>
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<td>(Sign and Print)</td>
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<td>ATTEST:</td>
<td>Corporate Surety</td>
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Performance and Payment Bonds
Page 7 of 8
CERTIFICATE AS TO CORPORATE PRINCIPAL

I, __________________________, certify that I am the __________________________.
Secretary of the Corporation named as Principal in the within Bond; that ________________
__________________________, who signed the said Bond on behalf of the Principal was
then ____________________________, of said Corporation; that I know his signature thereof is genuine; and that said Bond was duly signed, sealed, an
attested for and in behalf of said Corporation by authority of its governing body.

Title

__________________________________________________________________________

Date: _______________________________ (Affix Corporate Seal)

__________________________________________________________________________

Telephone No.

The rate of premium on this Bond is _____________ per thousand. Total of premium
charge

$________________________________________

NOTE: The above must be filled in by Corporate Surety. Power-of-Attorney of person
signed for Surety company must be attached.
SECTION A-9
CITY OF LAREDO
INSURANCE PROVISIONS AND LIMITS

Contractor shall provide and continuously maintain the minimum insurance coverages set forth below during the term of its agreement with the City of Laredo; and Contractor shall require its subcontractors to purchase the same types and amounts of insurance, at a minimum, as set forth below with respect to statutory workers' compensation and liability insurance.

1. Commercial general liability standard ISO insurance at minimum combined single limits of $1,000,000 per-occurrence and $2,000,000 general aggregate for bodily injury and property damage, which coverage shall include: products/completed operations ($2,000,000 products/completed operations aggregate); XCU (explosion, collapse, underground) hazards; and contractual liability. Without limitation, the commercial general liability coverage must cover all operations required in the contract, as well as contractual liability for the indemnity obligations assumed by the Contractor in the contract. Coverage must be written on an occurrence form.

2. Workers' compensation insurance at statutory limits, including employers' liability coverage at minimum limits of $1,000,000 each-occurrence, each accident/$1,000,000 by disease each-occurrence/$1,000,000 by disease aggregate.

3. Commercial automobile liability insurance at a minimum combined single limit of $1,000,000 per-occurrence for bodily injury and property damage, including non-owned and hired car coverage and owned vehicles if any are owned.

4. Umbrella liability or following-form excess liability at minimum limits, reference page four for project costs over $1,000,000. Coverage must be at least as broad as the underlying commercial general liability, auto liability, and employer's liability.

5. Pollution Legal Liability if applicable:
   a) Project costs of $1,000,000 to $10,000,000 and over $10,000,000; reference page four for limits.
   b) Contractors Pollution Liability:
      › Applies to operations that include the use, application, or consumption of pollutants.
      › Retro date shall not be later than the inception date of contract.
      › Contractual liability coverage to be included in contractor's pollution liability coverage.
   c) Environmental Liability:
      a. Applies to asbestos and removal of other hazardous materials and/or repair, maintenance, installation, construction operations that are high hazard.
      › $5,000,000 per-claim/$10,000,000 aggregate minimum.
      › Retro date shall not be later than the inception date of contract.
      › Contractual liability coverage to be included in contractor's pollution liability coverage.
      › At a minimum, coverage must apply to on-premises and transit operations.

6. Professional liability applies to professional services which include but are not limited to design build contractors, engineers, and architects at minimum limits of $1,000,000 per-claim/$2,000,000 annual aggregate. The retro date shall not be later than the inception date of the contract. Reference page four for limits based on project cost.
7. Builders Risk if applicable:
   
   a) "All-risk" including collapse, flood, and earthquake, to be written on completed value form.
   b) Coverage to include limits of at least $250,000 for off-premises storage and transit of construction materials. Soft costs to be included at a minimum limit of $500,000.
   c) Thirty (30)-day occupancy clause to apply.
   d) No testing exclusion should apply.

With reference to the foregoing insurance requirements, Contractor shall specifically endorse applicable insurance policies as follows:

1. City of Laredo shall be named as an additional insured on a primary and non-contributory basis, regardless of the application of other insurance, with respect to all liability coverages, except for the professional liability and workers' compensation.

2. All liability policies shall contain no cross-liability exclusions or insured versus insured restrictions.

3. A waiver of subrogation in favor of City of Laredo shall be contained in all policies.

4. All insurance policies shall be endorsed to require the insurer to immediately notify City of Laredo of any material change in the insurance coverage.

5. All insurance policies shall be endorsed to the effect that City of Laredo will receive at least thirty (30) days' notice prior to cancellation or non-renewal of the insurance.

6. The additional insured coverage in the CGL policy in favor of City of Laredo must apply to the ongoing operations of Contractor for contract costs or up to $1,000,000 and expanded to include product/s/complete operation for contract costs in excess of $1,000,000.

7. Required limits may be satisfied by any combination of primary and umbrella/excess liability insurances.

8. Contractor may maintain reasonable and customary deductibles, subject to approval by City of Laredo.

9. Insurance must be purchased from insurers that are financially acceptable to City of Laredo with a minimum A.M. Best financial rating of A-:VII.

10. Coverage for commercial general liability, professional liability, and pollution legal liability must be maintained for at least one (1) to two (2) years after the project is completed.

11. For projects in excess of $10,000,000 in cost, a per-project aggregate limit must be included in the commercial general liability.
All insurance must be written on standard ISO or equivalent forms. Certificates of insurance shall be prepared and executed by the insurance company, or its authorized agent, shall be furnished to City of Laredo within five (5) business days of being notified of the award of the contract, and shall contain provisions representing and warranting the following:

- Shall set forth all endorsements and insurance coverages according to requirements and instructions contained herein.
- Shall specifically set forth the notice-of-cancellation or termination provisions to City of Laredo.
- Copies of all required endorsements must be attached to the certificate of insurance. The certificates of insurance must be updated and resubmitted to the City of Laredo to show renewal coverages, as applicable, at least thirty (30) days prior to expiration of any one or more policies.

Upon request, Contractor shall furnish City of Laredo with certified copies of all insurance policies.

All of the above insurance provisions and limits are the minimum requirements, as referenced, and may be modified at the sole discretion of the City of Laredo.

**BONDS**

Bonds are required for public works contracts under the following circumstance:

1. **A Bid or Proposal Bond** is required in the amount of the bid submitted to the City of Laredo.
2. **Performance Bond** when the contract is in excess of $100,000, in a personal sum equal to 100% of the contract cost.
3. **Payment or Labor and Material Bond** when a contract is in excess of $50,000, each in a personal sum equal to 100% of the contract cost.
## CITY OF LAREDO
### INSURANCE PROVISIONS AND LIMITS

<table>
<thead>
<tr>
<th>CONTRACT COST</th>
<th>TYPE OF INSURANCE</th>
<th>LIMITS</th>
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</thead>
<tbody>
<tr>
<td>Less than $1,000,000</td>
<td>Umbrella Liability, Professional Liability</td>
<td>Not Required, $1,000,000 Per-Claim/$2,000,000 Aggregate</td>
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<td>$4,000,000 Per-Occ, $1,500,000 Per-Claim/$3,000,000 Aggregate</td>
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<td>$5,000,000 to $10,000,000</td>
<td>Umbrella Liability, Professional Liability</td>
<td>$9,000,000 to $10,000,000 Per-Occ, $1,500,000 Per-Claim/$3,000,000 Aggregate to $2,000,000 Per-Claim/$4,000,000 Aggregate</td>
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<td>Over $10,000,000</td>
<td>Umbrella Liability, Professional Liability</td>
<td>$10,000,000 or Higher, $2,000,000 Per-Claim/$4,000,000 Aggregate or Higher</td>
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<td>$1,000,000 to $10,000,000</td>
<td>Contractor's Pollution Legal Liability</td>
<td>$1,000,000 Per-Claim/$2,000,000 Aggregate</td>
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<tr>
<td>Over $10,000,000</td>
<td>Contractor's Pollution Legal Liability</td>
<td>$2,000,000 Per-Claim/$4,000,000 Aggregate</td>
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### TAIL COVERAGE

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<th>TYPE OF INSURANCE</th>
<th>LIMITS</th>
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</thead>
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<td>$1,000,000 to $5,000,000</td>
<td>Commercial General Liability, Professional Liability, and Pollution Legal Liability</td>
<td>One (1) Year</td>
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<tr>
<td>Over $5,000,000</td>
<td>Commercial General Liability, Professional Liability, and Pollution Legal Liability</td>
<td>Two (2) Years</td>
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<tr>
<td>Any Contract Size</td>
<td>Hazardous Environmental Work</td>
<td>Two (2) Years</td>
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NOTICE OF AWARD

Project: Flores Ave. Drainage and Utility Improvements – Phase II

The City of Laredo has considered the bids submitted for the above described project in response to its advertisement for bids dated ______________, 20__, and ______________, 20__, and related information to Bidders.

You are hereby notified that your bid in the net amount of $____________________ has been favorable considered for the project by the City Council at its regular council meeting on ______________, 20__. Pursuant to the information to Bidders you are asked to provide five (5) original signed contracts and to return the same, along with the required original Certificate of Insurance, and Payment Bond and Performance Bond within ten (10) days of your receipt of this Notice, for the approval and signature of the City Manager.

For the purpose of effective date of the required Certificate of Insurance, and the Performance Bond and the Payment Bond, the date of ______________, 20__, may be considered the date of the contract, if the Documents are approved by the City Manager.

If you fail to submit the signed Contract Performance and Payment Bonds, and the Certificate of Insurance within ten (10) working days from your receipt of this Notice, your bid will be considered as withdrawn and your bid bond will be forfeited, unless an extension for submittals has been requested in writing and approved by the City.

The Construction Contract time of two hundred forty (240) calendar days is to be strictly adhered to per Division B Section 1 and contractor agrees to pay liquidated damages for late completion an amount of $____________________ for each consecutive day exceeding the contract time allotted.

You are asked to acknowledge receipt of this Notice by signing in the appropriate place below.

Dated this the ___ day of ______________ of 20__.

CITY OF LAREDO ENGINEERING DEPT.

________________________________________
Ramon E. Chavez, P.E.,
City Engineer

ACKNOWLEDGMENT:

Receipt of this Notice is hereby acknowledged

________________________________________

Dated this ____________________

Authorized Signature
Title: _____________________________
Div-A Notice of Award
SECTION A-11
NOTICE TO PROCEED

Date: ____________________________

To: ____________________________

Project: Flores Ave. Drainage and Utility Improvements – Phase II

In accordance with the construction contract dated _________________ you are hereby authorized to proceed on _________________________________.

Contract time is two hundred forty (240) calendar days. Completion date for the project is approximately ________________, ________.

CITY OF LAREDO ENGINEERING DEPT.

________________________________________
Ramon E. Chavez, P.E.
City Engineer

The above NOTICE TO PROCEED is hereby acknowledged by

________________________________________

on this the _________________ day of _________________.

________________________________________
Authorized Signature

________________________________________
Typed Name:

Title: ____________________________
SECTION A-12

CERTIFICATE OF OWNER’S ATTORNEY

Project: Flores Ave. Drainage and Utility Improvements – Phase II

Awarded by the City Council:

I, the undersigned, Kristina Laurel Hale, City Attorney the duly authorized and acting legal representative of THE CITY OF LAREDO, do hereby certify as follows:

I have examined the attached Contract(s) and Surety bonds and the manner of execution thereof, and I am of the opinion that each of the aforesaid Agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said Agreements on behalf of the respective parties named thereon; and that the foregoing Agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions, and provisions thereof.

_________________________________________
City Attorney

Date: ________________________________
DIVISION B
SECTION 1

CONTRACT TIME & LIQUIDATED DAMAGES

Project: Flores Ave. Drainage and Utility Improvements – Phase II

The Contract Performance for this project shall be two hundred forty (240) calendar days defined in the Specifications under General Provisions, Division C, Section 1.

The time set forth in the proposal for the completion of the work is an essential element of the Contract. For each day under the conditions described in the preceding Paragraph that any work shall remain uncompleted after the expiration of the days specified in the Contract, together with any additional days allowed, the amount per day given in the following schedule will be deducted from the money due or to become due the Contractor, as liquidated damages for late completion of the specified work.

<table>
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<tr>
<th>From More Than</th>
<th>To and Including</th>
<th>Amount of Penalty Per Day over Contract Time</th>
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<td>$200</td>
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<td>1,700</td>
</tr>
<tr>
<td>20,000,000</td>
<td>Over 20,000,000</td>
<td>2,500</td>
</tr>
</tbody>
</table>
SECTION B-2

EQUAL OPPORTUNITY CLAUSE

PROJECT: Flores Ave. Drainage and Utility Improvements – Phase II

1. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex or natural origin. The Contractor will take Affirmative action to insure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color or national origin. Such action shall include, but not limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection of training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of the non-discrimination clause.

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, religion, color, sex or natural origin.

3. 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 by the agency contracting officer, advising the labor union or worker’s representative of the Contractor’s commitments under Section 202 of Executive Order No. 11246, as amended (3CFR 169 (1974) and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

4. The Contractor will comply with all provisions of Executive Order No. 11246, as amended, and of the rules, regulations and relevant orders of the Secretary of Labor.

5. The Contractor will furnish all information and reports required by Executive Order No. 11246, as amended, and by the rules, regulations and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

6. In the event of the Contractor’s noncompliance with the nondiscrimination clauses of this Contract or with any of such 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 in accordance with procedures authorized in Executive Order No. 11246, as amended, and such other sanctions may be imposed and remedies invoke as provided in Executive Order No. 11246, as
amended or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.

7. The Contractor will include the Provisions of Paragraph 1 through 7 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 No. 11246, as amended, 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 contracting may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or Vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interest of the United States.
SECTION B-3

WAGE DETERMINATION

PROJECT:  Flores Ave. Drainage and Utility Improvements – Phase II

Wage rates for the project are attached.
"General Decision Number: TX20190003 01/04/2019

Superseded General Decision Number: TX20180008

State: Texas

Construction Types: Heavy and Highway

Counties: Cameron, Hidalgo and Webb Counties in Texas.

HEAVY & HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.68 for calendar year 2019 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.68 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2019. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(68). Additional information on contractor requirements and worker protections
under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number   Publication Date
0                     01/04/2019

* SUTX2011-003 08/02/2011

<table>
<thead>
<tr>
<th>Rates</th>
<th>Fringes</th>
</tr>
</thead>
</table>

CEMENT MASON/CONCRETE
FINISHER (Paving & Structures)...$ 12.46

FORM BUILDER/FORM SETTER
(Structures)......................$ 12.30

FORM SETTER (Paving & Curb).....$ 12.16

LABORER
Asphalt Raker..............$ 10.61
Flagger......................$  9.10
Laborer, Common.............$  9.86
Laborer, Utility.............$ 11.53
Pipelayer.....................$ 11.87
Work Zone Barricade
Servicer.....................$ 12.88

POWER EQUIPMENT OPERATOR:
Asphalt Distributor........$ 13.48
Asphalt Paving Machine.....$ 12.25
Broom or Sweeper...........$ 10.33
Crane, Lattice Boom 80
Tons or Less..............$ 14.39
Crawler Tractor............$ 16.63
Excavator, 50,000 lbs or
less.........................$ 12.56
Excavator, over 50,000 lbs..$ 15.23
Foundation Drill, Truck
Mounted.....................$ 16.86
Front End Loader Operator,
Over 3 CY.................$ 13.69
Front End Loader, 3 CY or
less..........................$ 13.49
Loader/Backhoe.............$ 12.77
Mechanic....................$ 15.47
Milling Machine.........$ 14.64
Motor Grader Operator,
Rough......................$ 14.62
Motor Grader, Fine Grade...$ 16.52
Scraper....................$ 11.07

Servicer..................$ 12.34

Steel Worker (Reinforcing)....$ 14.07

TRUCK DRIVER
Lowboy-Float.................$ 13.63
Single Axle..................$ 10.82
Single or Tandem Axle Dump..$ 14.53
Tandem Axle Tractor with
Semi Trailer...............$ 12.12

WELDER....................$ 14.02

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is
like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.
Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.
WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

===============================================

END OF GENERAL DECISION

"
"General Decision Number: TX20190273 01/04/2019

Superseded General Decision Number: TX20180325

State: Texas

Construction Type: Building

County: Webb County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.60 for calendar year 2019 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.60 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2019. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.1(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional
information on contractor requirements and worker protections
under the EO is available at www.dol.gov/whd/govcontracts.

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BOIL0074-003 01/01/2017

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ENGI0178-005 06/01/2014

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POWER EQUIPMENT OPERATOR

(1) Tower Crane $29.00 10.60
(2) Cranes with Pile Driving or Caisson
Attachment and Hydraulic Crane 60 tons and above $28.75 10.60
(3) Hydraulic cranes 59 Tons and under $27.50 10.60

* IRON0084-011 06/01/2018

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PLUM0412-004 04/01/2013

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SUTX2014-051 07/21/2014
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<th>Rate Description</th>
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<td>Laborer: Common or General</td>
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<td>Laborer: Mason Tender - Brick</td>
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<td>Laborer: Pile Layer</td>
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<td>Laborer: Roof Tearoff</td>
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<td>Operator: Backhoe/Excavator/Trackhoe</td>
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<td>Operator: Bobcat/Skid</td>
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<td>Steer/Skid Loader</td>
<td>$13.93</td>
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<td>Operator: Bulldozer</td>
<td>$18.29</td>
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<td>Operator: Drill</td>
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<td>OPERATOR: Grader/Blade</td>
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<td>OPERATOR: Loader</td>
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<td>OPERATOR: Mechanic</td>
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<td>OPERATOR: Paver (Asphalt, Aggregate, and Concrete)</td>
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<td>OPERATOR: Roller</td>
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<td>PIPEFITTER</td>
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<td>ROOFER</td>
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<td>TRUCK DRIVER: Flatbed Truck</td>
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<td>TRUCK DRIVER: Water Truck</td>
<td>$12.00</td>
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</tbody>
</table>

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.
Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed
in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those
classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010

08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator. (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party’s position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

======================================================================================================

END OF GENERAL DECISION
SECTION B-4

INSPECTION BY CITY

Project: Flores Ave. Drainage and Utility Improvements – Phase II

The work covered by these Specifications shall at all times be subject to inspection by the City of Laredo (City) authorized inspectors.

The Contractor shall furnish the City Inspector with every reasonable facility for ascertaining whether the work performed is substandard and deviates from the requirements of the plans and specifications. The City Inspector shall have the authority to halt the construction of any portion of the work not meeting requirements until such time as said work has been corrected to the satisfaction of the Inspector and the Engineer.

City’s normal working hours are Monday through Friday, **not including Saturdays, Sundays, or legal holidays observed by the City** from 8:00 A.M. to 5:00 P.M. The contractor shall notify the City at least twenty-four (24) hours in advance for any work that is to be scheduled beyond the limits of the City’s working hours, and the Contractor shall not begin any such work scheduled unless proper inspection and/or testing has been pre-arranged with the City, with the cost for such inspection beyond the City’s working hours borne by the Contractor. **However, should the City opt to expedite a project and chooses a calendar day contract for such endeavor, the City will bear the 8:00 A.M. to 5:00 P.M. inspection cost only, and the contractor pays for time beyond the city’s working hours limit.**

Payment due for overtime inspection is expected to be processed timely, otherwise the City may elect to deduct said amount due from the contractor’s monthly estimate. **See Section C-9.02 Scope of Payment.**
SECTION B-5

PROJECT SIGN

The general contractor shall erect two (2) signs, unless otherwise noted by the City Engineers, at the project site identifying the project and indicating that the City of Laredo is participating in the development of the project.

The project signs shall be substantially in accordance with the drawing printed on the following page and shall be made from ¾ inch plywood, placed in a prominent location and maintained in good condition until completion of the project.

THE CONTRACTOR SHALL REMOVE AND DISPOSE OF THE PROJECT CONSTRUCTION SIGN WHEN THE WORK HAS BEEN COMPLETED
NOTE: Signs are to be installed in ground on 4’ x 4’ posts
Blue borders
White background
Red letter
Two (2) project signs are required - 4’ x 8’
SECTION B-6

ILLEGAL DUMPING

The general contractor shall not dispose of any material whatsoever taken from the project site, onto any areas not considered to be legal dump sites. Materials such as broken concrete, asphalt, rebar, trash, etc. are to be disposed of properly, i.e. at the city landfill or as directed by the city engineer. Unless otherwise noted, no material, including dirt, is to be dumped or place into an existing creek or channel.

The general contractor is hereby instructed to contact the City of Laredo Environmental Dept. at 956-794-1650 for additional information on illegal dumping city ordinances.

*Building construction debris should be hauled to the Landfill only by a franchised hauler.
C-1.01 DEFINITION OF TERMS:

Whenever the terms defined herein occur on the Plans, in any other documents or instrument herein contemplated or to which the Specifications apply, the intent and meaning shall be as follows:

C-1.02 OWNER: (Or Party of the First Party):

The individual, firm corporation or the political subdivision for whom the facilities covered by these Plans and Specifications are to be constructed.

C-1.03 CONTRACTOR: (Or Party of the Second Part):

The individual, firm or corporation with whom the Contract is made by the Owner.

C-1.04 ENGINEER:

City Engineer employed by the Owner, or such other Engineer, or Supervisor authorized by the City Engineer or the Owner to act on their behalf.

C-1.05 CONSULTANT:

Licensed Engineer or Architect employed by the Owner, and authorized by the City Engineer or the Owner to act on their behalf. The decisions by the City Engineer are final.

C-1.06 BIDDER:

An individual, firm or corporation submitting a proposal.

C-1.07 SUPERINTENDENT:

An authorized representative of the Contractor.

C-1.08 INSPECTOR:

An authorized representative of the Owner and Engineer

C-1.09 LABORATORY:
A testing laboratory approved by the Owner and Engineer.

C-1.10 CONTRACT:

The Agreement between the Owner and the Contractor covering the furnishing of all materials and labor necessary to complete the work and consisting of the Plans and Specifications, together with such supplemental agreements as may be made from time to time.

C-1.11 WORKING DAY:

A “Working Day” is defined as any day not including Saturdays, Sundays, or any legal holidays, observed by the City of Laredo, in which weather or other conditions, not under the control of the Contractor, will permit construction of the principal units of work for a continuous period of not less than seven (7) hours. If the contractor opts to work on Saturday, Sunday, or legal holiday requiring construction inspection, said days are considered working days and charged to the contract time, and the cost for such inspection borne by the contractor.

C-1.12 WORK:

All structures, services, machinery, equipment, or other facilities that are described in the Plans and Specifications together with such additions or modifications as may be ordered by the Owner from time to time.

C-1.13 WORK, ORDER, OR NOTICE TO PROCEED:

A document authorized by the Owner and issued by the Engineer directing the Contractor to proceed on all or part of the work and a specified date.

C-1.14 CHANGE ORDER:

A supplemental agreement adding to or modifying the Contract, including such additional Plans and Specifications as necessary to properly describe the required change.

C-1.15 SURETY:

The corporate body which is bound with the Contractor for the faithful performance of the work covered by the Contract.

C-1.16 PLANS:
The drawings published by the Engineer showing the locations, character, dimensions and details of the work which are part of the Contract.

C-1.17 SPECIFICATIONS:

The directions, provisions and requirements contained herein pertaining to the method and manner of performing the work, or to the quantities, or to the qualities of materials to be furnished under the Contract. The term “Specifications” shall be deemed to include the Contract Documents, the Special Provisions, the General Provision, and the Technical Provisions as contained herein, together with all supplemental agreements and change orders. Specifications are part of the Contract. Plans take precedence over Specifications if in conflict.

C-1.18 CALENDAR DAYS:

A “Calendar Day” is defined as any day of the week inclusive of Saturdays, Sundays, and legal holidays.

C-1.19 INSPECTION:

The periodic on site review of the progress of project construction, may be referred to as progress, pre-final, or final inspection, but in each case of inspection a “punch-list” of items requiring varying degrees of further work is prepared.

C-1.20 PROJECT ACCEPTANCE:

Condition resulting when all items of construction are complete, inspected for completion by inspector and engineering staff and approved by City Council.

Note: Items of construction may be approved by inspector and engineering staff as constructed in place for contractor progress payment purposes, but final acceptance of project is by City Council action.

C-1.21 RESPONSIBLE BIDDER:

Contractor which has adequate resources to perform a contract, comply with legal and regulatory requirements, and deliver per contract schedule.
SECTION C-2
DEFINITION OF ABBREVIATIONS

C-2.01 DEFINITION OF ABBREVIATIONS:

Whenever the abbreviations defined herein occur on the Plans, in the Specifications, Contract, Bond, advertisement, Proposal, or in any other Instrument herein contemplated or to which the Specifications apply or may apply, the intent and meaning shall be as follows:

A.S.H.O  American Association of State Highways Official
HP  Horsepower
K.W.  Kilowatt
Am. or Amp.  Ampere
KVA  Kilovolt
A.S.T.M.  American Society for Testing Materials
In. or "  Inch or Inches
Lin.  Linear
Asph.  Asphalt
Lb. or #  Pound
Ave.  Avenue
A.W.W.A.  American Waterworks Association
Max.  Maximum
Min.  Minimum
MH  Manhole
I.P.  Iron Pin
B & S.  Bell and Spigot
Mono.  Monolithic
Blvd.  Boulevard
No.  Number
B.T.U.  British Thermal Unit
%  Percent
B.M.  Bench Mark
PL  Property Line
C.I.  Cast Iron
R.  Radius
C.C.C.  Center to Center
Rein.  Reinforced or reinforcing
C/G  Curb & Gutter
C.L.  Center Line
V.G.  Valley Gutter
Con. or Conc.  Concrete
Rem.  Remove
C.S.P.  Concrete Sewer Pipe
Rep.  Replace
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<th>Abbreviation</th>
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<td>C.M.</td>
<td>Circular Mil</td>
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<tr>
<td>R.C.S.D.P.</td>
<td>Reinforced Concrete Storm Drain Pipe</td>
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<td>C.F.M.</td>
<td>Cubic Feet per Minute</td>
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<tr>
<td>C.O.</td>
<td>Cleanout</td>
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<tr>
<td>R.P.M.</td>
<td>Revolutions per minute</td>
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<td>Cond.</td>
<td>Conduit Minute</td>
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<td>Corr.</td>
<td>Corrugated</td>
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<td>ROW or R of W</td>
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<td>Cu.</td>
<td>Cubic</td>
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<td>Vol.</td>
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<td>Dia.</td>
<td>Diameter</td>
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<td>S.D.</td>
<td>Storm Drain</td>
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<td>D.S.</td>
<td>Double Strength</td>
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<td>Square</td>
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<td>Dr.</td>
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<td>Std.</td>
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<td>Elev. or El.</td>
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<td>T.H.D.</td>
<td>Texas Highway Department</td>
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<td>F.</td>
<td>Fahrenheit</td>
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<td>V.C.P.</td>
<td>Vitrified Clay Pipe</td>
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<td>Ft. or '</td>
<td>Foot or Feet</td>
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<tr>
<td>V</td>
<td>Volt</td>
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<td>Gal.</td>
<td>Gallon</td>
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<tr>
<td>Yd.</td>
<td>Yard</td>
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<tr>
<td>S.O.P. .</td>
<td>Secretaria de Obras Publicas (Mexican Secretaries of Public Works)</td>
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<tr>
<td>Tex. D.O.T., or TxDOT</td>
<td>Texas Department of Transportation</td>
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SECTION C-3
INSTRUCTION TO BIDDERS

C-3.01 EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND SITE OF WORK:

Submission of a Proposal shall constitute prima facie evidence that the Bidder has carefully examined the site of the proposed work, the Proposal, Contract Forms, Plans and Specifications, and has satisfied himself as to the character, quality, and quantity of work to be performed, materials to be furnished, and as to the requirements of these Specifications, Special Provisions, and Contract.

Any information on the Plans or in the Specifications as to the soil, or material borings, or tests of existing materials, or location of existing utilities is for the convenience of the Bidder. The accuracy of the information is not guaranteed, and no claims for extra work or damages will be considered if it is found during construction that the actual conditions or locations vary from those indicated on the Plans or in the Specifications.

C-3.02 INTERPRETATION OF ESTIMATES:

Any estimate of quantities of work to be done and materials to be furnished in the proposal or on the Plans is given only as a basis of comparison of Proposals and the Award of the Contract. Such estimate is the result of careful calculation and is believed to be correct, but the Owner does not expressly, or by implication, agree that the actual quantities involved will correspond exactly therewith, nor shall the Bidder plead misunderstanding or deception because of such estimate of quantities, or of the character, location or other conditions pertaining to the work. Payment to the Contractor under unit price contracts will be made only for the actual quantities of work performed or materials furnished in accordance with the Plans and Specifications, and it is understood that the quantities may be increased or diminished as hereinafter provided without in any way invalidating the unit bid prices.

C-3.03 PREPARATION OF PROPOSAL:

The Bidder shall submit his proposal on the forms furnished by the Owner. All blank space in the proposal form shall be filled in for each and every item for which quantity is given, and the Bidder shall state the price (typed, or written in ink, both in words and numerals for which he proposed to do each item of work. In case of conflict between words and numerals, the words will govern.

The Proposal shall be signed in ink by the person or persons making, or authorized to make the bid. If the Proposal is offered by an individual, his name and post office address shall be given. If the proposal is offered by a firm or partnership, the name and post office address of each member of the firm or
partnership shall be given. If the Proposal is offered by a corporation, the name and title of the person signing the Proposal, and the post office address of the corporation shall be given.

Any person signing a Proposal as agent must file with the Owner legal evidence that he has the authority to do so, and that the signature is binding upon the firm or corporation.

C-3.04 REJECTION OF PROPOSAL:
A Proposal showing any alterations or of words or figures, erasures, additions not called for, alternate bids not called for, incomplete bids, condition bids, or proposals not accompanied by proposal guaranty as required, will be considered as an irregular bid and may be rejected. The Owner reserves the right to waive technicalities as to changes, alterations, or reservations, and to make the award to the best interest of the Owner.

C-3.05 PROPOSAL GUARANTY:
Each Proposal shall be accompanied by an original certified check, cashier’s check or bid bond in the amount of five (5%) percent of the total amount bid. Checks shall be made payable unconditionally to the Owner.

C-3.06 DELIVERY OF PROPOSAL:
Each Proposal must be an original and must be sealed, together with the proposal guaranty, in an envelope plainly marked with the name of the project as shown on the Notice to Bidders, and the name and address of the Bidder. When submitted by mail, this envelope shall be placed in another envelope addressed as indicated in the Notice to Bidders.

Only those proposals actually in the hands of the designated official at the time set in the Notice to Bidders shall be considered. Proposals submitted by telephone, telegraph or fax, will NOT be considered.

C-3.07 WITHDRAWAL OF PROPOSAL:
A Bidder may withdraw his proposal provided he submits to the official designated to receive bids his request in writing to do so prior to the time set for opening of proposals.

C-3.08 PUBLIC OPENING OF PROPOSALS:
Proposals will be publicly opened and read aloud at the time and place set in the Notice to Bidders.
C-3.09 COMPETENCY OF BIDDERS:

Before any Contract is awarded, the Owner may require the Bidder to furnish a complete statement of his financial resources. His experience in similar work, his equipment available for the work proposed, or any other information necessary to establish his competency and reliability as a Contractor.

C-3.10 DISQUALIFICATION OF BIDDER:

Any of the following causes may be considered as sufficient for the disqualification of the Bidder and the rejection of his Proposal:

More than one proposal for the same work from an individual or corporation under the same of different name.
Evidence of collusion among Bidders.

An unbalanced Proposal.

Failure to submit a unit price for each item of work shown on the Proposal.

Lack of competency as revealed by the financial statement, experience record, or plant and equipment statement furnished.

Lack of responsibility as shown by past work judged from the standpoint of workmanship and progress.

Uncompleted work which, in the judgment of the Owner, might hinder or prevent the prompt completion of additional work if awarded.

Being in arrears on existing Contracts.

Having defaulted on a previous Contract.

C-3.11 MATERIALS GUARANTY:

Before any Contract is awarded, the Owner may require the Bidder to furnish a complete statement of the origin, composition or manufacturer of any and all materials proposed to be used in the work, together with samples, which may be subjected to tests to determined their quality and fitness for the work.
SECTION C-4

AWARD AND EXECUTION OF CONTRACT

C-4.01 CONSIDERATION OF PROPOSALS:

For the purpose of award, after the proposals are opened and read, the bids considered the most advantageous to the Owner will be carefully studied. The bids will then be compared and the results made public. Until the award of the Contract is made, the Owner reserves the right to reject any or all proposals, to waive technicalities, to advertise for new proposals, or to proceed to do the work otherwise when the best interests of the Owner will be thereby promoted.

C-4.02 AWARD TO CONTRACT:

Contract will not be awarded until the necessary investigations as to the competency of the low bidder are made. Award of Contract will be made by the Owner, upon recommendation by the Engineer, to the lowest responsible bidder meeting the requirements of the Owner. Award of Contract will be made within ninety (90) days after the opening of proposals, unless stated otherwise in the Notice to Bidders.

C-4.03 RETURN OF PROPOSAL GUARANTIES:

As soon as the proposal price has been compared the Engineer may, at his discretion, return the proposal guaranties accompanying in those proposals which, in his judgment, will not be considered in making the award. When award is made, the successful bidder’s proposal guaranty only will be retained until after Contract and Bond have been executed.

C-4.04 PERFORMANCE AND PAYMENT BOND:

Within ten (10) days after Notification of Award of Contract, the successful bidder shall execute and file with the Owner a separate surety and payment bond as required by Chapter 93 of the Acts of the Regular Session of the 56th Legislature of Texas, in the full amount of the contract price as a guarantee of the faithful performance of the Contract and payment of all obligations which may be incurred for material and labor used in the work. Bonds shall be executed by a surety company authorized to do business in the State of Texas on the bond forms provided in these Documents. Any surety shall be subject to the approval of the Owner. The successful bidder shall provide five (5) Original hard copies of the Performance and Payment Bond to the Engineer.

C-4.05 EXECUTION OF CONTRACT:

Within ten (10) days after Notification of Award of contract, the successful bidder shall sign and place in the hands of the Owner the necessary agreement entering into a Contract with the Owner. The successful bidder shall provide five (5) Original hard copies of the contract to the Engineer.
C-4.06 NOTICE TO PROCEED:

The Notice to Proceed shall be issued within ten (10) days of the execution of the Agreement by the City provided that the Contractor has properly executed and submitted all Documents required by the City of Laredo within the same period of time. Should there be reasons why the Notice to Proceed cannot be issued within such period; the time may be extended by mutual agreement between the City and Contractor. If the Contractor has submitted all Documents required and the Notice to Proceed has not been issued within the ten (10) day period or within the time extension, the Contractor may terminate the Agreement without further liability on the part of either party. Furthermore, should the Contractor fail to execute all the requirements within this same ten (10) days period or within the time extension, the City may terminate the Agreement.

C-4.07

The City of Laredo may make such investigations as he deems necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the City all such information and data for this purpose as the City may request.

C-4.08 APPROVAL OF CONTRACT:

No Contract shall be binding upon the Owner until it has been signed by the Owner and returned to the Contractor.

C-4.09 FAILURE TO EXECUTE CONTRACT:

Failure to comply with any of the requirements of these Specifications, to execute Contract within ten (10) days after notification of work, or to furnish surety as required, shall be just cause for the annulment of the award. In case of annulment of award, the proposal guaranty shall become the property of the Owner, not as penalty, but as a liquidated damage.

C-4.10

After the Notice to Proceed is issued, the Owner shall provide the Contractor with three (3) complete sets of Plans and Specifications for Contractor’s use during construction. In the case that additional sets are required, the Contractor shall make arrangements to obtain the extra sets at his own expense.

C-4.11 RESPONSE TIME DURING THE PROSECUTION OF THE PROJECT:

The contractor shall furnish the owner with three (3) local telephone numbers where contractor or a responsible representative of contractor can be reached at any and all time during the prosecution of this project, and especially during weekends or holidays. Failure of contractor to respond to any such emergency which causes city personnel, equipment and materials to be used in such emergency will result in the contractor being charged an amount which shall be twice the cost incurred by the City in using personnel,
equipment and materials to handle such emergency due to failure of the contractor to do so, and, in addition, the contractor will be charged a penalty of $500.00 for each emergency to which it does not respond. In this connection, “failure to respond” means the failure of the contractor to respond to telephone calls from the relevant staff or owner.

C4-12 – MOBILIZATION AND DEMOBILIZATION

Mobilization shall include all activities and associated costs for transportation of contractor’s personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary general facilities for the contractor’s operations at the site and premiums paid for insurance, performance and payment bonds, as applicable; and demobilization for site cleanup of offices, buildings, and other facilities assembled on the site specifically for this contract.

This work includes mobilization and demobilization required by the contract at the time of award and which lump sum amount shall not be more than 5% of the adjusted contract amount of the project.

Payment will be made as the work proceeds up to 90% of the lump sum amount after presentation of paid invoices or documentation of direct costs by the contractor showing specific mobilization and demobilization costs and supporting evidence of the charges. The balance will be included in the final contract payment.
SECTION C-5

SCOPE OF WORK

C-5.01 INTENT OF PLANS AND SPECIFICATIONS:

It is the intent of the Plans and Specifications to describe the complete work to be performed under the Contract. Except as provided on the Plans or in the Specifications, it is also the intent that the Contractor shall furnish all materials, supplies, tools, equipment, labor and incidentals necessary to complete the work.

C-5.02 CHANGES AND INCREASED OR DECREASED QUANTITIES OF WORK:

The Owner has the right to make such changes and alterations in the Plans or in the quantities of work as he may consider necessary or desirable, and such changes and alterations shall not be considered as a waiver of any condition of the Contract, nor shall they invalidate any provision thereof. The Contractor shall perform the work as increased or decreased, and no allowance will be made for anticipated profits.

Payment to the contractor will be made for the actual quantities of work done and materials furnished at the unit prices as set forth in the Contract, except as follows:

When the total cost of work to be done, or of materials to be furnished, is more than one hundred and twenty-five 125 percent of the total contract price for the items stated in the Proposal, then either party to the Contract, upon demand, shall be entitled to a revised consideration on that portion of the work above one hundred and twenty-five (125%) percent of the total contract price stated in the Proposal.

When the total cost of work to be done, or of materials to be furnished, is less than seventy-five (75%) percent of the total contract price for the items stated in the Proposal, then either party to the Contract, upon demand, shall be entitled to a revised consideration on the work actually done.

Revised consideration shall be determined by supplemental agreement between the parties, which supplemental agreement shall be included with, and shall become a party of, the Contract.

C-5.03 OMITTED ITEMS:

The Owner may, in writing, order the omission from the work of any item found unnecessary to the project. Such omission shall be subject to all provisions of Par. C-5.02.
C-5.04 EXTRA WORK:

When the proper completion of the project requires work for which no quantities or prices were shown in the Proposal, such work shall be called “EXTRA WORK” and shall be performed by the Contractor when so directed in writing by the Owner. “EXTRA WORK” shall be performed in accordance with these Specifications and as may be directed by the Engineer.

Prices for extra work shall be itemized and covered by a supplement agreement submitted by the Contractor and approved by the Owner prior to the starting of such work.

Claims for extra work not authorized in writing by the Owner prior to the performance thereof will be rejected.

C-5.05 MAINTENANCE OF TRAFFIC:

When the work requires partial or complete closing of any driveway, alley, street, or roadway, the Contractor shall so schedule and prosecute his work that traffic will be hindered to a minimum.

C-5.06 REMOVAL AND DISPOSAL OF STRUCTURES AND OBSTRUCTIONS:

All structures and/or obstructions on the site of the work, which are not to remain in place or which are not to be used in the new construction shall be removed as directed by the Engineer. Such items of removal are not listed in the Proposal will not be paid for as separate items; the cost of doing such work shall be included in the unit price bid for other items.

C-5.07 TOOLS AND ACCESSORIES:

When special wrenches, gauges, or other special tools or accessories are required to properly maintain and operate any machine or equipment furnished under this Contract, the furnishing of such tools and accessories shall be deemed to have been included in the Contract and they shall be furnished by the Contractor without extra cost to the Owner.

C-5.08 GUARANTEES:

All structural, mechanical and electrical equipment or instrument shall be guaranteed against mechanical and physical defects, leakage, breakage, or other damage occurring during normal operation for a period of one (1) year after such equipment or instruments have been accepted by the Owner. The Contractor shall promptly repair or make good, at his own expense, any defect in such equipment or instruments.
C-5.09 GENERAL GUARANTEE:

All work included in the Contract shall be guaranteed against faulty material or workmanship for a period of one (1) year after the work has been accepted by the Owner.

Neither final acceptance of the work, nor final payment thereof, nor occupancy and use of the work by the Owner shall constitute a waiver of the Owner’s right to require the Contractor to repair or make good any such faulty materials or workmanship.

C-5.10 FINAL CLEANING UP:

Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, tools, and materials and shall dispose of all rubbish, temporary structures, and surplus backfill. The site shall be left in a neat and presentable condition throughout. Any land area, driveway, sidewalk, alley, street or road (concrete or asphalt) which has been cut or disturbed during the prosecution of the work shall be repaired at the Contractor’s expense to a condition at least as good or better as originally existed.

C-5.11 EXISTING STRUCTURES:

The Plans show the locations of all known surfaces and subsurface structures. However, the exact location of gas mains, water mains, conduits, sewer etc., is unknown and the Owner assumes no responsibility for failure to show any of these structures on the Plans or to show them in their exact location. It is mutually agreed such failure will not be considered sufficient basis for claims for additional compensation for extra work or for increasing the pay quantities in any manner whatsoever, unless the obstruction encountered is such as necessitates, or requires the building of special work, provision for which is not made in the Plans and Proposal, in which case the provisions in these Specifications for extra work shall apply.
SECTION C-6

CONTROL OF WORK AND MATERIALS

C-6.01 AUTHORITY OF ENGINEER:

The work will be observed, tested and inspected by the Engineer, and performed to his satisfaction, in accordance with the Contract, Plans and Specifications. The Engineer will decide all questions which may arise as to the quality and acceptability of materials furnished and work performed, as to the manner of performance and rate of progress of said work, as to the interpretation of the Plans or Specifications relating to the work, as to the fulfillment of the Contract on the part of the Contractor and to the rights of different Contractors on the project.

The decisions of the City Engineer will be final.

C-6.02 CITY ENGINEER AS REFEREE:

The City Engineer will act as referee in all questions, arising under the terms of the Contract between the parties thereto, and his decisions shall be final and binding.

C-6.03 ADEQUACY OF DESIGN:

It is understood that the Owner selected the Engineer named herein to prepare the Plans and Specifications, and all supplements thereto, and it is agreed that the Owner will be responsible for the adequacy of the design, sufficiency of the Plans and Specifications, and safety of structures, provided the Contractor has complied with said Plans and Specifications, all modifications thereof, and additions and alterations thereto approved by the Engineer. The burden of proof shall be upon the contractor to show that he has fully complied with the Plans and Specifications, all modifications thereof, and all additions and alterations thereof.

C-6.04 PLANS:

Plans will show the lines, grades, cross sections, details and general features of the work. Where shop drawings or working drawings are required, they shall be furnished by the Contractor and approved by the Engineer. Authorized alterations to the Plans will be endorsed on approved copies of the Plans or shown on supplementary sheets.

The approval by the Engineer of the Contractor’s shop drawings or working drawings will not relieve the Contractor of any responsibility under the Contract.
The Contractor shall furnish the Engineer with such blue print copies of shop drawings or working drawings as may be required for approval and for the purposes of supervision.

The contract price shall include the cost of furnishing all such prints.

C-6.05 CONFORMITY WITH PLANS:

The finished work shall conform with the lines, grades, cross sections, details and dimensions shown on the Plans. Such deviations from the Plans as may be required will, in all cases, be determined by the Engineer and authorized in writing.

C-6.06 COORDINATION OF PLANS AND SPECIFICATIONS AND SUPPLEMENTAL AGREEMENTS:

The Plans, Specifications, and supplemental agreements are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. In case of disagreement, Plans shall govern over “Technical Provisions,” and “Special Provisions” shall govern over “Technical Provisions.” The Contractor shall not take advantage of any apparent error or omission on the Plans or Specifications. In the event the Contractor discovers any apparent error or discrepancy, he shall immediately call upon the Engineer for his interpretation and decision, and such decision shall be final.

C-6.07 COOPERATION OF CONTRACTOR:

The Contractor shall give the work the constant attention necessary to facilitate the progress thereof and shall cooperate with the Engineer and with other Contractors in every way possible.

The Contractor shall have on the work at all times, a satisfactory and competent English-speaking Superintendent, authorized to receive order, and act for him as his agent. The Contractor shall designate to the Engineer in writing the name of such Superintendent, and the designated Superintendent may not be removed from the work without the written permission of the Engineer.

C-6.08 CONSTRUCTION STAKES:

The Contractor shall furnish and set at his own expense any and all construction stakes and blue tops as seems necessary for the satisfactory prosecution of the work.

Any missing construction stakes which have been destroyed by the different utility companies, vandals and/or the contractor at the time of construction will be replaced by the contractor at his own expense.
The Engineer may, at his option, make spot or complete checks on all construction alignment and grades to determine the accuracy of the contractor’s survey work. These checks, however, will not relieve the Contractor of his responsibility of constructing the work to the lines and grades as shown on the plans or approved change orders. Computations, sketches, and other drawings used in the design and layout of this project will be made available to the Contractor, however these items will not relieve the contractor of his responsibility.

C-6.09 QUANTITIES OF MATERIALS:

It shall be the responsibility of the Contractor to verify all quantities of materials shown on the Plans before ordering such materials. Payment is provided for acceptable materials, and materials rejected due to improper fabrication or excess quantity or other reasons within the control of the Contractor will not be paid for regardless of the quantities or dimension shown on the Plans.

C-6.10 APPROVAL OF MATERIALS:

The sources of supply of materials shall be subject to the approval of the Engineer. Representative samples of materials proposed for use shall be submitted, if required, for examination and testing by an independent testing laboratory selected by the City.

Results obtained from testing such samples may be used for preliminary approval, but will not be used as final acceptance of materials. All materials proposed for use may be inspected or tested at any time during their preparation or use.

If at any time, it is found that sources of supply which have been approved do not furnish a product of uniform quality, or if the product becomes unacceptable at any time, the Contractor shall furnish approved material from another source.

Any material, which after approval has for any reason become unfit for use, shall not be incorporated into the work.

C-6.11 SAMPLES AND TESTS:

Samples and testing procedures shall conform to the requirements of appropriate designations of the American Association of State Highway Officials or the American Society for Testing Materials.

Test for determining the fitness of materials; tests for the purpose of obtaining preliminary approval of materials; tests for determining concrete mixes will be at the expense of the Contractor. Tests for the actual control of the work, such as soil compacting tests and concrete compressive strength test, will be at the
expense of the Owner. Any and all retesting because of failure in soil compaction or concrete compressive strength tests shall be done at the expense of the Contractor. Tested and accepted subgrade shall be covered and protected with the flexible base within a maximum of seven (7) days. Tested and accepted flexible base shall be primed and cured a minimum of seventy-two (72) hours and shall be cured with asphalt within seven (7) days. Failure to comply with the seven (7) days limitations may result in the need for re-testing at the Contractors expense depending on weather conditions and at the discretion of the Engineer. The Contractor shall provide such facilities as the Engineer may require for conducting field tests and collecting and forwarding samples. All sampling and testing shall be under the control of the Engineer and shall be done in laboratories approved by him.

C-6.12 STORAGE:

Materials shall be stored as to insure the preservation of the quality and fitness for the work. Material which is not, in the opinion of the Engineer, properly stored and protected will not be included as material in hand in the estimates.

C-6.13 AUTHORITY AND DUTIES OF INSPECTORS:

Inspectors employed by the Owner shall be authorized to inspect all work done in any part of the project and all preparation, fabrication, or manufacturer of the materials to be used.

The Inspector shall be authorized to call to the attention of the Contractor any failure of the work or materials to conform to the Specifications or the Plans. He will in no case act as foreman or perform other duties for the Contractor, nor shall he interfere with the management of the work. In the event the Contractor does not comply with the requirements of the Owner and the Engineer, he may stop all work until the non-compliance is corrected.

If the progress of the work becomes unduly delayed because of negligence on the part of the Contractor, the Inspector shall notify the Owner and the Engineer, who may require the Contractor to give reasons for the delay. If it is found that the Contractor is at fault, then it is the prerogative of the Owner to demand correction.

Inspection as provided herein shall not relieve the Contractor from any obligation to perform the work in conformity with the requirements of the Plan and Specifications. No Inspector shall be authorized to revoke, alter, enlarge or release any requirements of the Plans and Specifications, or to issue instructions contrary to the Plans and Specifications, or to approve or accept any portion of the work.

The Contractor shall furnish every reasonable facility for ascertaining whether or not the work is performed in accordance with the Plans and Specifications.
No backfill shall be made unless inspected by the Engineer or the City’s representative designated in writing and verbal approval of field Engineer is given to such work; if the Contractor should backfill any work without such inspection and approval, the Contractor shall remove or uncover such portions of the finished work as may be directed. After examinations, the Contractor shall restore said portion of the work to the standard required by the Plans and Specifications. Should the work thus exposed and examined prove acceptable or unacceptable, the uncovering or removing and the replacing of the covering or making good of the parts removed shall be done at the Contractor’s expense.

C-6.14 SUSPENSION OF WORK:

In case of any dispute arising between the Contractor and the Inspector as to materials furnished or the manner of performing the work, the Inspector shall have authority to reject materials or suspend work until the question at issue can be referred to and decided by the Engineer.

If the Contractor refuses to suspend work on verbal order, the Inspector shall issue a written order to suspend work giving the reason for such suspension. After placing the order in the hands of the Contractor’s man in charge, the Inspector shall immediately leave the job. Work done during the absence of the Inspector shall not be paid for.

C-6.15 REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK:

All work which has been rejected or condemned shall be repaired or removed and replaced as the Engineer may direct, at the expense of the Contractor. Materials not conforming to the requirements of the Plans and Specifications shall be removed immediately from the site of the work and replaced with satisfactory material at the expense of the Contractor.

Work done without lines and grades, work done beyond the lines and grade shown on the Plans, work done without inspection, or any extra or unclassified work done without written authority and prior agreement in writing as to the prices will be done at the Contractor’s risk and will be considered unauthorized. At the option of the Engineer, such work may not be measured and paid for, or may be ordered removed and replaced at the expense of the Contractor.

Upon the failure of the Contractor to repair satisfactorily or to remove and replace rejected, unauthorized, or condemned work or materials immediately after receiving formal notice from the Engineer, the Owner may at his own option:

a. Recover for such defective work or materials on the Contractor’s bond, or;
b. Recover from such defective work or materials by action in a court having proper jurisdiction in such matter, or;

c. Employ labor and equipment and satisfactorily repair, or remove and replace, such defective work or materials and charge the cost of same to the Contractor, which cost will be deducted from any money due him.

C-6.16 DISPUTED CLAIMS FOR EXTRA WORK:

In case the Contractor deems extra compensation is due him for work or materials not clearly covered in the Contract, or not ordered by the Engineer as “EXTRA WORK”, the Contractor shall notify the Engineer in writing of his intention to make claim for such extra compensation before he begins the work on which he bases the claim and shall afford the Engineer every facility for keeping actual cost of the work.

Failure on the part of the Contractor to give such notice or to afford the Engineer every facility for keeping account of actual cost of the work shall constitute waiver of the claim for extra compensation. The filing of such notice by the Contractor and the keeping of cost by the Engineer shall not in any way be construed to prove the validity of the claim. Extra work of any kind should only be performed by Contractor upon receipt of an approved Change Order issued by Owner. When the work has been completed, the Contractor shall within ten (10) day file claim for extra compensation with the Engineer, who will present it to the Owner for consideration.

C-6.17 FINAL INSPECTION

Whenever the work provided for under the Contract has been satisfactorily completed and the final cleaning up performed, the Contractor shall notify the Engineer to make the “Final Inspection”. Such inspection will be made within ten (10) days of such notification. After such final inspection, if the work is found to be satisfactory, the Contractor will be notified in writing of the acceptance of same. No time charge will be made against the Contractor between the date of notification of the Engineer and the date of the final inspection.
SECTION C-7

LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

C-7.01 LAWS TO BE OBSERVED:

The Contractor shall make himself familiar with and shall observe and comply with, all Federal, State, and local laws, ordinances and regulations which in any manner affect the conduct of the work, and shall indemnify and save harmless the Owner and the Owner’s representative against any claim arising from the violation of any such law, ordinance, or regulation, damages to public or private property whether by himself or by his employees and whether said work is in public property or right-of-way, temporary construction easements, dedicated easements, or staging/storage areas.

C-7.02 PERMITS AND LICENSES:

The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary to the due and lawful prosecution of the work.

C-7.03 PATENTED DEVICES, MATERIALS AND PROCESSES:

If the Contractor is required or desires, to use any design, device, material or process covered by letters, patent, or copyright, he shall provide for such use by suitable legal agreement with the patentee or Owner of such patent. The Contractor and his surety shall indemnify and save harmless the Owner from any and all claims for infringement by reason of the use of any such patented design, device, material, or process, or any trademark or copyright in connection with the work agreed to be performed under this Contract, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay for reasons of any such infringement at any time during the prosecution, or after the completion of the work.

C-7.04 PUBLIC, SAFETY AND CONVENIENCE:

The safety of the public and the convenience of traffic shall be regarded as of prime importance during construction and provisions thereof, made necessary by the work, shall be the direct responsibility of the Contractor, and shall be performed at his own expense.

Where the Contractor is required to construct temporary crossings for streams, culverts, ditches or trenches, his responsibility for accidents shall include the approaches as well as the structures of such crossing.
C-7.05 SANITARY PROVISIONS:

The Contractor shall, at his own expense, provide and maintain in a neat, sanitary condition such accommodations for the use of his employees as may be necessary to comply with the requirements of the State Department of Health and of other authorities having jurisdiction.

C-7.06 BARRICADES AND WARNING SIGNS:

The Contractor shall furnish and maintain adequate barricades, warning and directing signs, red flags, lights and other traffic control devices as are necessary to comply with the latest edition of the TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAYS.

All provisions of barricades and warning signs shall be considered an incidental and necessary part of the work and no direct payment will be made therefore. All costs of providing such safe guards shall be included in the prices bid for other parts of the work.

C-7.07 USE OF EXPLOSIVES:

When the use of explosives is necessary in the prosecution of the work, the Contractor shall use the utmost care not to endanger life or property. All explosives shall be stored in a secured manner and all storage places shall be marked clearly with the words “DANGEROUS EXPLOSIVES”. The method of storing and handling explosives and highly inflammable materials shall conform to the requirements of Federal and State laws and regulations. The Contractor shall not use explosives until he has taken the legal precautions necessary to save harmless the Owner from any claims arising from such use of explosives.

C-7.08 PROTECTION AND RESTORATION OF PROPERTY:

The Contractor shall take all measures necessary to protect public or private property which might be injured by any process of construction, and in case of any injury or damage to said property, he shall restore at his own expense the damaged property to a condition similar or equal to the existing before such injury damage was done, or he shall make good such injury or damage in an acceptable manner.

Where the work involves excavation any public or private driveway, alley street or roadway, the Contractor shall do any work necessary to restore such driveway, alley, street or roadway to a condition similar or equal to that existing before such work was done. The Contractor shall be responsible for any subsidence of backfill or pavement failure due to such excavation, and shall promptly repair any such subsidence or failure.
C-7.09 PROTECTION OF EXISTING UTILITIES:

The Contractor shall contact the utility company for exact location prior to doing any work that might interfere with or damage present utilities.

The Contractor shall take all measures necessary to protect existing surface drains, seers, underdrains, conduits, utilities, or similar underground structures, and to provide temporary service when service in any of these is interrupted.

When such facilities are encountered, the Contractor shall notify the Engineer who will arrange for their removal, if necessary. Any utility lines cut or damaged shall be repaired and restored to working conditions as determined by the Engineer.

C-7.10 RESPONSIBILITY FOR DAMAGE CLAIMS:

The Contractor shall save harmless the Owner from all suits, action in or claims brought on account of any injuries or damages sustained by any person or property in consequence of any neglect in safeguarding the work by the Contractor; or on account of any claim or amount recovered for any infringement of patent or reward under the “Workmen’s Compensation Laws” or any other laws. He shall be held responsible for all damage or injury to property of any character occurring during the prosecution of the work resulting from any omission, neglect, or misconduct on his part in the manner or method executing the work, or from defective work or materials.

C-7.11 RESPONSIBILITY FOR THE WORK:

Until acceptance of the work by the Engineer, in writing, it shall be under the charges and care of the Contractor. The Contractor shall rebuild and make good at his own expense all injuries and damage to the work occurring before its completion and acceptance. In case of suspension of work for any cause, the Contractor shall be responsible for all the preservation of all materials.

C-7.12 USE OF COMPLETED WORK:

Whenever, in the opinion of the Engineer, any portion of the work is in acceptable conditions, it may be entered upon and used by the Owner upon the written order of the Engineer. Such use shall be held as an acceptance of that portion of the work, but not be considered as a waiver of any of the provisions of these Specifications. Pending final completion and acceptance of the entire work, all necessary repairs and renewal of any part of the work so used, due to defective material or work, to natural causes other than wear and tear, or to the operations of the Contractor, shall be performed by the Contractor at his own expense.
C-7.13 NO WAIVER OF LEGAL RIGHT:

Inspection by the Engineer or by any of his duly representatives, any order, measurement, or certificate by the Engineer; any order by the Owner for the payment of money, any payment for or acceptance of any of work, or extension of time; or any possession taken by the Owner shall not operate as a waiver of any provision of the Contract, or any power therein preserved to the Owner, or of any right to damages therein provided. A waiver of any breach of the Contract shall not be held to be a waiver of any other or subsequent breach.

The Owner reserves the right to correct any error that may be discovered in any estimate that may have been paid, and to adjust that or any subsequent estimate to meet the requirements of the Contract. The Owner reserves the right to claim and recover sums as may be sufficient to correct any error or make good any deficit in the work resulting from error, dishonesty, or collusion in the work after the final payment has been made.

C-7.14 RESPONSIBILITIES OF PARTIES AS TO UTILITY WORK:

It shall be the responsibility of the Contractor to check and coordinate his work with the public and private utility companies which have authority from the City of Laredo to own and operate lines, pipes, conduits, or other means of conveyance within the streets Right-of-Way. The Contractor shall contact the Engineer concerning any and all utility relocation work needed, and it shall be the responsibility of the Contractor to advise the Engineer of any lines or utility poles to be relocated. The Engineer shall assist in coordinating the various utility relocation activities but shall not be responsible for any delays occasioned by this work, although appropriate allowance for additional contract time will be made by the Engineer if warranted. The Owner shall not be responsible for any acts of the Contractor or any damages resulting from work done by the Contractor relating to the removal, alteration, or other activity concerning utilities.

C-7.15 KEY POINTS OF PUBLIC RIGHT-OF-WAY ORDINANCE:

1.) All projects in public R.O.W. must go through Utility Coordination Committee.
2.) All Contractors must be registered at The Building Development Service Department at 794-1625 to be able to work in public R.O.W.
3.) All work in Public R.O.W. requires a permit from The Building Development Services Department and subject to inspections by same. Any additional inspections requested after normal working hours of 8 am to 5 pm Monday to Friday and Saturday and Sunday and holidays are charged at premium rates. Permits must be secured prior to pre-construction meeting.
4.) All work done in Public R.O.W. that impedes the flow of traffic or pedestrian path requires a traffic control plan or pedestrian accessibility.
5.) Contractor must provide certificate of insurance. Insurance must be liability, workman compensation and performance bond.
SECTION C-8
PROSECUTION AND PROGRESS

C-8.01 RIGHT-OF-WAY:

The Owner will furnish all and or right-of-way necessary for the performance of the contract and will use due diligence in acquiring land or right-of-way. Should all necessary land or right-of-way not be acquired prior to the beginning of construction, the Contractor shall begin with work upon such land or right-of-way as the Owner may have acquired.

C-8.02 DELAYS DUE TO OWNER:

Should the Owner be prevented or enjoined from proceeding with the work or authorizing its prosecution, either before or after its commencement, by reason of any litigation or by reason of the Owner’s inability to acquire necessary land or right-of-way, the Contractor shall not entitled to make or assert any claim for damage by reason of such delay, or to withdraw from the contract except by consent of Owner.

The time for completion of the work will be extended by such time as determined by the Engineer as will compensate for the time lost by reason of said delay.

C-8.03 SUBLETTING OR ASSIGNING OF CONTRACT:

The “City” does not allow, permit, negotiate, authorize nor approve any assignment of contract proceeds between the “City”, the “Contractor”, and/or with a bank, lending institution or any type of financial institution either before, during or after a contract award.

The “City” agrees to pay the “Contractor” for specified services as stated in the agreed contract. The “City” does not agree to pay any additional party either jointly or separately for the contract under discussion.

C-8.04 SUBCONTRACTING:

The Owner will not recognize any subcontractor on the work. The Contractor shall be fully responsible to the Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them.

C-8.05 PROSECUTION OF WORK:

Prior to beginning of the work, the Contractor shall submit to the Engineer such schedules, charts, or briefs as may be required, outlining the manner of prosecution of the work. The contractor shall begin the work within ten (10) calendar days after the date set in the “Work Order” or notice to proceed and shall continuously prosecute same with such diligence as will enable him to complete the work within the time specified. Upon
completion of work submit forms of Affidavit of Payment of Debts and Claims and Release of Liens and Letter for Certificate of Warranty.

The contractor shall notify the Engineer at least twenty-four (24) hours prior to the beginning at any point. He shall not begin new portions of the work to the detriment of portions already begun.

Owner’s normal working hours are Monday through Friday from 8:00 AM to 5:00 PM. The contractor shall notify the owner at least twenty-four (24) hours in advance for any work that is to be scheduled beyond the limits of the owner’s working hours, and he shall not begin any such work schedule unless proper inspection by the Contractor has been pre-arranged with the Owner, with the cost for such work beyond the owner’s working hours borne by the Contractor. For Clarification, See Division B - Section 4 “Inspection by City”.

If at any time the methods, equipment, or sequence of operations sued by the Contractor are found to be inadequate to secure the quality of the work or rate of progress required by the contract, the Engineer may in writing order such modifications in the Contractor’s methods, equipment, or sequence of operations as he may deem necessary and the contractor shall comply with such order.

C-8.06 WORKMEN AND EQUIPMENT:

All workmen employed by the Contractor shall be skilled and competent. Any person employed by the Contractor who in the opinion of the Engineer does not perform his work in a proper and skillful manner or who is disrespectful, intemperate, disorderly, or otherwise objectionable shall at the written order of the Engineer be immediately removed from the work and shall not be employed again on any part of the work without written consent from the Engineer.

The Contractor shall furnish and use such suitable machinery and equipment as may be required in the opinion of the Engineer to properly prosecute the work. The Contractor shall at the written order of the Engineer remove from the work any equipment found unsuited to properly perform the work.

Upon failure of the Contractor remove the work any person or equipment as ordered by the Engineer, the Engineer may withhold all estimates which have or may become due, or may suspend the work until such orders are complied with.

C-8.07 TEMPORARY SUSPENSION OF WORK:

The Engineer shall have the authority to suspend the work wholly or in part for such period or periods as he may deem necessary due to unsuitable weather, or such other conditions as are considered unfavorable for the prosecution of the work or for such time as is necessary due to failure on the part of the Contractor to comply with orders given or to perform any or all provisions of the contract.
If work is stopped for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way, and he shall take every precaution to prevent damage or deterioration of the work performed.

The Contractor shall not suspend the work without written authority from the Engineer and shall proceed with the work promptly when notified by the Engineer to resume operations.

C-8.08 COMPUTATION OF CONTRACT TIME:

The Contractor shall complete the work within the number of days stated in the contract. The number of days used shall be the number of days from the first day of actual commencement of operations or the 10th day after the date set in the Work Order or Notice to Proceed whichever comes first, and counting that day as the first elapsed day of contract time.

If the completion of the contract requires unforeseen work, or work and materials in greater quantities than those set forth in the proposal, then additional days or suspension of time charge will be allowed the Contractor equal to the time which in the opinion of the Engineers the work as a whole is delayed.

C-8.09 FAILURE TO COMPLETE THE WORK ON TIME:

The time set forth in the proposal for the completion of the work is an essential element of the contract. If the contractor fails to complete the work in the number of contract days specified, a time charge will be made for each day thereafter until the work has been satisfactorily completed.

An amount per day is set forth in the Division B Section 1, and said amount is to be deducted from the amount due the Contractor for each day charged in excess of the number specified, the time charge shall be based on the total days of such delay. Such deductions shall be considered liquidated damages and may be used as compensation to the Owner for the added expenses for engineering supervision, testing, inspection, and other costs.

C-8.10 ABANDONMENT OF WORK OR DEFAULT OF CONTRACT:

The Engineer may give notice in writing to the Contractor and his surety of delay, neglect, or default stating which if the Contractor:

- Fails to begin work within the time specified, or fails to perform the work with sufficient workmen and equipment;

- Fails to provide materials of sufficient quantity to insure the completion of the work within the contract time; or
- Performs the work unsuitable; or

- Neglects or refuses to remove materials or perform new work such as may have been rejected; or

- Discontinues the work without authority; or

- Refuses to suspend or resume operations when so directed by the Engineer; or

- Becomes insolvent or is declared bankrupt; or

- Commits any act of bankruptcy insolvency; or

- Makes an authorized assignment for the benefit of any creditor; or

- Fails from any other cause whatsoever to carry out the work in an acceptable manner.

The ten (10) days after such notice if given, if a satisfactory effort has not been made by the Contractor or his surety to correct such delay, neglect, or default, the Owner may declare the work abandoned and so notify the Contractor and his surety.

After receiving such notification of abandonment, the Contractor shall not remove from the work any machinery, equipment, tools, materials or supplies then on the site. The Owner shall have the power and authority without violating the contract to take prosecution of the work out of the hands of the contractor and to appropriate or use any or all materials and equipment on the site as may be suitable and acceptable and enter into an agreement for the completion of the contract according to the terms and provisions thereof, or use such other methods as he may elect for the completion of the contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under the contract shall be deducted from any money due or which may become due to the contractor. In the case the cost to the Owner is less than the amount which would have been payable under the contract if it had been completed by the Contractor, then the Contractor shall be entitled to receive the difference. In case the cost to the Owner exceeds the amount which would have been payable under the contract, if it had been completed by the Contractor, the Contractor and his surety shall be liable and shall pay the Owner the amount of such excess.
SECTION C-9

MEASUREMENT AND PAYMENT

C-9.01 MEASUREMENT OF QUANTITIES:

All work completed under the Contract will be measured in United States standard measures. Linear and surface measurements will be taken horizontally unless otherwise shown on the Plans. Structures will be measured to the neat lines shown on the Plans.

When any material is cubic yards in the vehicle, such measurement will be made at the point of delivery. The capacity of each vehicle shall be plainly marked on said vehicle and the capacity of marking shall not be changed without written permission of the Engineer. The Engineer shall have authority to require all vehicles to have uniform capacity.

C-9.02 SCOPE OF PAYMENT:

The Contractor shall accept the payment as provided in this Contract as full compensation for furnishing all materials, equipment, tools, labor and incidentals necessary to complete the work and for performing all work contemplated and embraced under this contract, as full compensation for loss or damage arising from the nature of the work, or from action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work; as full compensation for all expenses incurred in consequence of the suspension or discontinuance of the work; as full compensation for all expenses incurred in consequence of the suspension or discontinuance of the work herein specified; as full compensation for expenses incurred in any infringement of patent, trade-mark, or copyright; and as full compensation for completing the work in conformity with the requirements of the Plans and Specifications. Payment will be made only on items which are complete, in place, tested and accepted by the owner. Materials on hand shall be considered for payment ONLY when proper PAID invoices are submitted with Contractor’s pay estimates. Materials on hand must be placed in a secured area designed for the project under this contract and be available for inspection by City Engineers at all times. The Contractor must provide an inventory of all materials on a form acceptable to the City Engineer and which must accompany each pay request. The payment of any partial or current estimate shall in no way affect the obligation of the Contractor at his own cost to repair or renew any defective parts of the construction or to replace any defective materials used in the construction and to be responsible for all damages due to such defects. Any items to complete the work indicated on plan shall be considered subsidiary to include positions of work and no further compensation will be made.

No monies payable under this contract, except the estimate for the first month or period, shall become due and payable until the Contractor shall satisfy the Owner that he has fully settled and paid for all materials and equipment used in or upon the work and labor done in connection therewith and the Owner may if he so elects pay any or all bills wholly or in part, and deduct the amount or amounts paid from any estimate(s) except the first estimate.
In event the surety on any bond given by the Contractor becomes insolvent or is placed in the hands of a receiver or has its right to do business in the State revoked by Law, the Owner may if he so elects withhold payment of any or all estimates until the Contractor shall give a good and sufficient bond in lieu of the bond so executed by said surety.

C-9.03 PAYMENT FOR ALTERED QUANTITIES:

When alterations in the Plans or quantities of work not requiring supplemental agreements are ordered and performed, the Contractor shall accept payment in full at the contract price for the actual quantities of work done. No allowance for anticipated profits will be made. Increased or decreased work involving supplemental agreements will be paid for as stipulated in such agreements.

C-9.04 PAYMENT FOR OMITTED ITEMS:

When any item ordered omitted from the Contract, the Contractor shall accept payment in full at the contract price for any work actually performed on such item prior to the date of issuance of such order. No allowance will be made for anticipated profits on work ordered omitted. Acceptable materials ordered by the Contractor, or delivered on the work prior to the date of issuance of such order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner. The Contractor shall submit immediately certified statements covering all money expended in the preparation for any item ordered omitted and shall be entitled to reimbursement for any money expended in preparation for any items when such preparation is of no value to the remaining items of the Contract.

C-9.05 PAYMENT FOR EXTRA WORK:

Extra work performed under a supplemental agreement will be paid for according to the terms of such supplemental agreement.
Extra work if performed on a force account basis will be paid for as follows:

For all labor and foreman, the Contractor will receive the wage paid on the project for each hour that said labor and foremen are actually engaged on such work to which shall be added the actual cost of premiums for public liability and workmen’s compensation insurance and social security taxes for the actual amount of such payroll.

For all materials used on such work the Contractor will receive the actual cost of such materials including freight charges.

For machinery and equipment used on such work the Contractor will receive an agreed rental price for each hour that such machinery and equipment is actually used on such work. The agreed price shall include the cost of fuel, lubrication and repairs.

To the sum of the foregoing an amount equal to fifteen (15) percent thereof will be added, as compensation for the use of small tools, Superintendent’s services, timekeeper’s services.
Premium on bond and all other overhead expenses incurred in the prosecution of the extra work including Contractor’s profit.

The sum of such payments provided for shall be accepted by the Contractor’s as full compensation as provided in C-9.02.

C-9.06 PARTIAL PAYMENTS:

Once a month and within the thirty (30) days after submittal of a correct and complete estimate, the Owner shall make a progress payment to the basis of a duly certified and approved estimate of the work performed during the preceding calendar month under this Contract. To insure the proper performance of the Contract, the Owner shall retain ten (10) percent ** of the amount of each estimate until final completion and acceptance of all work covered by this Contract.

**NOTE Retainage for construction contracts over four hundred thousand ($400,000) shall be five (5) percent.

In the event that the base bid is less than fifty thousand ($50,000) the total contract price will be paid in one payment upon completion and acceptance of the project. If any defective material or work be discovered or should a reasonable doubt arise as to the integrity of any part of the work completed prior to final acceptance and payment, there will be deducted from the first estimate presented after the discovery of such work, an amount equal to the value of the defective or questionable work. Such defective work will be made from all subsequent estimates until the defects have been remedied or the cause for doubt removed.

C-9.07 TERMINATION OF THE CONTRACT BY THE CONTRACTOR:

If the work is stopped for a period of thirty (30) days under an order of any court of other public authority having jurisdiction, or as a result of an act of government, such as declaration of a national emergency making materials unavailable, through no act or fault of the Contractor or subcontractor or their agents or employees or any other persons performing any of the work under a Contract with the Contractor, or if the work should be stopped for a period of thirty (30) days by the Contractor because the Engineer has not issued a Certificate for payment as provided in C-9.06 or because the Owner has not made payment within the ten(10) days after such stopping of work, then the Contractor may, upon seven (7) additional days written notice to the Owner and the Engineer, terminated the Contract and recover from the Owner payment for all work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit and damages.

C-9.08 TERMINATION OF THE CONTRACT BY THE OWNER:

If the Contractor is adjudged a bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he persistently or repeatedly refused or fails, except in cases for which extension of time is
provided, to supply enough properly skilled workmen, or proper materials, or if he fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contracts Documents, then the Owner, upon certification by the Engineer that sufficient cause exists to justify such action, may without prejudice to any right or remedy and after giving the Contractor and his surety, if any, seven (7) days written notice, terminate the employment of the Contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished.

C-9.09

If the unpaid balance of the Contract Sum exceeds the costs of finishing the work, including compensation for the Engineer’s additional services made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be certified by the Engineer, upon application, and this obligation for payment shall survive the termination of the Contract.

C-9.10 ACCEPTANCE OF FINAL PAYMENT:

When the work provided for in the contract has been completed and the final inspection has been made by the Engineer, and all parts of the work have been approved and accepted, the final estimate showing all sums due the Contractor shall be prepared. All prior partial estimates and payments shall be subject to correction in the final estimate and payment. No payment on the final estimate will be made until the Contractor furnishes satisfactory evidence that all claims growing out of lawful demands of laborers, work, men, mechanics, subcontractors, material, men, furnishers of machinery and parts thereof, and suppliers of all kinds have been satisfied. Upon final payment the Contractor shall execute a certificate and release upon the Owner on the form specified.

C-9.11 AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS AND RELEASE OF LIENS and PROOF OF INSURANCE:

Each and every pay estimate must be accompanied by an “Affidavit of Payment of Debts and Claims and Release of Liens” form (sample of which follows this Section); and copies of proof of current insurances for the project.

C-9.12 MATERIALS ON HAND INVENTORY:

When materials on hand payment is requested, and “Inventory of Materials on Hand” is required and must be included with Contractor’s Pay Estimate. Proof of payment for materials on hand is also to be included with the Materials Inventory. A sample form follows this section.
C-9.13 PHOTOGRAPHS:

The Contractor shall submit with each monthly progress pay estimate four (4) each 3 ½" x 5" color photographs depicting generally the work done during that month, and each photograph properly identified and dated.
# Project Acceptance Requirements

Items required by The City of Laredo for Acceptance of the Project.

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Consultant</th>
<th>Contractor</th>
<th>Date</th>
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<tr>
<th>REQUIRED ITEMS</th>
<th>SUBMITTED</th>
<th>RESUBMIT</th>
<th>COMMENTS</th>
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<tbody>
<tr>
<td>Completion of Punch List</td>
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<tr>
<td>Engineers / Architects Completion Report</td>
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<td>Affidavit of Payments of Debts &amp; Claims &amp; Release of Liens from the Contractor.</td>
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<td>Warranty Letter from the Contractor to the City of Laredo</td>
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<tr>
<td>Warranty Statement Form</td>
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<tr>
<td>Certificate of Occupancy from Building Development Services</td>
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<td>Legal Description &amp; Physical Address</td>
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<td>Reproducible Record Drawings</td>
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<tr>
<td>Electronic Record Drawings (CD with PDF files /ACAD)</td>
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<tr>
<td>Final Payment Request</td>
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# CITY OF LAREDO
## CONTRACTOR'S APPLICATION FOR PAYMENT

**PROJECT:**

**ESTIMATE NO.:**

**DATE FROM:**

**TO:**

**ORIGINAL CONTRACT:**

**TOTAL WORK TO DATE:** $

**CHANGE ORDERS:**

**MATERIALS ON HAND:** $

**10% RETAINAGE:** $

**TOTAL TO DATE:**

**PREVIOUS PAYMENTS:** $

**% COMPLETE:**

**AMOUNT DUE:** $

**CERTIFICATE OF CONTRACTOR:**

I certify that all items and amounts shown on this request for partial payment are correct and that all work has been performed and/or materials supplied in full in accordance with the requirements on the contract documents.

(Contractor)  
By: ________________________________
Signature  Date

_______________________________
Print Name

**CERTIFICATE OF FIELD REPRESENTATIVE:**

I have checked this request for partial payment against the notes and reports of my inspections of the project and in my opinion the statement of work performed and/or material supplied is accurate and that the contractor is observing the requirements of the contract documents.

(Inspector)  
By: ________________________________
Signature  Date

_______________________________
Print Name

**CERTIFICATE OF ENGINEER:**

I certify that I have checked and verified the above and foregoing request for partial payment and that it is a true and correct statement of work performed and/or material supplied by the contractor and that same has been performed and/or supplied in full accordance with the requirements of the contract documents.

(Consultant)  
By: ________________________________
Signature  Date

_______________________________
Print Name

**RECOMMENDED FOR PAYMENT:**

**VERIFIED FOR PAYMENT:**

_______________________________  
Ramon E. Chavez, P.E, City Engineer  Engineering Project Manager  DATE:  DATE:

**APPROVED FOR PAYMENT:**

**DATE:**

_______________________________
Finance Department
AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS
AND RELEASE OF LIENS

TO:  CITY OF LAREDO
WEBB COUNTY, TEXAS

PROJECT:

By this instrument the undersigned contractor engaged in the construction of the above project certifies that on this date, or anytime prior thereto, except listed below, contractor has paid in full or has otherwise satisfied all obligations for all materials and for all known indebtedness and claims against the project, its land, improvements and equipment of every kind.

The undersigned hereby certifies that he has received all payments currently due under his contract for work on the project above referred. Therefore, the undersigned does hereby waive and/or release any and all liens against the property, project and as of the _________ day of ______________, 2019.

________________________________
Company Name

STATE OF TEXAS:
COUNTY OF ______________:

Before me, the undersigned authority, on this day personally appeared ___________________, known to me to be the person whose name is subscribed to the foregoing instrument, and being first duly sworn, acknowledge to me that he executed the same for the purposes and consideration therein expressed and declared to me that the statements therein are true.

SWORN AND SUBSCRIBED TO before me this ______________ day of ______________, ______________.

NOTARY PUBLIC
MY COMMISSION EXPIRES:
MATERIALS ON HAND INVENTORY

Project: 
Contractor: 
Estimate No. Dates: From to 

<table>
<thead>
<tr>
<th>No.</th>
<th>Invoice No.</th>
<th>Vendor</th>
<th>Balance Last Period</th>
<th>Received Current</th>
<th>Placed Current</th>
<th>Balance</th>
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FORM LETTER FOR CERTIFICATE OF WARRANTY

DATE:

Mr. Ramon E. Chavez, P.E., City Engineer
City Engineer
City of Laredo
1110 Houston St.
Laredo, Texas 78040

Re:

Dear Mr. Chavez:
__________________________ guarantees all materials and workmanship on the above referred project to be free of defects for a period of one (1) year from the date of acceptance by the owner. Upon notice, any defective materials or faulty workmanship developing within this period, will be replace at no cost to the owner.

Sincerely,

___________________________

Company Name

ACKNOWLEDGEMENT

STATE OF TEXAS

COUNTY OF ______________

Before me, Notary Public for and in ______________ County, State of ______________ on this personally appeared ______________ known to me to be person(s) whose name(s) subscribed to the foregoing affidavit and acknowledge to me that he executed the same for the purpose and consideration expressed therein.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, THIS _______ DAY OF ______________, ______________.

____________________________________

Notary Public in and for ______________ County, State of ______________ My Commission Expires:
FORM LETTER FOR ENGINEERING COMPLETION REPORT

DATE:

Mr. Ramon E. Chavez, P.E.,
City Engineer
1110 Houston Street
Laredo, Texas 78040

Re:

Dear Mr. Chavez:

In accordance with the contracts between ___________________________ and The City of Laredo, Webb County, Texas, and pursuant to the specifications in the contract documents, I take this opportunity to file this Completion Report with reference to the above mentioned project as follows:

STATE OF _____________________

COUNTY OF ___________________

This is to Certify that I, _______________________________ Registered Professional Engineer, have inspected the work accomplished by _______________________________ and, under contract with The City of Laredo, Webb County, Texas, found that workmanship and materials supplied are in accordance with plans and specifications for said project, and as amended by the “AS-BUILT” drawings.

SIGNED THIS THE ____________ DAY OF ___________, 2019.

__________________________

_________________, P.E.

P.E. SEAL
SECTION C-10
City of Laredo
Warranty Statement Form

Project Information

Name: ______________________________ Location: ______________________________
Cost: ______________________________ State Date: ______________________________
Contract/P.O. #: ________________________ Council Acceptance: ______________________
Completion Date: ________________________

Contractor/Sub-Contractor/Vendor Information

Name: ______________________________ Address: ______________________________
Contact Number: ________________________ Email Address: __________________________

Warranty Information

Coverage Type (Detail):
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

Required Maintenance (Detail):
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

Manuals Received (if applicable): ______________________________ Expiration Date:________________
Copies Provided To: _____________________________________

Warranty Statement

We are the __________________________________________________ contractor for the above indicated project. We guarantee our workmanship, equipment and materials to be free from defects for a period of ________________________________ from the completion date.

Signature: _____________________________________  Date: ______________________________

For Warranty Management Office Use Only:

Entered into Warranty Management Tracker? ____________________ Entered By________________
Date Entered: _______________________ Warranty Management Acct # Assigned: ________________
SECTION C-11

ETHICS COMMISSION RULES

Certificate of Interested Parties (Form 1295):

In 2015, the Texas Legislature adopted House Bill 1295, which added section 2252.908 of the Government Code. The law states that a governmental entity or state agency may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency.

The law applies (with a few exceptions) only to a contract between a business entity and a governmental entity or state agency that either (1) requires an action or vote by the governing body of the entity or agency before the contract may be signed or (2) has a value of at least $1 million. The disclosure requirement applies to a contract entered into on or after January 1, 2016.

Changed or Amended Contracts:

Form 1295 is only required for a change made to an existing contract in certain circumstances: (1) if a Form 1295 was not filed for the existing contract, then a filing is only required if the changed contract either requires an action or vote by the governing body or the value of the changed contract is at least $1 million; or (2) if a Form 1295 was filed for the existing contract, then another filing is only required for the changed contract if there is a change to the information disclosed in the Form 1295, the changed contract requires an action or vote by the governing body, or the value of the changed contract increases by at least $1 million.

As required by law, the Commission adopted the Certificate of Interested Parties form (Form 1295) on October 5, 2015. The Commission also adopted rules (Chapter 46) to implement the law. The Commission does not have any additional authority to enforce or interpret section 2252.908 of the Government Code.

Filing Process:

A business entity must use the Form 1295 filing application the Commission created to enter the required information on Form 1295 and print a copy of the completed form. Once entered into the filing application, the completed form will include a unique certification number, called a “certification of filing.”

An authorized agent of the business entity must sign the printed copy of the form affirming under the penalty of perjury that the completed form is true and correct.

The completed, printed, and signed Form 1295 bearing the unique certification of filing number must be filed with the governmental body or state agency with which the business entity is entering into the contract.

https://www.ethics.state.tx.us/tec/1295-Info.htm
Acknowledgement by State Agency or Governmental Entity:

The governmental entity or state agency must acknowledge receipt of the filed Form 1295 with the certification of filing, using the Commission’s filing application, not later than the 30th day after the date the governing body or state agency receives the Form 1295. The Commission will post the completed Form 1295 to its website within seven business days after the governmental entity or state agency acknowledges receipt of the form.

Additional Information:

Section 2252.908, Government Code.

Certificate of Interested Parties (Form 1295)**
**This is a sample form for illustration purposes only. DO NOT FILL OUT THIS SAMPLE FORM. Form 1295 MUST BE FILED ELECTRONICALLY! Paper copies and PDF copies of this sample form are not accepted!

Chapter 46, Ethics Commission Rules (includes new rule 46.4, regarding changes to contracts, which went into effect on January 1, 2017)

Last Revision: December 21, 2017

https://www.ethics.state.tx.us/tec/1295-Info.htm
(a) In this section:
   (1) “Business entity” means any entity recognized by law through which business is conducted, including a sole proprietorship, partnership, or corporation.
   (2) “Governmental entity” means a municipality, county, public school district, or special-purpose district or authority.
   (3) “Interested party” means a person who has a controlling interest in a business entity with whom a governmental entity or state agency contracts or who actively participates in facilitating the contract or negotiating the terms of the contract, including a broker, intermediary, adviser, or attorney for the business entity.
   (4) “State agency” means a board, commission, office, department, or other agency in the executive, judicial, or legislative branch of state government. The term includes an institution of higher education as defined by Section 61.003, Education Code.

(b) This section applies only to a contract of a governmental entity or state agency that:
   (1) requires an action or vote by the governing body of the entity or agency before the contract may be signed; or
   (2) has a value of at least $1 million.

(c) Notwithstanding Subsection (b), this section does not apply to:
   (1) a sponsored research contract of an institution of higher education;
   (2) an interagency contract of a state agency or an institution of higher education; or
   (3) a contract related to health and human services if:
       (A) the value of the contract cannot be determined at the time the contract is executed; and
       (B) any qualified vendor is eligible for the contract.

Text of subsection as amended by Acts 2017, 85th R.S., Ch. 526 (SB 255)
(Changes identified by italicized text apply only to a contract entered into or amended on or after January 1, 2018).

(c) Notwithstanding Subsection (b), this section does not apply to:
   (1) a sponsored research contract of an institution of higher education;
   (2) an interagency contract of a state agency or an institution of higher education;
   (3) a contract related to health and human services if:
       (A) the value of the contract cannot be determined at the time the contract is executed; and
       (B) any qualified vendor is eligible for the contract;
   (4) a contract with a publicly traded business entity, including a wholly owned subsidiary of the business entity;
   (5) a contract with an electric utility, as that term is defined by Section 31.002, Utilities Code; or

https://www.ethics.state.tx.us/statutes/Gov-Code-2252.908-12-19-17.htm#2252.908
(d) A governmental entity or state agency may not enter into a contract described by Subsection (b) with a business entity unless the business entity, in accordance with this section and rules adopted under this section, submits a disclosure of interested parties to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency.

(e) The disclosure of interested parties must be submitted on a form prescribed by the Texas Ethics Commission that includes:

1. a list of each interested party for the contract of which the contracting business entity is aware; and
2. the signature of the authorized agent of the contracting business entity, acknowledging that the disclosure is made under oath and under penalty of perjury.

_text of subsection as amended by Acts 2017, 85th R.S., Ch. 526 (SB 255) (Changes identified by italicized text apply only to a contract entered into or amended on or after January 1, 2018).

(f) Not later than the 30th day after the date the governmental entity or state agency receives a disclosure of interested parties required under this section, the governmental entity or state agency shall submit a copy of the disclosure to the Texas Ethics Commission.

(g) The Texas Ethics Commission shall adopt rules necessary to implement this section, prescribe the disclosure of interested parties form, and post a copy of the form on the commission's Internet website.

_Added by Acts 2015, 84th Leg., R.S., Ch. 1024 (H.B. 1295), Sec. 3, eff. September 1, 2015. Amended by Acts 2017, 85th Leg., R.S., Ch. 526 (SB 255, Sec. 5, eff. September 1, 2017).

https://www.ethics.state.tx.us/statutes/Gov-Code-2252.908-12-19-17.htm#2252.908
§ 46.1. Application
(a) This chapter applies to section 2252.908 of the Government Code
(b) Section 2252.908 of the Government Code applies only to a contract of a governmental entity or state agency entered into after December 31, 2015, that meets either of the following conditions:
(1) the contract requires an action or vote by the governing body of the entity or agency; or
(2) The value of the contract is at least $1 million.
(c) A contract does not require an action or vote by the governing body of a governmental entity or state agency if:
(1) the governing body has legal authority to delegate to its staff the authority to execute the contract
(2) The governing body has delegated to its staff the authority to execute the contract; and
(3) The governing body does not participate in the selection of the business entity with which the contract is entered into.

§ 46.3. Definitions
(a) “Contract” means a contract between a governmental entity or state agency and a business entity at the time it is voted on by the governing body or at the time it binds the governmental entity or state agency, whichever is earlier, and includes an amended, extended, or renewed contract.
(b) “Business entity” includes an entity through which business is conducted with a governmental entity or state agency, regardless of whether the entity is a for-profit or nonprofit entity. The term does not include a governmental entity or state agency.
(c) “Controlling interest” means: (1) an ownership interest or participating interest in a business entity by virtue of units, percentage, shares, stock, or otherwise that exceeds 10 percent; (2) membership on the board of directors or other governing body of a business entity of which the board or other governing body is composed of not more than 10 members; or (3) service as an officer of a business entity that has four or fewer officers, or service as one of the four officers most highly compensated by a business entity that has more than four officers. Subsection (3) of this section does not apply to an officer of a publicly held business entity or its wholly owned subsidiaries.
(d) “Interested party” means: (1) a person who has a controlling interest in a business entity with whom a governmental entity or state agency contracts; or (2) an intermediary.
(e) “Intermediary,” for purposes of this rule, means, a person who actively participates in the facilitation of the contract or negotiating the contract, including a broker, adviser, attorney, or representative of or agent for the business entity who:
(1) receives compensation from the business entity for the person’s participation;
(2) communicates directly with the governmental entity or state agency on behalf of the business entity regarding the contract; and
(3) is not an employee of the business entity or of an entity with a controlling interest in the business entity.
(f) “Signed” includes any symbol executed or adopted by a person with present intention to authenticate a writing, including an electronic signature.
(g) “Value” of a contract is based on the amount of consideration received or to be received by the business entity from the governmental entity or state agency under the contract.

https://www.ethics.state.tx.us/legal/ch46.html
§ 46.4. Changes to Contracts (new rule effective January 1, 2017)
(a) Section 2252.908 of the Government Code does not apply to a change made to an existing contract, including an amendment, change order, or extension of a contract, except as provided by subsections (b) or (c) of this section.
(b) Section 2252.908 of the Government Code applies to a change made to an existing contract, including an amendment, change order, or extension of a contract, if a disclosure of interested parties form was not filed for the existing contract; and either:
(1) the changed contract requires an action or vote by the governing body of the entity or agency; or
(2) the value of the changed contract is at least $1 million.
(c) Section 2252.908 of the Government Code applies to a change made to an existing contract, including an amendment, change order, or extension of a contract, if the business entity submitted a disclosure of interested parties form to the governmental entity or state agency that is a party to the existing contract; and either:
(1) there is a change to the disclosure of interested parties; or
(2) the changed contract requires an action or vote by the governing body of the entity or agency; or
(3) the value of the changed contract is at least $1 million greater than the value of the existing contract.

§ 46.5. Disclosure of Interested Parties Form
(a) A disclosure of interested parties form required by section 2252.908 of the Government Code must be filed on an electronic form prescribed by the commission that contains the following:
(1) The name of the business entity filing the form and the city, state, and country of the business entity’s place of business;
(2) The name of the governmental entity or state agency that is a party to the contract for which the form is being filed;
(3) The name of each interested party and the city, state, and country of the place of business of each interested party;
(4) The identification number used by the governmental entity or state agency to track or identify the contract for which the form is being filed and a short description of the services, goods, or other property used by the governmental entity or state agency provided under the contract; and
(5) An indication of whether each interested party has a controlling interest in the business entity, is an intermediary in the contract for which the disclosure is being filed, or both.
(b) The certification of filing and the completed disclosure of interested parties form generated by the commission’s electronic filing application must be printed, signed by an authorized agent of the contracting business entity, and submitted to the governmental entity or state agency that is the party to the contract for which the form is being filed.
(c) A governmental entity or state agency that receives a completed disclosure of interested parties form and certification of filing shall notify the commission, in an electronic format prescribed by the commission, of the receipt of those documents not later than the 30th day after the date the governmental entity or state agency receives the disclosure.
(d) The commission shall make each disclosure of interested parties form filed with the commission under section 2252.908(f) of the Government Code available to the public on the commission’s Internet website not later than the seventh business day after the date the commission receives the notice required under subsection (c) of this section.

https://www.ethics.state.tx.us/legal/ch46.html
H.B. No. 1295
AN ACT
relating to the disclosure of research, research sponsors, and interested parties by persons contracting with governmental entities and state agencies.
BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

SECTION 1. Subchapter Z, Chapter 51, Education Code, is amended by adding Section 51.954 to read as follows:

Sec. 51.954. DISCLOSURE OF SPONSORS OF RESEARCH IN PUBLIC COMMUNICATIONS. (a) In any public communication the content of which is based on the results of sponsored research, a faculty member or other employee or appointee of an institution of higher education who conducted or participated in conducting the research shall conspicuously disclose the identity of each sponsor of the research.
(b) In this section:
(1) "Institution of higher education" has the meaning assigned by Section 61.003.
(2) "Public communication" means oral or written communication intended for public consumption or distribution, including:
   (A) testimony in a public administrative, legislative, regulatory, or judicial proceeding;
   (B) printed matter including a magazine, journal, newsletter, newspaper, pamphlet, or report; or
   (C) posting of information on a website or similar Internet host for information.
(3) "Sponsor" means an entity that contracts for or provides money or materials for research.
(4) "Sponsored research" means research:
   (A) that is conducted under a contract with or a grant from an individual or entity, other than the institution conducting the research, for the purpose of the research; and
   (B) in which payments received or the value of materials received under that contract or grant, or under a combination of more than one such contract or grant, constitutes at least 50 percent of the cost of conducting the research.

SECTION 2. Subchapter Z, Chapter 51, Education Code, is amended by adding Section 51.955 to read as follows:

Sec. 51.955. PROHIBITED STATE AGENCY ACTIONS RELATED TO DISCLOSURE OF PUBLICLY FUNDED RESEARCH. (a) In this section, "institution of higher education" has the meaning assigned by Section 61.003.
(b) A state agency that expends appropriated funds may not:

(1) enter into a research contract with an institution of higher education if that contract contains a provision precluding public disclosure of any final data generated or produced in the course of executing the contract unless the agency reasonably determines that the premature disclosure of such data would adversely affect public safety, the protection of intellectual property rights of the institution of higher education, publication rights in professional scientific publications, or valuable confidential information of the institution of higher education or a third party; or
(2) adopt a rule that is based on research conducted under a contract entered into with an institution of higher education unless the agency:
   (A) has made the results of the research and all data supporting the research publicly available; or
   (B) reasonably determines that the premature disclosure of such data would adversely affect public safety, the protection of intellectual property rights of the institution of higher education, publication rights in professional scientific publications, or valuable confidential information of the institution of higher education or a third party.

(c) Subsection (b)(1) does not apply to a research contract between an institution of higher education and the Cancer Prevention and Research Institute of Texas.
(d) A response to a request for information regarding research described by Subsection (b) must be made in accordance with Chapter 552, Government Code.
(e) This section does not require the public disclosure of personal identifying information or any other information the disclosure of which is otherwise prohibited by law.

SECTION 3. Subchapter Z, Chapter 2252, Government Code, is amended by adding Section 2252.908 to read as follows:
Sec. 2252.908. DISCLOSURE OF INTERESTED PARTIES.

(a) In this section:
(1) "Business entity" means any entity recognized by law through which business is conducted, including a sole proprietorship, partnership, or corporation.
(2) "Governmental entity" means a municipality, county, public school district, or special-purpose district or authority.
(3) "Interested party" means a person who has a controlling interest in a business entity with whom a governmental entity or state agency contracts or who actively participates in facilitating the contract or negotiating the terms of the contract, including a broker, intermediary, adviser, or attorney for the business entity.
(4) "State agency" means a board, commission, office, department, or other agency in the executive, judicial, or

legislative branch of state government. The term includes an institution of higher education as defined by Section 61.003, Education Code.

(b) This section applies only to a contract of a governmental entity or state agency that:

(1) requires an action or vote by the governing body of the entity or agency before the contract may be signed; or
(2) has a value of at least $1 million.

(c) Notwithstanding Subsection (b), this section does not apply to:

(1) a sponsored research contract of an institution of higher education;
(2) an interagency contract of a state agency or an institution of higher education; or
(3) a contract related to health and human services if:
   (A) the value of the contract cannot be determined at the time the contract is executed; and
   (B) any qualified vendor is eligible for the contract.

(d) A governmental entity or state agency may not enter into a contract described by Subsection (b) with a business entity unless the business entity, in accordance with this section and rules adopted under this section, submits a disclosure of interested parties to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency.

(e) The disclosure of interested parties must be submitted on a form prescribed by the Texas Ethics Commission that includes:

(1) a list of each interested party for the contract of which the contracting business entity is aware; and
(2) the signature of the authorized agent of the contracting business entity, acknowledging that the disclosure is made under oath and under penalty of perjury.

(f) Not later than the 30th day after the date the governmental entity or state agency receives a disclosure of interested parties required under this section, the governmental entity or state agency shall submit a copy of the disclosure to the Texas Ethics Commission.

(g) The Texas Ethics Commission shall adopt rules necessary to implement this section, prescribe the disclosure of interested parties form, and post a copy of the form on the commission's Internet website.

SECTION 4. (a) Not later than December 1, 2015, the Texas Ethics Commission shall adopt the rules, prescribe the disclosure of interested parties form, and post the form on the commission's Internet website as required by Section 2252.908, Government Code, as added by this Act.

(b) Section 2252.908, Government Code, as added by this Act, applies only to a contract entered into on or after January 1, 2016.

SECTION 5. This Act takes effect September 1, 2015.

President of the Senate    Speaker of the House

I certify that H.B. No. 1295 was passed by the House on May 11, 2015, by the following vote: Yeas 135, Nays 0, 1 present, not voting; that the House refused to concur in Senate amendments to H.B. No. 1295 on May 28, 2015, and requested the appointment of a conference committee to consider the differences between the two houses; and that the House adopted the conference committee report on H.B. No. 1295 on May 31, 2015, by the following vote: Yeas 144, Nays 0, 2 present, not voting.

Chief Clerk of the House

I certify that H.B. No. 1295 was passed by the Senate, with amendments, on May 25, 2015, by the following vote: Yeas 30, Nays 1; at the request of the House, the Senate appointed a conference committee to consider the differences between the two houses; and that the Senate adopted the conference committee report on H.B. No. 1295 on May 31, 2015, by the following vote: Yeas 30, Nays 1.

Secretary of the Senate

APPROVED: ________________

Date

Governor

**CERTIFICATE OF INTERESTED PARTIES**

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

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

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

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

4. | Name of Interested Party | City, State, Country (place of business) | Nature of Interest (check applicable) |
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5. Check only if there is no Interested Party.

6. **UNSWORN DECLARATION**

My name is ___________________________ and my date of birth is ________________

My address is

Street ___________________________ City ___________ State ___________ Zip ___________

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

Executed in ________________ County, State of ________________, on the ______ day of __________, 20____ (month) (year)

______________________________
Signature of authorized agent of contracting business entity

(Designation)

**ADD ADDITIONAL PAGES AS NECESSARY**

Form provided by Texas Ethics Commission www.ethics.state.tx.us Revised 12/22/2017

https://www.ethics.state.tx.us/forms/1295.pdf
SECTION C-12
ALTERNATES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS
Applicable portions of the Project Manual, including but not limited to relevant Drawings and Specifications.

1.2 SUMMARY
This Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS
A. Alternate: A Bid Item for a scope of work described in Section A-5 Bid Proposal that, if accepted by Owner, may result in additions to or deductions from the Base Bid.

1.4 PROCEDURES
A. Coordination: The Contractor must modify or adjust any affected adjacent Work as necessary to completely integrate work of the Alternate into the Project.

B. The Contractor must include as part of each Alternate, any miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of the Alternate.

C. Notification: The awarded contract will include all accepted Alternates.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in such schedule contain requirements for materials necessary to achieve the Work described under each Alternate.

E. Bidders must respond to allAlternates listed in Section A-5 Bid Proposal, even if acceptance or rejection of an alternate will not change the Bid amount. Bid amounts must be entered in the spaces for each Alternate.

The Owner has established a priority order (Alternate No. 1 has the highest priority) for the acceptance of Bid Alternates based on the Project needs and budget. Alternates will be accepted in the order listed on the Bid Form, but such acceptance will not exceed the Project budget.

PART 2 – PRODUCTS

NOT USED
PART 3 – EXECUTION

3.1 SCHEDULE OF ALTERNATES

Alternate No. 1: Provide stamped concrete pavement as described in Section 432 Stamped Concrete.

The price for Alternate No. 1 shall replace the costs associated with asphalt payment items included in the Base Bid.

END
SECTION C-13
ALLOWANCES

PART 1. – GENERAL

1.1 SUMMARY (All allowances are to be included in the Base Proposal as per construction document and required Scope of Work)

A. The general contractor shall include in the contract sum all allowances stated in the contract documents. These allowances shall cover the net cost of the materials and equipment delivered and unloaded at the site. The general contractor's handling costs on the site, labor and installation costs, overhead and profit, and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in the allowance. The contractor shall cause the work covered by these allowances to be performed for such amounts and be such persons as the Engineer or Owner may direct but he will not be required to employ persons against whom he makes a reasonable objections. If the cost, when determined, is more than or less than the allowance, the Contract Sum shall be adjusted accordingly by Field Order, which could include additional handling costs on the site, labor, installation costs, overhead, profit and other expenses resulting to the general contractor from any increase or decrease over the original allowance. If there is a balance at the end of the project, the allowance amount will be credited to the Owner through a formal change order.

B. Item No. 1. Traffic Conduit & Traffic Signal Cable Allowance: This is a cash allowance reserved for potential additional general construction items related to installation of traffic conduit as approved by Engineer and Owner. Traffic signal cable allowance is for replacement in kind of cable that may be damaged during construction. Allowance $10,000.00 (excluding contractor's overhead and profit). This item is to be included in the Base Proposal amount.

Item No. 2. Utility Relocations Allowance: This is a cash allowance reserved for the relocation of existing utilities as required and approved by Engineer and Owner. Allowance $50,000.00 (excluding contractor's overhead and profit). This item is to be included in the Base Proposal amount.

Item No. 3 Storm Sewer Allowance: This is a contingency allowance reserved for additional storm sewer work as required and approved by Engineer and Owner. Allowance $50,000.00 (excluding contractor's overhead and profit). This item is to be included in the Base Proposal amount.

Item No. 4 Sanitary Sewer Allowance: This is a contingency allowance reserved for additional sanitary sewer work as required and approved by Engineer and Owner. Allowance $50,000.00 (excluding contractor's overhead and profit). This item is to be included in the Base Proposal amount.
**Item No. 5  Water Line Allowance:** This is a contingency allowance reserved for additional water line work as required and approved by Engineer and Owner. Allowance **$50,000.00** (excluding contractor's overhead and profit). **This item is to be included in the Base Proposal amount.**

**PART 2. – PRODUCTS**

NOT USED IN THIS SECTION

**PART 3. – EXECUTION**

NOT USED IN THIS SECTION

END OF SECTION
SECTION C-14
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

Prepare and maintain record documents for the project to reflect accurately the construction as built. Documents must be submitted at work completion as a condition of final acceptance.

1.01 MAINTENANCE OF RECORD DOCUMENTS

A. Maintain at the job site, one copy of the following as Project Record Documents:

3. Addenda.
4. Reviewed shop drawings.
5. Approved samples.
6. Change orders and field orders.
7. Field and laboratory test records.
8. Correspondence.

B. Store record documents in an approved location apart from documents used for construction. Do not use record documents for construction purposes. Provide files and racks for orderly storage. Maintain documents in clean, dry, legible condition. Make documents and samples available at all times for inspection by the City.

1.02 MARKING DEVICES

Mark all changes legibly in a contrasting color.

1.03 RECORDING

A. Keep record documents current. Do not permanently conceal any work until required information has been recorded.

B. Label each document "PROJECT RECORD" in neat, large, printed letters. Legibly mark contract drawings to record actual construction, showing:

1. Depths of various elements of foundation in relation to survey data.
2. Horizontal and vertical location of underground and underslab utilities and appurtenances referenced to permanent surface improvements.
3. Location of internal utilities and appurtenances referenced to permanent surface improvements.
4. Field changes of dimension and detail.
5. Changes made by change order or field order.
6. Details not on original contract drawings.

C. Legibly mark specifications and addenda to record:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
2. Changes made by change order or field order.
3. Other matters not originally specified.

D. Delete Engineer’s seals from record documents.

1.04 SUBMITTAL

A. At project completion, submit record documents as required in Section 824 – Closeout Procedures. Place all letter-sized material in a 3-ring binder, neatly indexed. Bind contract drawings and shop drawings in rolls of convenient size for ease of handling.

B. Accompany the submittal with a transmittal letter in duplicate, containing:

   1. Date.
   2. Project title and number.
   3. Contractor’s name and address.
   4. Title and number of each record document.
   5. Certification that each document as submitted is complete and accurate.
   6. Signature of Contractor.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION
SECTION C-15
TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 Description:
This section shall govern the requirement for CONTRACTOR to maintain a suitable office near the project area throughout construction.

PART 2 - PRODUCTS - NOT USED

PART 3 – EXECUTION

3.1 Office at the Work Site
During the performance of this Contract, CONTRACTOR shall maintain a suitable office near the site of the Work which shall be the headquarters of his superintendent. Any communication given to the superintendent or delivered to CONTRACTOR’s office at the site of the Work in his absence shall be deemed to have been delivered to CONTRACTOR.

The office shall be provided with outside entrance door with a lock, adequate heating, air conditioning, and lighting facilities. CONTRACTOR shall pay all utility bills and shall provide wireless internet service. The general arrangement of the office and facilities provided shall be acceptable to Owner and Owner’s Representative.

PART 4 – MEASUREMENT AND PAYMENT

4.1 Measurement
Temporary office shall not be measured for payment.

4.2 Payment
There shall be no separate payment for temporary facilities. Payment shall be considered subsidiary to the work as a whole.

END OF SECTION
SECTION 102
EXCAVATION AND BACKFILL FOR UTILITIES

D-102.01 SCOPE: This section shall govern all excavation and backfill which will be encountered during the work, and supplements those paragraphs pertaining to excavation in Sections entitled "SPECIFICATIONS FOR SDR 26-GRAVITY SEWER PIPING", "WATER LINE CONSTRUCTION", and "PVC PIPE WATER CONDUITS & INSTALLATION" of these specifications.

D-102.02 CLASSIFICATION: All excavation for this Project shall be considered unclassified. The Contractor is expected to determine the nature of the work and to make his bid prices reflective of the actual conditions which will be encountered. No claim for extra compensation shall be made by the Contractor due to rock, or other unfavorable excavation conditions encountered during the course of the work.

D-102.03 EXISTING UTILITIES: Before commencing excavation, the Contractor shall notify all utility companies with sufficient lead time, and confirm the location of existing underground lines and conduits in the work area by calling 811.

D-102.04 CLEARING: The Contractor shall do all clearing, grubbing, etc. necessary to complete the work.

D-102.05 DEWATERING: The Contractor shall provide and maintain adequate equipment to remove and dispose of all surface and ground-water entering excavations, trenches, or other parts of the work.

D-102.06 EXCAVATION: Unless otherwise ordered by the Engineer in writing, trench shall be as indicated in the Drawings, and trenching for water lines shall be excavated to a depth of five feet.

D-102.07 SHEETING AND SHORING: Where necessary to protect workmen, the work, or the existing structures, the Contractor shall sheet, brace, and shore the excavation to prevent caving or sliding. This item is further described in Division D, Section 802, entitled "SHEETING AND BRACING".

D-102.08 DISPOSAL OF EXCESS SOIL: Unless otherwise specified, the Contractor shall dispose of all unsuitable or excess excavation spoil daily. Disposal shall be made at a location and in a manner which is acceptable to the Owner.

D-102.09 PIPE ZONE: The "pipe zone" shall mean that portion of the trench which extends from 24 " above the top of the pipe joints to the bottom of the excavation. "Above the pipe zone" shall mean that portion of the trench which shall extend from 24" above the top of the pipe joints to the top of the finished surface.

D-102.10 BLASTING: Shall be prohibited except where allowed in writing by the City and Engineer. The Contractor shall take all necessary precautions as specified in the General Provisions of these Specifications. The Contractor shall be solely responsible for any damage incurred due to blasting.
D-102.11 OVER-EXCAVATION: In the event of over-excavation, the over-excavated depth of the trench shall be filled with the appropriate bedding material.

D-102.12 STABILIZATION: Subgrades for pipe work shall be firm, dense, and thoroughly consolidated. The subgrade shall be free of mud, muck, loose material and debris, and shall remain firm and intact under the workmen's feet.

D-102.13 PIPE EMBEDMENT & PIPE ZONE BACKFILL: The first layer of backfill shall be sufficient to provide a compacted depth of one-half the outside diameter of the barrel. This layer shall be placed by hand and tamped with hand or pneumatic tampers. The rest of the pipe zone shall be placed in a similar manner in layers not to exceed 8" loose measure to the top of the pipe zone. Unless otherwise specified, the embedment and material in the pipe zone shall be zero P.I. sand or gravel material, as specified by the engineer. Select excavation material may be acceptable; however, the contractor shall be required to submit ample sieve analysis results from a reputable independent testing laboratory to the engineer in order to use such materials for embedment. Backfill material containing rock over 3" in any dimension shall not be used in trenches under paved areas. The pipe trench shall be backfilled in a manner so as to prevent future settlement for a period of one year after date of final payment. All secondary backfill material shall be as required on section D-102.14, 1.2.

Before leaving the work at night or any other time, the upper ends of all pipes shall be securely closed with a tight fitting plug and provisions shall be made to keep the line from floating out of place should the trench fill with water. Any damage to the lines from failure to follow these provisions shall be repaired at Contractor's expense.

Provisions must be made at all times to keep the interior of the pipe that has been laid free from dirt, silt, gravel, and any other foreign matter and any such material that is deposited within the pipe from any cause whatsoever must be removed as the work progresses.

D-102.14 BACKFILLING: All trenches and excavations shall be backfilled within 24 hours after pipes are installed therein unless other means of protecting the pipe is directed by the Engineer. At no times, however, shall any backfilling be done until the Engineer has inspected the pipe to be covered. Backfilling requirements:

**Materials:**

1.1. Initial (primary) backfill to a point of 12 inches above the top of pipe shall be done as follows:

1.1.1. Suitable excavated material placed in uniform lifts not more than 6 inches in depth and shall be compacted to the density specified herein. The maximum dry density and optimum moisture shall be determined as per TxDot Tex-114-E. Test for in place density shall be in accordance with TxDOT Tex-115-E within 24 hours after compaction. Each lift shall be compacted to the required density and moisture as shown bellow, unless otherwise shown on the plans:
1.1.2. Zero PI Sand. When shown on the plans, backfill the primary trench zone with zero PI sand. Non-plastic material meeting the specifications below will not be required to be tested for density.

**OPTION ZERO P.I.**

SIEVE ANALYSIS

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<th>Sieve Analysis</th>
<th>Percentage</th>
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<tr>
<td>3/8&quot; sieve</td>
<td>95-100%</td>
</tr>
<tr>
<td>1/4&quot; sieve</td>
<td>85-100%</td>
</tr>
<tr>
<td>No.40 sieve</td>
<td>75-100%</td>
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<tr>
<td>No.80 sieve</td>
<td>20-90%</td>
</tr>
<tr>
<td>No.200 sieve</td>
<td>00-20%</td>
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</tbody>
</table>

The sand shall be placed in layers no to exceed 10 inches in depth and lightly tamped to consolidate the mass against pipe and earth surfaces.

There is no separate item for sand, unless shown on the plans as a separate pay item.

1.1.3. Flowable Backfill. When shown on the plans, conform with Division D Section 134.

There is no separate item for sand, unless shown on the plans as a separate pay item.

1.1.4. Select Fill or Flexible Base (gravel, caliche, crushed limestone).

Clean gravel approved by the engineer may be used for backfill from the bottom of the trench to the 12 inches above the top of pipe. The gravel shall be placed in layers no to exceed 10 inches in depth and lightly tamped to consolidate the mass against pipe and earth surfaces.

Flexible base material (caliche, crushed limestone) may be used from the bottom of the trench to 12 inches above the top of the pipe or to the bottom of the street base in lifts no to exceed 8 inches. Material shall contain the required moisture to obtain the density for each layer to no less of 95% of the maximum dry density. There is no separate item for sand, unless shown on the plans as a separate pay item.

1.2. Secondary Backfill. After the initial backfill has been completed at a point of 12 inches above the top of pipe, the material for secondary backfill shall be placed in uniform layers no more than 10 inches in depth (loose measurement) and shall be compacted to the required density specified herein. Excavation material used for secondary backfill shall comply with the following unless shown on the plans:

**Secondary Backfill**
(1). **Timing of backfill:** All trenches and excavation shall be backfilled within twenty-four (24) hours after pipes are installed, unless other means of protecting pipe is directed by the Engineer. At no time, however, shall any backfilling be done until the Engineer has inspected the pipe to be covered. In the case the trench cannot be backfilled, steel plates shall be used to protect the public.

(2). **Backfill placement:** After the bedding has been prepared and the pipes installed as required by the pertinent specifications, selected materials from excavation or borrow shall be placed along both sides of the pipe equally in uniform layers not exceeding six (6) inches in depth (loose measurement) in the primary backfill zone and ten (10) inches in depth (loose measurement) in the secondary backfill zone, wetted if required, and thoroughly compacted so that on each side of the pipe there shall be a berm of thoroughly compacted material at least as wide as the external diameter of the pipe, except insofar as undisturbed material obtrudes into this area.

(3). **Addition to backfill:** Whenever excavation is made for installing pipe culverts or sewers across private property or beyond the limits of the embankment, the top soil removed in excavating the trench shall be kept separate and replaced, as nearly as feasible, in its original position, and the entire area involved in the construction operations shall be restored to a presentable condition.

(4). **Earth trench:** In earth trench, the pipe shall be placed on the natural, undisturbed earth foundation with the trench bottom flat or nearly so. Where rock, shale, or boulders are encountered in the trench, the same shall be removed to a depth of six (6) inches below the grade line and the trench shall be refilled with good, sound earth, gravel, or granular material up to original grade and tamped into place.

(5). **Inspection:** Prior to the final approval of the utility lines, the Engineer, accompanied by the Contractor's representative, shall make a thorough inspection by appropriate methods of the entire installation. Any indication of defects in material or workmanship or obstruction in the pipe due to the Contractor's negligence shall be corrected by the Contractor without additional
① **GENERAL:** There are five (5) different conditions for backfill of proposed pipe. The plans indicate which condition shall prevail in each section or block of the "pipe route". If the plans do not indicate a backfill condition, Condition "A" shall prevail.

Please refer to the appendix for Utility Trench Backfill Methods.

**D-102.15 WATER JETTING:** Only in “Condition C” above, and for pipe diameters of 12” or less, and in trenches 8’ or less, and only when authority is obtained in writing from the City Engineer, backfill may be compacted with water by use of the jetting method. When using the jetting method, backfill above the pipe zone shall be placed in lifts not to exceed 5 feet. Water jetting shall be delivered under sufficient volume and pressure through an approved jetting hose and pipe nozzle. The jetting hose shall have a minimum inside dimension of two inches (2”). The jetting hose shall be connected to an approved minimum two inches (2”) water pump capable of delivering water at the volume and pressure as required by the Engineer. The pipe nozzle shall be of sufficient length to introduce the water at a depth of not less than one foot (1’) above the preceding lift. Points of trench jetting shall be staggered along the length of the trench and spaced at not more than three feet (3’) on centers. Each five feet (5’) lift shall be jetted initially at a depth of not more than one foot (1’) above the preceding lift. Sufficient water shall be introduced into the secondary backfill to cause complete subsidence of the backfill and develop free standing water at the surface of each lift. After the final lift has been jetted as approved, twelve (12) hours shall be allowed for the reduction of the materials moisture content. When the backfill moisture content is acceptable for mechanical or pneumatic compaction, the surface shall be compacted to the satisfaction of the Engineer. The surface of the final lift of trenches subject to traffic shall be compacted by ditch tamping equipment.

**D-102.16 SITE RESTORATION:** The Contractor shall remove and dispose in an acceptable manner of all excess construction material, trash, debris, excess spoil material, etc., from the construction site. All pavement, fences, drainage structures, drainage ditches, and etc., shall be replaced to a condition as good as, or better than, the original structure as existed. The site shall be graded to a smooth well drained condition.

**D-102.17 EXISTING GROUND WATER CONDITIONS:** Where ground water conditions exist, the following shall apply inclusive of crushed stone or gravel backfilling. No pipe shall be laid in trench containing water. There will be no separate payment for trench dewatering or the materials, equipment, or labor required to reestablish wet trenches to the conditions and specifications required herein. Non-Storm Water Discharge Permit will need to be obtained from the Environmental Services Department.

**D-102.18 DISPOSAL OF EXCAVATED MATERIALS:** Excavated materials, so far as needed and of a suitable and acceptable character, shall be piled adjacent to the excavations to be used as backfill as required. All excavated material that is unsuitable for backfilling purposes or which is in excess of the amount required or needed to satisfactorily complete the backfill, shall be disposed of daily. The character and suitability of all backfill material shall meet the approval of the Engineer. Desirable top soil, or sod, etc., shall be carefully piled separately from the other excavated material.
so that it can be placed in this original position when required. Excavated material shall be handled at all times in such manner as to cause a minimum of inconvenience to public travel and to permit safe and convenient access to private and public properties adjacent to or along the line of the work. In parkways and easements, where it is necessary to deposit excavated materials on lawns during the progress of the work, care shall be taken to prevent damage to such lawns. Where damage is done to such lawns all expense of replacing the lawn shall be borne by the Contractor.

**D-102.19 REMOVAL AND REPLACEMENT OF SOD, SHRUBBERY, PLANTS, ETC.:** Where it is necessary to remove the sod, shrubbery, plants, etc., in order to make any excavation for this work, such areas as are backfilled shall have the same sod, shrubbery, plants, etc. replaced in good condition or if necessary to furnish new sod, shrubbery, or plants of the same kind and in good condition, same shall be furnished by the Contractor at his expense.

The sod, where removal is deemed necessary, shall be removed in squares cut out with a sharp spade or other satisfactory tool; the square shall be of such sizes that they may be conveniently handles without breaking. Such sod shall be removed in layers of not less than four inches (4") depth and shall be stored and given proper attention to protect sod from drying out, pending the time of replacement.

If trees and plants shall be removed, this work shall be done in the approved manner as to require protection of roots, branches, etc.; when backfilling is completed the trees and plants shall be replaced in their original position or as near such position as possible.

If irrigation system has to be removed and replaced, refer to Section 806.

**D-102.20 PROTECTION OF TREES, PLANTS, SHRUBBERY, ETC.:** In developed areas where trees, plants, shrubbery, etc., are adjacent to the line of work, the Contractor shall protect such trees, plants, or shrubbery by wooden boxes, frames, or guards of sufficient strength to prevent any injury from machinery, trucks, or workmen during the prosecution of the work.

**D-102.21 Payment.** No pay item will be included in the proposal nor direct payment made for excavation and backfill. The cost for placing the material shall be included in the unit price bid for the specific work function.
SECTION 104
PVC WATER PIPE

D-104.01 GENERAL

1. Description
   This work shall consists of the construction, complete in place of PVC Water Pipe as specified herein, and in conformity with the lines, grades, dimensions, materials, and design shown on the plans.

D-104.02 PRODUCTS

1. Polyvinyl Chloride Water Pipe

A. GENERAL
   All polyvinyl chloride (PVC) water pipe shall of the rigid (UNPLASTICIZED) type and must bear the National Sanitation Foundation seal of approval for potable water pipe. Each joint of pipe shall consist of single continuous extrusion; bells or other components attached by solvent welding are not acceptable. Pipe shall be pressure rated at 305 psi (DR 14, C-900) as indicated.

   Pipe shall have push-on, rubber joints of the bell and spigot type with thickened general bells with rubber gasket joints. The wall thickness of each pipe bell and joint coupling must be greater than the standard pipe barrel thickness. Clearance must be provided in every gasket joint for both lateral pipe deflection and for linear expansion and contraction. Concrete thrust blocking shall be placed behind bends and tees. Concrete support cradles or blocking shall be required for support of all fire hydrants, valves and AWWA C110 fittings; such support shall be provided for AWWA C153 fittings when required by the Engineer.

   Pipe installed in any project must be manufactured within last twelve (12) months.

B. APPLICABLE SPECIFICATIONS
   Except as modified or supplemented herein, PVC pipe shall meet the following standards:

   -DR 14, C-900, Class 305 PVC Pipe to be used for installation of water mains 8” to 12” not deeper than 16 feet unless specifically identified in the plans. The use of 6” diameter is allowed for the Fire Hydrant assembly and other stubouts. All installation methods, testing procedures and backfilling requirements must be followed as per these specifications.

   -Fittings used with PVC Pressure pipe shall be AWWA C-110 or AWWA C-153 compact ductile iron mechanical joint fittings manufactured in USA with 316 stainless steel bolts, rods and nuts.

   -DR 21 for PVC Pressure Pipe, in 2 and 3 inches nominal size,

   -DR 18, C905, Class 235, for water mains 16 to 24 inches nominal size. Any pipe greater than 24” requires a separate specification submittal.
Standard sizes, dimensions and tolerances shall be as follows:

<table>
<thead>
<tr>
<th>Nominal Size (inches)</th>
<th>Outside Avg. (inches)</th>
<th>Diameter Tolerance (inches)</th>
<th>Wall Min. (inches)</th>
<th>Thickness Tolerance (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6.900</td>
<td>+0.011</td>
<td>0.493</td>
<td>+0.046</td>
</tr>
<tr>
<td>8</td>
<td>9.050</td>
<td>+0.015</td>
<td>0.646</td>
<td>+0.060</td>
</tr>
<tr>
<td>12</td>
<td>13.200</td>
<td>+0.015</td>
<td>0.943</td>
<td>+0.088</td>
</tr>
</tbody>
</table>

All pipe 2” and larger must be approved Underwriter's Laboratories for use in buried water supply and fire protection systems.

Concrete steel cylinder pipe: Requires a separate submittal for review and approval by the Utilities Director.

C. MATERIAL REQUIREMENTS
All pipe and fittings shall be made from clean, virgin, NSF approved, Class 12454B PVC free of defects. Clean reworked materials generated from the manufacturer's own production may be used within the current limits of the referenced AWWA C-900 or C-905.

D. MARKING
Permanent marking on each joint piece shall include the following at intervals of not more that 5 feet:
- Nominal pipe size and OD base (e.g., 4 CIPS)
- The type of plastic material (e.g., PVC 12454B)
- The Standard Dimension Ration and the pressure rating in psi for water at 73 F (e.g., DR 14, 200 psi).
- The AWWA designation with which the pipe complies (e.g., AWWA C-900).
- The manufacturer’s name or code and the National Sanitation Foundation (NSF) mark.
- Install the marking facing up.

E. TRACER TAPE
For all non-metallic pipe 8” and larger, directly above centerline of the pipe and approximately 18” below finished grade, shall be placed Conductive Tracer Detection Tape. The tape shall be encased in a protective, inert, plastic jacket and color coded in accordance with APWA Uniform Code.

D-104.03 EXECUTION

1. Excavation
Trench all shall be straight. The minimum width of trench excavation shall not be less than the internal diameter of the pipe plus twelve (12”) inches. The pipe shall have a minimum cover...
of 36" unless shown otherwise on the plans.

2. Embedment Using Gravel or Granular Material

Where rock shale or boulders are encountered in the trench, the same shall be removed to a depth of 6" below the grade line and the trench shall be refilled with sand, gravel, or up to the original grade and tamped into place. Where ground water is found, replace the backfill material with gravel or granular material as shown on the construction plans, otherwise, at least the bedding and primary backfill shall be replaced with gravel or granular material.

3. Pipe Laying

Pipe shall not be laid where the sub-grade is in a condition unsatisfactory to the Engineer. If sub-grade is soft, spongy, or disintegrated, the material shall be removed until a firm, stable and uniform bearing is reached and the sub-grade brought back to grade with suitable materials thoroughly compacted in place. Embedment for the pipe or the pipe itself will NOT be laid in water.

Where pipe is installed beneath railroad tracks, construction clearance to cross under railroad trackage shall be obtained by Contractor or facility owner from proper railroad authorities. Any expense of bracing or support to tracks during excavation operation beneath trackage shall be considered part of the contractor.

Where pipe shall be installed beneath State Highways, construction clearance and other requirements to cross under State Highways shall be obtained from State Highway District Engineer by facility owner.

Proper traffic control devices as per TMUTCD shall be placed and maintained to assure maximum traffic and pedestrian safety, or as directed by Local, Railroad, State Highway authorities or other governing agencies.

Owner will obtain all permits for construction, and will make a formal application for the right to cross canals, railroads, highways, pipe lines etc., Contractor must cooperate fully with all agencies involved while construction in areas controlled by such agencies.

Before pipe is laid, all dirt shall be removed from inside; and all lumps, blisters, excess coal tar, dirt, oil, and grease removed from both inside and outside of pipe.

After pipe is laid, care shall be taken to avoid entrance of dirt, water or small animals by use of tight bulk heads in all openings.

Contractor shall not leave more than 600 linear feet of open trench.

4. Service Saddles

Service saddles shall be of the un-hinged type on PVC Class 900 pipe (size 6" to 12"). The saddle body and bottom is to be of 85-5-5-5 solid brass or as per the latest regulations,
material as per ASTM B-62, single width with a minimum of two (2) silicone bronze bolts and a cc-thread.

Bronze saddles with bronze bolts must meet the latest revision of AWWA specifications for saddles to be used on Class 900 PVC pipes.

-Saddles 6" to 12" are to be Jones J-996, or approved equal.
-Saddles 14" to 16" are to be Jones J-979, or approved equal

On January 4, 2014 the water pipe, fittings and fixtures must comply with the S.3874 Reduction of Lead in Drinking Water Act SEC.2 (d) (1) (A) not containing more than 0.2 percent lead when used with respect to solder and flux and (B) not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.

For tapping sleeve valves Stainless Steel Saddle including body, bolts and nuts shall be Type 316 as per ASTM A240M (to meet or exceed).

These specifications are not intended to eliminate any material or equipment of equal quality and purpose of that specified, but instead designed to set standards. If the contractor wishes to use equal material or equipment, he shall submit a sample and/or written proof of quality that substitute is of equal or better quality to Engineer and Water Utilities Engineer and shall function as these plans and specifications intend.

5. Pipe Joints

Manufacturer's recommendations shall be followed.

6. Pipe Restraints

- **Mechanical joints**: Refer to Section 132
- **Concrete Thrust Blocks**
  Thrust blocks shall be made of concrete and shall only be used where specifically call for in the plans or otherwise indicated by the engineer or inspection, in addition to restraints when the pipe line changes direction, as at tees and bends; changes size, as at reducers (also some crosses and tees); stops, as at dead end; or is expected to develop thrust at valves. The dimensions of the thrust block shall be as per concrete mix used should be of a minimum strength of 2500 psi or as specified by Engineer, dimensions should be.

  The size and type of thrust block depends on pressure, pipe size, kind of soil, and the type of fitting. View Concrete thrust block details Drawing No. 104. **Thrust based on 150 psi water pressure. Area based on 2,000 psf soil bearing**
7. Storage
Storage of PVC shall be in the shade or shall be covered with a suitable cover. PVC pipe shall not be exposed to the sun longer than 24 hours while being laid.

8. Hydrostatic Tests
All pipe lines constructed under this contract before being accepted shall be tested with a hydraulic test according to Section 116"Hydrostatic Tests for Pressure Mains".

The cost of testing and finding leaks and repairing the same and re-testing, if necessary, shall be at the expense of the Contractor. The water required to fill the lines shall be furnished by the Contractor.

9. Line Disinfection
The completed water line shall be disinfected according to Section 118"Disinfection of Potable Water Mains".

The chlorinated water shall then be discharged from the water line and replaced with fresh potable water.

The Contractor will furnish all labor materials and equipment necessary to complete the proper disinfection of the line and the cost of this operation shall be included in the bid price for installation of the distribution system.

10. Measurement
PVC pipe will be measured for payment in linear feet along the center line of the trench. No
deduction will be made for valves and fittings.

11. **Payment**

PVC pipe will be paid for at the unit price per linear foot, complete in place, as provided in the proposal and contract. The contract price per linear foot shall be the total compensation for the furnishing of all labor, materials, tools, equipment, and incidentals necessary to complete work, including excavation, granular embedment material, backfill, and disposal of surplus materials, in accordance with the plans and these specifications.
Add the following to Section D-104.10 Measurement:

Restrained joint pipe will not be measured separately for payment and shall be included in the contract price per linear foot for each respective diameter.

Add the following to Section D-104.11 Payment:

Payment shall include all joint restraint, including mechanical thrust restraint and thrust blocking, and all fittings as indicated in the Drawings.

END OF SECTION
SECTION 106
DUCTILE IRON PIPE

GENERAL

D-106.01 DESCRIPTION:

1. Scope: This section describes the manufacture, construction, and installation of ductile iron pipe and fittings.

D-106.02 QUALITY ASSURANCE: Reference Standards:

   a. AWWA - C105, C110, C111, C115, C151, C153, C600, C651.
   b. ASTM - C33, C150

D-106.03 SUBMITTALS:

1. Submit manufacturer's data on pipe furnished, indicating compliance with the Specifications regarding dimensions, thickness, weights, and materials. Where flanged pipe is called for, submit complete piping layout indicating the length of each flanged joint to be furnished.

PRODUCTS

D-106.04 DUCTILE IRON PIPE AND FITTINGS:

1. GENERAL:
   a. Ductile iron pressure pipe six inches (6") in diameter and larger shall conform to the current American National Standard Specifications for Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids, AWWA C151 (A 21.51). The interior of the pipe shall be cement-mortar lining in accordance with the latest edition of ANSI/AWWA C104 Standard. All pipe shall be AWWA Class 150, or higher rated pipe.
   b. Ductile iron pipe less than six inches (6") in diameter shall be prohibited.

2. DESIGN REQUIREMENTS:
   a. The ductile iron shall conform in all respects to the Current Specification for Ductile Iron Castings, ASTM Designation A536.
   b. Thickness Class: Ductile iron pipe shall be Class 52 minimum unless otherwise shown on the plans.

3. JOINTS:
   a. All ductile iron pressure pipes shall be furnished with one of the following types of joints. Buried pipe shall be furnished with push-on or mechanical joint ends unless otherwise noted. Exposed pipe shall be flanged.

<table>
<thead>
<tr>
<th>TYPE OF JOINT</th>
<th>REFERENCE STANDARD</th>
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</table>
Push-on Joint AWWA C111
Mechanical Joint AWWA C111
Flanged Ends AWWA C110 & 115

b. All screwed flanges shall be ductile iron.
c. Provide restrained joint inside encasement.

4. COATING AND LINING: All ductile iron pipe and all fittings shall be bituminous coated outside in accordance with AWWA Standards, and polyethylene wrapped as per D-106.10.

5. UNDERWRITER'S APPROVAL: Ductile iron pipe shall be approved by the Underwriter's Laboratory and shall be accepted by the State Fire Insurance Board for use in water distribution systems without penalty. All pipes shall be new.

6. BOLTS AND NUTS: Bolts and nuts for pipe mechanical joints shall be Type 316 stainless steel. Flange bolts and nuts for above ground installation shall conform to Type 304 stainless steel. Flange bolts and nuts for below ground or in a vault or submerged installations shall be Type 316 stainless steel.

D-106.05 FLANGE GASKETS: Flange gaskets shall be full faced and conform to Appendix A of AWWA C115.

EXECUTION

D-106.06 EXECUTION: Lay all pipes in accordance with AWWA C600, except as modified herein.

D-106.07 PIPE LAYING AND JOINTING:

1. After the subgrade and embedment materials have been placed and the length of pipe has been placed in the trench, center the spigot in the bell and apply the pipe joint lubricant recommended by the pipe manufacturer. Force the spigot "home" using cables or excavating machinery. Use timbers to protect the bell of the joint from damage during jointing operation, especially when excavating machinery is used to force the pipe home.

2. Lay the pipe in such a fashion that the full length of the barrel of the pipe is resting on the embedment. Excavate bell holes so the bell of the pipe does not touch the bottom of the ditch. Take precautions to prevent dirt and embedment materials from entering the joint space. No blocking up of the pipe or joints will be permitted.

D-106.08 CUTTING OF PIPE: Saw cut pipe for closure pieces in a neat, workmanlike manner without damage to the pipe. Make each cut square to the centerline of the pipe and bevel the outside edge of the pipe at the cut to the same configuration and dimensions as the factory applied spigot level.
D-106.9 PROTECTION OF PIPE: At all times when pipe laying is not in progress, cover the open ends of the pipeline with a water tight cap to prevent water, debris, and animals from entering the pipe. Remove all foreign matter or dirt from the pipe during laying operations. Do not lay pipe in water or when trench conditions are unsuitable for such work.

D-106.10 POLYETHYLENE TUBE PROTECTION: All buried cast iron and ductile iron pipe and fitting shall be provided with polyethylene tube protection. Install polyethylene tube according to AWWA C105. Completely cover all fitting and connections with 8 mil (minimum) low density polyethylene film or 4 mil (minimum) cross laminated high-density polyethylene meeting ANSI/AWWA Specification C-105 current, with all edges and laps taped securely to provide a continuous and watertight wrap. Repair all punctures of the polyethylene, including those caused in the placement of bedding aggregates, with duct tape to restore the continuous protective rap before backfilling.

D-106.11 HYDROSTATIC TESTS: All pipe lines constructed under this contract before being accepted shall be tested with a hydraulic test according to Section 116"Hydrostatic Tests for Pressure Mains".

The cost of testing and finding leaks and repairing the same and re-testing, if necessary, shall be at the expense of the Contractor. The water required to fill the lines shall be furnished by the Contractor.

D-106.12 LINE DISINFECTION: The completed water line shall be disinfected according to Section 118"Disinfection of Potable Water Mains".

The chlorinated water shall then be discharged from the water line and replaced with fresh potable water.

The Contractor will furnish all labor materials and equipment necessary to complete the proper disinfection of the line and the cost of this operation shall be included in the bid price for installation of the distribution system.

D-106.13 MEASUREMENT: Ductile Iron pipe will be measured for payment in linear feet along the center line of the trench. No deduction will be made for valves and fittings.

D-106.14 PAYMENT: Ductile Iron pipe will be paid for at the unit price per linear foot, complete in place, as provided in the proposal and contract. The contract price per linear foot shall be the total compensation for the furnishing of all labor, materials, tools, equipment, and incidentals necessary to complete work, including excavation, granular embedment material, backfill, and disposal of surplus materials, in accordance with the plans and these specifications.
SECTION 108

BUTTERFLY VALVE

D-108.01 DESCRIPTION: This item shall govern the furnishing of all materials and doing all of the work required to install butterfly valves of the sizes called for in the plans and/or as directed by the Engineer.

D-108.02 MATERIALS

1. All butterfly valves shall be manufactured in accordance with the latest revision of AWWA C504 for Class 150B service and comply with the following details:

   - Valve Bodies shall be constructed of cast iron ASTM A-126 Class Band conform to AWWA C504 in terms of laying lengths and minimum body shell thickness.
   - Flanged valves shall be fully faced and drilled in accordance with ANSI Standard B16.1 Class 125.
   - All valves installed below grade shall be Mechanical Joints with joint restraints as per Section 132.
   - Valve Discs shall also be made from cast iron ASTM A-126 Class B (3"- 20"). Disc shall be furnished with 316 stainless steel seating edge to mate with the rubber seat on the body. The disc shall be an on-center, lens-shaped design to afford minimal pressure drop and line turbulence. Disc shall be retained by Type 316 stainless steel pin, extending through the full diameter of the shaft to withstand the specified line pressure up to valve rating and the torque required to operate the valve. Disc stops located in the flow stream are not allowed.
   - On the 30” and larger disc designs, the disc must be of a flow-through design. All surfaces shall be visually inspected and measurable to assure all structural members are at full disc strength. Disc and shaft connection shall be made with stainless steel through pins.
   - Valve Seat shall be Buna N rubber located on the valve body. In sizes 20" and smaller, valves shall have bonded seats that meet test procedures outlined in ASTM 0-429 Method B. Valve seats shall be field adjustable around the full 360° circumference and replaceable without dismantling the actuator, disc or shaft and without removing the valve from the line.
   - Valve Shafts shall conform to stainless steel Type 316. Shaft seals shall be standard self-adjusting, Chevron V-Type packing. Shaft seals shall be of a design allowing replacement without removing the valve shaft.
   - Valve Bearings shall be sleeve type that are corrosion resistant and self lubricating. Bearing load shall not exceed 1/51h of the compressive load strength of the material.
   - Valve Actuators shall be fully grease packed and have stops in the open/close position. The actuator shall have a mechanical stop which will withstand an input torque of 450 ft. lbs. The traveling nut shall engage alignment grooves in the housing.
• The Valve Interior and Exterior Surfaces, except for seating, shall be coated in accordance with TT-C-494A and AWWA C550. Valve interior and exterior surfaces except for seating shall be a minimum of 8 mils Ameron 370 or approved equal.

2. CAST IRON VALVE BOXES: Stems of all buried valves shall be protected by valve box assemblies. Valve box castings shall conform to ASTM A48, Class 30B. Testing shall be verified by the manufacturer. Valve box extension shall be as per manufacturer recommendations. Valve boxes shall be two piece, cast iron, screw type. The drop cover shall be lettered "WATER". A 24”x24”x6” thick minimum concrete collar around the valve box shall be provided.

D-108.03 CONSTRUCTION METHODS

SETTING VALVES: Valves shall be set in place as piping is being laid. A concrete or steel support shall be provided for each butterfly valve. Valves shall be set with stems vertical. Valve boxes shall be placed and adjusted so that the lids are slightly below finished grade and so that the base does not bear directly upon any part of the valve.

PLASTIC WRAP AND SAND: The valve and fittings beneath shall be completely wrapped with 8 mil (minimum) low density polyethylene film or 4 mil (minimum) cross laminated high-density polyethylene meeting ANSI/AWWA Specification C-105 current, with all edges and laps taped securely to provide a continuous and watertight wrap. Repair all punctures of the polyethylene, including those caused in the placement of bedding aggregates, with duct tape to restore the continuous protective rap. Sand shall be used to a point 6” all around the valve.

BACKFILLING: Backfill around valve and valve box shall be placed in accordance with the adjacent pipe backfill, as shown in the plans and specified separately herein.

D-108.04 MEASUREMENT

Butterfly Valves will be measured each complete assembly.

D-108.05 PAYMENT

Payment for "Butterfly Valves" will be paid for at the unit price bid per each, which price shall be full compensation for all labor, materials, equipment, including couplings, reaction blocking, joint restraint, valve box assembly, concrete collar, valve concrete or steel support, valve stem extensions, packing operator extensions, and other incidentals necessary to complete the installation and make the valve fully functional as intended.
SECTION 110
WATER VALVES

D 110.01 GENERAL

1. Description
   This item to consist of valves furnished and installed as indicated. Unless otherwise indicated, all valves 4” and larger shall be AWWA type valves suitable design and fully equipped for service buried in earth, without need for further modification and shall be wrapped with 8 mil polyethylene film with all edges and laps securely taped to provide continuous wrap. Unless otherwise indicated, all valve stems shall be adjusted to situate the operating nut not less than 30” but not more than 36” below the proposed ground or paving surface of the finished project.

D 110.02 PRODUCTS

1. Materials
   Contractor shall, as requested by the Utilities Director, submit descriptive information and evidence that materials and equipment Contractor proposes for incorporation into work is of the kind and quality that satisfies the specified functions and quality.

   1. Iron Body Gate Valves, 6” to 12” shall comply with AWWA C509, resilient wedge gate valve.
   2. Iron Body Gate Valves larger than 12”, including Tapping Valve, shall conform to AWWA C515.
   3. Stainless Steel Type 316 Tapping Sleeve:
      a. Mechanical Joint end outlet and neck conforming to type 316 Stainless steel. The valve inlet flange shall have a machined projection or raised face complying with MSS SP-60 for accurate alignment to the mating recess in the tapping sleeve flange. Seat rings and body casting shall be over-sized as required to accommodate full size cutters; the outlet end shall be constructed and drilled to allow the drilling machine adapter to be attached directly to the valve.
      b. Test plug ¾” NPT shall be stainless steel type 316
      c. Body, bolts, nuts shall be stainless steel type 316, nuts coated to prevent galling.
      d. SBR Body gasket to be full circumferential with hydro mechanical outlet seal, bridge plate to be stainless steel type 316.

      All tests and inspections called for by the applicable standards shall be performed by the manufacturer. Upon request, results of these tests shall be made available to the City.

   5. Other Requirements:
      Each submittal shall be accompanied by:
      -Complete data covering the operator, including type and size, model number, etc., the manufacturer’s name and address of his nearest service facility, the numbers of turns to fully open and close the valve, detailed instruction for calibrating the limit stops for open and closed positions and any other information which may be necessary to operate and maintain the operator.
      - Complete dimensional data and installation instructions for the valve assembly as it is to be installed, including the operator.
- Complete replacement parts lists and drawings, identifying every part from both the valve and operator.

2. Valves

1. **Stem Seals**: All valves shall be approved O-ring type stem seals. At least two O-rings shall be in contact with the valve stem where it penetrates the valve body. All Valves must open counter clock and close clock wise.

   a. **Operation**: All valves shall be approved O-ring type stem seals. At least two O-rings shall be in contact with the valve stem where it penetrates the valve body.

   b. **Gearing**: Valves shall gear and, when necessary for proper bury depth and cover, shall be horizontal bevel-geared type enclosed in a lubricated gear case.

   c. **Bypass**: Unless otherwise indicated, 16" and larger gate valve shall be equipped with a bypass of the non-rising stem type which meets the same AWWA standard required for the main valve.

   d. **Valve Ends**: Valve ends shall be push-on, flanged or mechanical joint, as indicated or approved.

   e. **Gear Case**: All geared valves shall have enclosed gear cases of the extended type, attached to the valve bonnet in a manner that makes it possible to replace the stem seal without disassembly and without disturbing the gears, bearing or gear lubricant. Gear cases shall be designed and fabricated with an opening to atmosphere so that water leakage past the stem seal does not enter the gear case.

   f. **Valve Body**: Valves in 16" and larger sizes installed in the horizontal position shall have bronze rollers, tracks, scrapers, etc.

   g. **Bolts**: The valves shall have bolts and nuts for the stuffing box and bonnet with the following compositions: type 316 stainless steel, nuts coated to prevent galling.

   h. **Stem**: The valve stem shall be made of bronze ASTM B-132 alloy C67600 bar stock material. The stem shall have at least one "anti-friction" thrust washer above and below the stem collar to reduce operating torque. Valves with cast stems or two piece stem collars are not acceptable.

   i. **Body thickness**: The valve body, bonnet, stuffing box, and disc shall be composed of ASTM A-126 Class B grey iron or ASTM A395. The body and bonnet shall also adhere to the minimum wall thickness as set forth in Table 2, section 4.3.1 of AWWA C509.

   j. **Resilient wedge**: The valve disc and guide lugs must be fully encapsulated in SBR ASTM D2000 rubber material. Guide caps of an acetal bearing material shall be placed over solid guide lugs to prevent abrasion and to reduce the operating torque.

   k. **Coatings**: The valves shall have all internal and external ferrous surfaces coated with a fusion bonded thermostetting powder epoxy coating of 10 mils nominal thickness. The coating shall conform to AWWA C550.

   l. **Warranty**: The valves shall be warranted by the manufacturer against defects in materials or workmanship for a period of ten (10) years from the date of manufacture. The manufacturing facility for the valves must have current ISO certification.
D 110.03 EXECUTION

1. Construction Methods

1. Setting Valves
   Unless otherwise indicated, main valves, blow-off valves and piping shall be set and jointed in the manner described for cleaning, laying, and jointing pipe.

   Unless otherwise indicated, valves shall be set at the locations shown on the drawings as piping is being laid and such that their location does not conflict with other appurtenances such as curb ramps. A concrete or steel support shall be provided for each valve. Valves shall be installed so the tops of operating stems will be at the proper elevation required for the piping at the location indicated above but not exceeding 5ft. in depth. Valve boxes and valve stem casings shall be firmly supported and maintained, centered and aligned plum over the valve or operating stem, with the top of the box or casing installed flush with the finished ground or pavement in existing streets, and installed with the top of the box or casing approximately 6” below the standard street subgrade in streets which are excavated for paving construction or where such excavation is scheduled or elsewhere as directed by the Engineer.

2. Protective Covering
   Unless otherwise indicated, all flanges, nuts, bolts, threaded outlets and all other steel component shall be coal tar coated and shall be wrapped with standard 8 mil (minimum) low density polyethylene film or 4 mil (minimum) cross laminated high-density polyethylene meeting ANSI/AWWA Specification C-105 current, with all edges and laps taped securely to provide a continuous and watertight wrap. Repair all punctures of the polyethylene, including those caused in the placement of bedding aggregates, with duct tape to restore the continuous protective rap before backfilling.

3. Valve Box, Casing and Cover.
   Stems of all buried valves shall be protected by valve box assemblies. Valve box castings shall conform to ASTM A48, Class 30B. Testing shall be verified by the manufacturer. Valve box extension shall be as per manufacturer recommendations. Valve boxes shall be two piece, cast iron, screw type. The drop cover shall be lettered "WATER". A 24”x24”x6” thick minimum concrete collar around the valve box shall be provided.

D 110.04 MEASUREMENT
All types of valves will be measured per each complete assembly.

D 110.05 PAYMENT
Payment shall be full compensation in accordance with the pay item seen in the bid, for excavation, furnishing, hauling and placing valves and barrel extensions including all incidental and subsidiary material and work; preparing, shaping, dewatering, shoring of trenches, bedding, placing, adjusting to grade, couplings, sleeves, concrete support, joint restraints, valve stem extenders, concrete collars complete in place, and compacting backfill materials and for all other incidentals necessary to complete the installation, as indicated, complete in place.
**SECTION 112**

**FIRE HYDRANTS**

**D-112.01 TYPE OF HYDRANT**  All fire hydrants shall be Dry Barrel, Traffic Model (break away), Post Type having Compression Type Main Valves (5 1/4" opening), closing with line pressure. Hydrants shall be cast-iron, fully bronze mounted, working pressure of 200 psi, test pressure of 400 psi, anything buried below the buried line shall be 316 stainless steel bolts and nuts, anything above may be 304 stainless steel bolts and nuts, all nuts coated to prevent galling and shall conform and be in accordance with the latest specifications and revisions of American Water Works Association (AWWA) Standard C-502 for Fire Hydrants for ordinary water works service, except for supplementary requirements contained herein.

**D-112.02 DESIGN OF HYDRANT**  Hydrants shall be Mueller Company A423 Super Centurion with safety crash flange or approved equal.

**D-112.03 FUNCTIONAL REQUIREMENTS**  Design Working Pressure shall be 200 psi (test pressure 400 psi). All parts shall conform to the required dimensions and shall be free from defects that could prevent proper functioning of the hydrant. All castings shall be clean and sound without defects that will weaken their structure or impair their service.

Inlet shall be side connection hub end for mechanical joint (ANSI A21.11 - current). Shoe shall be rigidly designed to prevent breakage, with harnessing lugs for joint restraint.

Lower Barrel shall be rigid to assure above ground break at traffic feature. Bury length of hydrant shall be 3 1/2 feet hydrant lead pipe may be elbowed up from main using restrained joints; flanged joints in lead pipes are not allowed. Flange type connections between hydrant shoe, barrel sections and bonnet shall have minimum 6- Stainless Steel Type 316 bolts and nuts for the underground fittings and Stainless Steel Type 304 for the above ground connections, all nuts coated to prevent galling.

Hydrant Main Valve shall be 5 1/4 inch I.D. Valve stem design shall meet requirements of AWWA C502, with operating nut turning clockwise to close. Operating nut shall be pentagonal - 1 1/2 inch (point to flat) at base, and 1 7/16" at top - 1 inch minimum height. Seat ring shall be bronze (bronze to bronze threading), and shall be removable with light weight stem wrench. Valve mechanisms shall be flushed with each operation of valve; there shall be a minimum of two (2) drain ports.

Traffic feature shall have replaceable break-away Stainless Steel stem coupling-held to stem by readily removable type 304 stainless steel fastenings. Break-away flange or frangible lugs shall be designed to assure above ground break. Break-away or frangible bolts will not be acceptable.

Outlet nozzles shall be located approximately 18" above ground. Each hydrant shall have two (2) 2 1/2 inch nozzles 180 degrees apart with National (American) Standard Fire Hose Coupling Screw Thread NFPA 1963 and one (1) 4 1/2 inch pumper nozzle with national standard thread. Nozzles shall be threaded or cam-locked, O-ring sealed, and shall have type 304 stainless steel locking devices. Nozzle caps (without chains) and cap gaskets shall be furnished on the hydrant. The cap nut shall have the same configuration as the operating nut.
Fire Hydrants

Hydrant shall have Dry-Top Construction, factory lubricated oil or grease with the lubricant plug readily accessible.

Hydrant shall have double O-ring seals in a bronze stem sheath housing to assure separation of lubricant for water and shall have a weather seal, to provide complete weather protection.

**D-112.04 VALVE FACING** The main valve of the hydrant shall be SBR Rubber with a 90 Durometer hardness. The hydrant shall be equipped with a travel stop device located in the top of the hydrant which terminates the downward travel of the main rod. Travel stop devices in the form of a stop in the elbow of the hydrant which could allow the main rod to be put into compression if the hydrant is "over opened" will not be permitted.

**D-112.05 LOWER BARREL SECTION** The lower barrel section shall be made to conform with the section thickness requirements of AWWA Specification C-502-1973, or the latest revision thereof, and can be furnished in Gray Iron or Ductile Iron. Screwed on flanges are not acceptable.

**D-112.06 HYDRANT ADJUSTMENT** The hydrant must be capable of accommodating an extension piece at the ground line without shutting down the hydrant or excavating. No more than two (2) fire hydrant extensions will be permitted.

**D-112.07 OPERATING NUT** Hydrant operating nut and cap nuts shall be pentagonal shape 1 1/2" point to flat NST unless otherwise specified. The operating nut shall be a combination weather shield and functional operating device that will protect all operating parts from excessive moisture intrusion by means of an "O" ring seal.

**D-112.08 BREAK-AWAY STEMS** Break-away stem coupling shall be of stainless steel; its retaining pins, bolts, nuts, etc., of type 316 stainless steel, nuts shall be coated to prevent galling.

**D-112.09 SETTING FIRE HYDRANTS** Fire hydrants shall be located in a manner to provide accessibility and in such a manner that the possibility of damage from vehicles or conflict with pedestrian travel will be minimized. Unless otherwise directed, the setting of any hydrant shall conform to the construction drawings.

All hydrants shall stand plumb; those near curbs shall have the 4 1/2" nozzle facing the curb and perpendicular to it. The hydrant bury mark shall be located at ground or other finish grade; nozzles of all new hydrants shall be approximately 18" above grade. Lower barrel length shall not exceed 5 feet. No more than two (2) fire hydrant extensions will be permitted unless approved by the Utilities Engineer. Each hydrant assembly shall be connected to the water main by an anchor tee fully restrained, 6" ductile iron or PVC pipe fully restrained; a restrained 6" gate valve as per Section 110 shall be installed in the line for individual shutoff of each new hydrant.

The bonnet of the Fire hydrants on mains under construction shall be painted white. When the mains are accepted and placed in service this hydrant shall be repainted to original color.

**D-112.10 SUPPLEMENTAL DETAILS**

A. **HYDRANT OUTLET:** Each hydrant shall have two (2) 2 1/2" hose nozzles and one (1) 4 1/2"
pumper with National Standard Threads.

B. DIRECTION OF OPENING: Hydrant shall open by turning to the left (counterclockwise) and shall close by turning to the right (clockwise).

C. DRAIN OPENING: Each hydrant shall have two (2) external drain ports. Drain valve mechanisms that include springs or rods are not acceptable.

D. PAINT: The exterior surface of the hydrant shall be coated with a coating that shall meet or exceed the requirements of Federal Specification TT-C-494b. A second coat of water based or oil based enamel paint red in color will then be applied from the top of the hydrant to a point 18 to 20 inches below the center line of the pumper nozzle or down to the traffic safety flange connection at the ground line.

All interior surfaces, machined surfaces, such as the threaded portion of the stem or stem nut, which must fit closely with the adjacent parts, shall be coated with a coating that shall meet or exceed Federal Specification TT-C-494b. Stem surfaces contained within a lubricant reservoir and not in contact with potable water may be free of coating.

The interior and exterior of the hydrant shoe shall be coated with a fusion-bonded epoxy having a nominal dry film thickness of 8 mils, conforming to ANSI/AWWA C550-01, and certified to NSF 61.

E. IDENTIFICATION TAG: A brass identification tag shall be provided to each hydrant that is connected to a water main of 16” diameter or bigger. The tag shall be bolted down at the bonnet and the diameter of the main line shall be engraved.

F. FH MARKERS: Raised blue pavement markers shall be provided on public and private streets to indicate the locations of the fire hydrants. These markers shall be placed just off center to the side the fire hydrant is located.

D-112.11 MEASUREMENT Fire hydrants will be measured per each complete assembly.

D-112.12 PAYMENT Fire hydrants installation shall be paid for at the unit price bid per each, including fittings between the main line and the fire hydrant, anchor tee, gate valve, joint restraints, piping, brass identification tag, polyethylene wrapping, setting, adjusting to grade, and other appurtenances necessary for proper operation.
SECTION 116
HYDROSTATIC TESTS FOR PRESSURE MAINS

D-116.01 GENERAL

1. Summary

A. Measurement and Payment
   1. Separate payment will not be made for hydrostatic testing of water mains. Include costs for testing, repair of defects, and retesting required in this section in appropriate unit prices bid for water line construction.

   2. The costs associated with purchase of water to fill proposed lines for flushing, disinfecting, chlorination, dechlorination, and hydrostatic testing shall be paid by the Contractor. Said costs shall be subsidiary to the unit price bid for construction of appropriate size of water line.

2. Quality Assurance

A. Contractor shall perform hydrostatic tests on water lines in accordance to AWWA C600-93 and these specifications. Hydrostatic test must be performed in the presence of the City of Laredo Utilities Inspector.

3. Submittals

A. Submit in accordance with the Standard General Conditions and Supplementary Conditions.

   B. Copies of all testing results shall be submitted to the Engineer prior to acceptance of piping system.

D-116.02 PRODUCTS

1. Water

A. Water used to fill proposed lines, for flushing, for disinfection, and testing of lines shall be potable water from the City of Laredo. Contractor shall coordinate and contract with the City for a temporary construction meter to be located off an existing fire hydrant, if available; otherwise a temporary fire hydrant shall be furnished by the Contractor.

D-116.03 EXECUTION

1. General

A. Conduct pressure and leakage tests in accordance with Section 3 of AWWA C600 of these specifications. Contractor must notify City of Laredo Utilities Engineer 48 hours prior to pressure and leakage testing.

   B. Commence test procedures when following conditions met.

      1. Pipe section to be tested is clean and free of dirt, sand, or other foreign material.

      2. Pipe outlets plugged with test plugs. Plugs, pipes, fittings, and valves secured to prevent blowouts.

      3. Value of applied test pressure checked at each point in test section to ensure it does not exceed maximum allowable pressure of pipes, valves, fittings, and
appurtenances.

C. Safety: Perform pressure testing in accordance with OSHA requirements and in manner protecting worker, bystanders, and adjacent property.

D. Correct leaks defects, and retest until acceptable results obtained.

D-116.04 PRESSURE TESTS

A. Test pressures shall be as follows:
   1. Water Main Test Pressure: 150 psi at highest elevation in test section.

B. Test Procedure:
   1. Add water to expel air.
   2. Pressurizing equipment shall include regulator set to avoid over pressurizing and damaging otherwise acceptable line.
   3. Make test connection, subject main to normal water pressure, and examine for leaks.
   4. Apply test pressure by means of force pump of design and capacity that required pressure can be applied and maintained without interruption for duration of test.
   5. Measure test pressure by means of tested and properly calibrated pressure gauge.
   6. Maintain initial test pressure for sufficient length of time to permit inspecting piping under test, but not less than 30 min.
   7. In case repairs are required, repeat pressure test until pipe installation conforms to specified requirements.
   8. Perform final test at required test pressure for 4 hrs.

C. Water main considered to have failed pressure test if applied pressure drops 1 psi.

D-116.05 LEAKAGE TEST

A. Conduct pressure test and initial leakage test concurrently. Final leakage test may be waived by Engineer if found unnecessary to add water during duration of final pressure test.

B. Leakage defined as quantity of water to be supplied into newly laid pipe, or section thereof, necessary to maintain specified leakage test pressure after main has been filled with water and entrapped air expelled.

1. Leakage shall not exceed number of gph as determined by following formula for rubber-sealed joints.

   \[ L = \frac{ND(P)^{1/2}}{7,400} \]

   Where:
   
   \( L \) = allowable leakage in gallons per hour
   \( N \) = number of joints under test
   \( D \) = nominal diameter of main in inches
   \( P \) = average pressure in lbs./sq. in. gauge during leakage test
2. If section under test contains joints of various diameter allowable leakage will be sum of computed leakage for each size of joint.

C. Test Procedure:

1. Submit test section to approximately 150 psi gauge pressure at highest elevation of water main under test.
2. Conduct final leakage test for 4 hours.
3. Repair defects and retest until acceptable results obtained.

D-116.06 MEASUREMENT AND PAYMENT

There will be no separate measurement or payment for Hydrostatic Tests for Pressure Mains, all cost shall be included in the various bid items involved.
SECTION 118
DISINFECTION OF POTABLE WATER MAINS

D 118.01 GENERAL

1. Summary

A. Section Includes:
   1. Requirements for disinfection of new water mains and existing water mains which has
      been relocated or contaminated by construction operations.

B. Measurement and Payment:
   1. Include cost of work specified in this section in unit prices bid for construction of appropriate water line.
   2. Costs associated with purchasing of water to fill proposed line, for flushing, disinfecting, chlorination, dechlorination, and hydrostatic testing shall be paid for by the Contractor. Said costs are subsidiary to the unit price bid for construction of appropriate size water line.

2. References

A. American Water Works Association (AWWA):
   1. AWWA C651-92- Standard for disinfecting water main.

3. Submittals

A. Prior to starting disinfection work, furnish detailed outline of proposed sequence operation, manner of filling and flushing units, source and quality of water to be used, and disposal of wasted water.

B. Submit in accordance with the Standard General Conditions and Supplementary Conditions.

C. Copies of all test results shall be submitted to the Engineer prior to acceptance of piping system.

4. Quality Assurance

A. Regulatory Requirements:
   1. Disinfection work shall be acceptable to Engineer, and to the City of Laredo Regulations. All testing must be performed at the presence of the City of Laredo Utilities Inspector.

B. Source Quality Assurance:
   1. Perform work in connection with disinfection under direction of experienced supervisor.
   2. Use equipment in proper working condition and adequate for specified work.

D 118.02 PRODUCTS

1. Chlorine

A. Chlorine gas-water solution or direct chlorine feed is preferred for disinfection.

B. Use of high test calcium hypochlorite or tablet method of disinfection shall be approved by the Engineer.

C. Tablet form calcium hypochlorite may be used only for water mains up to 12" in dia. and less
than 2,500 ft in length.

2. Water

A. Water used to fill proposed lines, for flushing, and for disinfection and testing of lines shall be potable water from the City of Laredo. Contractor shall coordinate and contract with the City for a temporary construction meter to be located off and existing fire hydrant, if available, otherwise a temporary fire hydrant shall be furnished by the Contractor.

D 118.03 EXECUTION

1. General

A. Method of disinfection for water containment devices and piping systems shall conform to AWWA C 651. Contractor must notify City of Laredo Utilities Engineer 48 hours prior to disinfecting a pipe.

2. Chlorine Preparation

A. Liquid Chlorine:
   1. Apply chlorine gas-water solution by means of solution feed chlorinating device of, if approved by Engineer, dry gas may be fed directly through proper devices for regulating rate of flow and providing effective diffusion of gas into water within unit being treated.
   2. Provide chlorinating devices for feeding solutions of chlorine gas that prevent backflow of water into chlorine cylinder.

B. Calcium Hypochlorite:
   1. Prepare granular calcium hypochlorite as water mixture before introduction into unit. Make dry powder into paste and thin to approximately 1% chlorine solution.
   2. To prepare chlorine solution, add 1 lb. of calcium hypochlorite (65% to 70% available to 7 1/2 gal of water.

3. Pipeline Preparation

A. After pressure and leakage tests complete, flush units thoroughly to remove foreign material.
B. Release entrapped air at high points and fill units with disinfecting agent and water to allow disinfecting agent to come in contact with interior surfaces.
C. If complete venting cannot be accomplished through available outlets, provide necessary corporation cocks and vent piping.

4. Application of Disinfectant

A. Point of Application:
   1. Apply chlorinating agent at supply end of unit being disinfected.
   2. For pipes, apply disinfectant through corporation cock installed in top of pipe.
   3. Place tablets in accordance with AWWA C651.

B. Rate of Application:
   1. Introduce water at controlled rate in order to regulate chlorine dosage.
2. Proportion rate of chlorine mixture flow to rate of water entering unit so chlorine dose applied produces at least 25 mg/l chlorine residual after period of 24 hrs.

3. Method of determining rate of flow of water into unit being disinfected shall be approved by Engineer.

C. Isolating Systems:
1. Keep chlorine gas-water disinfecting solution and contaminated water from flowing into units previously chlorinated and flushed.

D. Quality:
1. Retain chlorinated water in unit long enough to destroy nonspore-forming bacteria.
2. Minimum retention period shall be 24 hrs with chlorine residual at end of this period of not less than 25 mg/l (ppm)

E. Disinfecting Valves:
1. Operate valves and appurtenances while line or unit is being disinfected to ensure surfaces of valves are disinfected.

F. Swabbing:
1. Flush and swap pipe, fittings or valves that must be placed in service immediately with 5% solution of calcium hypochlorite immediately prior assembly.
2. Secure approval from Engineer before using this method of disinfection.

G. Valve Operation:
Valves proposed for construction shall be operated by Contractor. Existing City valve shall be operated by City personnel only. Contractor shall coordinate opening or closing of City valves and the isolation of City water lines with the City of Laredo Water Utilities.

5. **Final Flushing and Test**

A. Following chlorination, flush unit or system until replacement water in system is proven to be comparable in quality to water which will enter unit or system.

B. Laboratory tests shall be performed at the City of Laredo Testing Labs and samples will be taken by the City of Laredo Water Utilities Inspector.

C. Repetition of Flushing and Testing:
1. If initial treatment results in unsatisfactory bacterial test, repeat disinfection until satisfactory results obtained.

D. Prevent entry of contaminated water into previously disinfected units or systems.

E. Contractor shall discharge water at acceptable chlorine level. Any cost associated with dechlorination shall be paid by Contractor.

**D-118.04 MEASUREMENT AND PAYMENT**

There will be no separate measurement or payment for Disinfection of Potable Water Mains, all cost shall be included in the various bid items involved.
SECTION 120
CONCRETE ENCASEMENT, CRADLES, SADDLES, AND COLLARS

D-120.01 DESCRIPTION: This Item shall govern for placing concrete encasement, cradles, saddles, and collars, when called for the Project plans or as directed by the Engineer.

D-120.02 MATERIALS: Concrete: All concrete shall, at a minimum, conform to the provisions of TxDOT Specifications, (Item 421) 2004 edition or latest revision, "Concrete" (Class B) or shall be of the class noted on the plans.

D-120.03 CONSTRUCTION METHODS:

1. Concrete Encasement: When concrete encasement is show on the plans or when directed by the Engineer, the trench shall be excavated and fine graded to a depth conforming with details and sections shown on the plans. The pipe shall be supported by precast concrete blocks of the same strength as the concrete for encasement and securely tied down to prevent floatation. Encasement shall then be placed to a depth and width conforming with details and sections shown on the plans.

2. Concrete Cradles: When concrete cradles are shown on the plans or when called for by the Engineer, the trench shall be prepared and the pipe supported in the same manner as described in this specification and shall be constructed in accordance with details and sections shown on the plans.

3. Concrete Saddles: When shown on the plans or when directed by the Engineer, pipe to receive concrete saddle shall be backfilled in accordance with TxDOT (Item No. 402) "Excavation, Trenching, and Backfill" to the spring line and concrete placed for a depth and width conforming with details and sections shown on the plans.

4. Concrete Collars: When shown on the plans or when directed by the Engineer, concrete collars shall be constructed in accordance with details and sections shown on the plans.

D-120.04 MEASUREMENT: "Concrete Encasement, Cradles, Saddles, and Collars", will be measured by the cubic yard of accepted work, complete in place. Reinforcing, if required, shall not be measured for payment.

D-120.05 PAYMENT: There will be no separate payment for Concrete Encasement, Cradles, Saddles, and Collars; all materials, manipulation, labor, tools, equipment, and incidentals necessary to complete the work shall be included in the various bid items involved.
Delete Section D-120.04 Measurement and replace with the following:

**D-120.04 MEASUREMENT:**

Concrete encasement, cradles, saddles, and collars will not be measured for payment and shall be considered subsidiary to the related work item.
SECTION 122
ADJUSTING VALVE BOXES TO GRADE

D-122.01 GENERAL: Section includes adjusting elevation of valve boxes to new grades.

D-122.02 REFERENCE:
A. ASTM C270 - Specification for Mortar for Unit Masonry.

PRODUCTS

D-122.03 CONCRETE MATERIALS:
A. For cast in place concrete, conform to requirements to Section 504- Concrete and Section 406 - Concrete Structures.
B. For mortar mix, conform to requirements of ASTM C270, Type S, using Portland Cement.

EXECUTION

D-122.04 EXAMINATION: Examine existing valve box for damage or defects that would affect adjustment to grade and report such damage or defects to the Utilities Engineer.

D-122.05 ESTABLISHING GRADE: Coordinate grade related items with existing grade and finished grade or paving.

D-122.06 ADJUSTING VALVE BOXES:
A. Salvage and reuse valve box, if in good condition.
B. Remove and replace 6-inch ductile iron or PVC riser pipe with suitable length for depth of cover required to establish the adjusted elevation to accommodate actual finish grade.
C. Reinstall valve box and riser piping plumbed in vertical position. The nut of the valve shall be centered. The drop cover shall be lettered "WATER". A 24"x24"x6” thick minimum concrete collar around the valve box shall be provided.

D-122.07 BACKFILL AND GRADING:
A. Backfill the area of excavation surrounding each adjusted valve box and compact according to requirement of Section 102 - Excavation and Backfill for Utilities.
B. Grade to ground surface to drain away from each valve box. Place earth fill around the valve box concrete slab, if the valve is outside of the pavement area.

D-122.08 MEASUREMENT AND PAYMENT: There will be no separate payment for Adjusting Valve Boxes to Grade; all materials, manipulation, labor, tools, equipment, and incidentals necessary to complete the work shall be included in the various bid items involved.
SECTION 128
DISPOSAL OF WASTE MATERIAL AND SALVAGEABLE MATERIAL

D-128.01 GENERAL: Section includes disposal of waste material and salvageable material.

D-128.02 SUBMITTALS:

A. Obtain and submit disposal permits for proposed disposal sites if required by local ordinances, TCEQ and/or EPA.

B. Submit a copy of written permission from a property owner, along with description of property prior to disposal of excess material adjacent to the Project. Submit a written and signed release from property owner upon completion of disposal work.

EXECUTION

D-128.03 SALVAGEABLE MATERIAL:

Excavated Material: when indicated on plans, load haul, and deposit excavated material at a location or locations shown on plans outside the limits of project.

Base, Surface, and Bedding Material: Local shell, gravel, bituminous, or other base and surfacing material designated for salvage.

Pipe Culvert: Load culverts designated for salvage into designated trucks.

Other Salvageable Materials: Conform to requirements of individual specification section.

Coordinate disposal of material with Environmental Services Director.

D-128.04 EXCESS MATERIAL:

A. Vegetation, rubble, broken concrete, debris, asphaltic concrete pavement, excess soil, and other materials not designated for salvage, shall become property of the Contractor and shall be removed from the job site and legally disposed of.

B. Excess soil may be deposited on private property adjacent to the project when written permission is obtained from property owner. See Paragraph 128.02B above.

C. Waste materials shall be removed from the site on a daily basis, such that the site is maintained in a neat and orderly condition.

D-128.05 MEASUREMENT AND PAYMENT: There will be no separate payment for waste material disposal; all materials, manipulation, labor, tools, equipment, and incidentals necessary to complete the work shall be included in the various bid items involved.
SECTION 130
DUCTILE IRON FITTINGS

D-130.01 DESCRIPTION: This item shall consist of grey-iron and ductile-iron fittings installation and adjustment installed in accordance with these specifications and as directed by the Engineer.

D-130.02 MATERIALS AND CONSTRUCTION:
1. Fittings: All fittings shall conform to American Water Works Association (AWWA) Standards for Grey-Iron and Ductile-Iron Compact Fittings, and AWWA Standard C-153 for Ductile Iron Compact Fittings, Class D, manufactured in the USA. Fittings 6 inches through 24 inches in size shall be mechanical joint type unless otherwise specified on the plans. Fittings shall be installed with the thrust blocking and/or joint restraint, as shown in the plans. Adapters shall be used where necessary to provide a transition between asbestos-cement pipe and the fittings. All bolts and nuts shall be stainless steel type 316, nuts coated to prevent galling. Ductile Iron Fittings and restraints shall be wrapped with standard 8 mil (minimum) low density polyethylene film or 4 mil (minimum) cross laminated high-density polyethylene meeting ANSI/AWWA Specification C-105 current, with all edges and laps taped securely to provide a continuous and watertight wrap. Repair all punctures of the polyethylene, including those caused in the placement of bedding aggregates, with duct tape to restore the continuous protective rap before backfilling.

2. Cleaning Ductile-Iron: All lumps, blisters, and excess coal-tar coating shall be removed from the ends of cast-iron fittings. The outside of the spigot and the inside of the bell shall be wire-brushed and wiped clean, dry, and free from oil and grease before the pipe is laid. The interior of the pipe shall be blown clean with compressed air or swabbed out clean and dry as directed by the Engineer. Immediately prior to placing any pipe in the trench, the interior shall be cleaned by an approved brush or swab or with compressed air to remove all dirt and foreign materials. All pipe and fittings shall be suspended above ground to be inspected for defects by the Contractor.

D-130.04 MEASUREMENT: Ductile-Iron Fittings will be measured per each complete assembly.

D-130.05 PAYMENT: Payment for Cast-Iron and Ductile Iron Compact Fittings will be included in the unit price bid for all types and sizes installed. Such payment shall also include excavation, selected embedment material, anticorrosion embedment when specified, backfilling, hauling and disposition of surplus excavated materials, polyethylene wrapping, asphaltic material for ferrous surfaces, all glands, nuts, bolts, gaskets and concrete reaction and thrust blocking and joint restraint systems.
SECTION 132
PIPE JOINT RESTRAINT SYSTEMS

D 132.01 GENERAL

1. Description
This specification covers pipe joint restraint systems to be used on domestic water mains for PVC C-900 pipe sizes 4-inch through 12-inch diameter and PVC C-905 pipe sizes 16-inch through 24-inch diameter, and for Ductile Iron pipe sizes from 4-inch through 24-inch diameter. Joint restraint systems are classified as “mechanical joint” or non-metallic restrained joint “for the specific type of pipe joint to be restrained.

D 132.02 PRODUCTS

1. General Requirements
A. Underwriter Laboratories (U.L) and Factory Mutual (FM) certifications are required on all restraint systems.

B. Unless otherwise noted, restraint systems to be used on PVC C-900 and C-905 pipe shall meet or exceed A.S.T.M. Standard F1674-96, “Standard Test Methods for Joint Restraint Products for Use with PVC Pipe,” or the latest revision thereof and shall be made in USA only. Restraint systems used on ductile pipe shall meet or exceed U.L. Standard 194 and shall be made in USA only.

C. Non-metallic restrained joint pipe and couplings shall be utilized specifically for C-900 PVC pipe and fittings in sizes 4”-12”, and for C-905 PVC pipe and fittings in size 16”.

D. Each restraint system shall be packaged individually and include installation instructions.

E. Each restraint system shall be wrapped with 8 mil. of polyethylene film with all edges and laps securely taped to provide continued wrap.

2. Specific Requirements:
A. Restrainer for PVC C-900/C-905 & Ductile Iron Push-on Type Connections:

1. Pipe restraints shall be utilized to prevent movement for push-on D.I. or PVC (C900&C905) (compression type) bell and spigot pipe connections or where a flexible coupling has been used to join two sections of plain-end pipe D.I. or PVC (C900&C905). The restrainer may be adapted to connect a plain end D.I. or PVC pipe to a ductile iron mechanical joint (MJ) bell fitting. The restrainer must not be directionally sensitive.
2. The pipe shall be restrained by a split retainer band. The band shall be cast ductile iron, meeting or exceeding ASTM A536-80, Grade 65-45-12. The inside face or contact surface of the band shall be of sufficient width to incorporate cast or machined non-directionally sensitive serration to grip the outside circumference of the pipe. The serration shall provide full (360 degrees) contact and maintain pipe roundness and avoid any localized points of stress. The split band casting shall be designed to “bottom-out” before clamping bolt forces (110ft-lb minimum torque) can over-stress the pipe, but will provide full non-directionally sensitive restraint at the rated pressures.

3. All T-head bolts, nuts and restraining rods shall be 316 Stainless Steel. Nuts coated to prevent galling.

4. The split ring type non-directionally sensitive restrainer system shall be capable of a test pressure twice the maximum sustained working pressure listed in section D and be for both D.I. and/or PVC C900.

5. Restraint systems sizes six through twelve inches shall be capable of use for both ductile iron and/or PVC C900.

6. The restraint system may consist of two types: the two split retainer rings and for new construction use only the one split and one solid cast backup ring.

B. Non-metallic restrained joint pipe and couplings for PVC C-900/C-905 Type Connections:

1. Gasketed restrained coupling connections shall join two sections of factory grooved PVC (C900/C-905) pipe, NSF 61. The restrainer coupling must not be directionally sensitive.

2. The coupling shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F-477 and shall be DR-14 Class 305 C-900 for 4” -12” pipe, meeting or exceeding the performance requirements of AWWA C-900, latest revision; and DR-18 C-905 for 16” pipe, meeting or exceeding the performance requirements of AWWA C-905, latest revision. The inside face or contact surface of the coupling connection shall be of sufficient width to incorporate a factory machined non-directionally sensitive groove in both pipe and coupling to grip the outside circumference of the pipe. The couplings shall provide full (360 degrees) contact and maintain pipe roundness and avoid and localized points of stress. The coupling shall be designed with an internal stop to align the precision-machined grooves in the coupling and pipe prior to installation of a non-metallic thermoplastic restraint spleen, and will provide full non-directionally sensitive restraint at the rated pressures.
3. High-strength flexible thermoplastic spleens shall be inserted into mating precision-machined grooves in the pipe and coupling to provide full non-directional restraint with evenly distributed loading.

4. The non-metallic restrained joint pipe and couplings for PVC C-900/C-905 type non-directionally sensitive restrainer system shall be capable of a test pressure twice the maximum sustained working pressure and be for PVC: C-900 pipe sizes four (4) through twelve (12) inch, and C-905 pipe size sixteen (16) inch.

5. Non-metallic restrained joint pipe and couplings for PVC C-900 restrained systems sizes four (4) through twelve (12) inches shall be capable of use for both (DR 18) and four (4) through eight (8) inches for (DR 14) PVC C900 pipe. Non-metallic restrained joint pipe and couplings for PVC C-905 restrained systems size sixteen (16) inches shall be capable of use for (DR 18) PVC C905 pipe.

6. The non-metallic restrained joint pipe and couplings for PVC C-900 restraint system and for PVC C-905 restraint system shall consist of a pipe and couplings system produced by the same manufacturer meeting the performance qualifications of Factory Mutual (FM) and Underwriters Lab (UL).

D. Fitting Restraint for Ductile Iron Pipe (Only):

1. Radial bolt type restrainer systems shall be limited to ductile iron pipe in conjunction with Mechanical Joint (MJ) bell end pipe of fittings. The system shall utilize a standard MJ gasket with a ductile iron replacement gland conforming to ASTM A 536-80. The gland dimensions shall conform to Standard MJ bolt circle criteria.

2. Individual wedge restrainers shall be ductile iron heat treated to a minimum hardness of 370 BHN. The wedge screws shall be compressed to the outside wall of the pipe using a shoulder bolt and twist-off nuts to insure proper actuating of the restraining system.

3. All bolts, nuts and restraining rods shall be 316 Stainless Steel. Nuts coated to prevent galling.

4. Standard MJ gasket shall be virgin SBR meeting ASTM D-2000 3 BA 715 or 3 BA 515.

E. Maximum Sustained Working Pressure Requirements:

<table>
<thead>
<tr>
<th>Nominal Diameter</th>
<th>PVC C-900 / C-905</th>
<th>Ductile Iron</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 &amp; 6 inch</td>
<td>305 psi</td>
<td>350 psi</td>
</tr>
<tr>
<td>8 inch</td>
<td>305 psi</td>
<td>250 psi</td>
</tr>
<tr>
<td>10 &amp; 12 inch</td>
<td>305 psi</td>
<td>200 psi</td>
</tr>
</tbody>
</table>
3. Tests:

The City of Laredo Utilities Department may, at no cost to the manufacturer, subject random joint restraint system products to testing by an independent laboratory for compliance with these standards. Any visible defect of failure to meet the quality standards herein will be ground for rejecting the entire order.

4. Product List:

The attached qualified product list identifies specified manufacturers models approved for installation in City of Laredo water distribution systems.

Recommended Manufacturers and Models: (Subject to Review & Approval by City of Laredo)

A. Slip on Joint Restraint Systems:

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>MATERIAL</th>
<th>PVC C-900/C-905</th>
<th>Ductile Iron</th>
<th>D.I. 16” Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ford/Uni-Flange (4” - 16”)</td>
<td></td>
<td>1390C</td>
<td>1390C</td>
<td>1390C</td>
</tr>
<tr>
<td>EBBA Iron Sales, Inc (4” - 12”)</td>
<td></td>
<td>1500</td>
<td>1700</td>
<td>1700</td>
</tr>
<tr>
<td>Romac Industries, Inc. (4&quot; - 8&quot;)</td>
<td></td>
<td>Model 611</td>
<td>Model 611</td>
<td>470SJ</td>
</tr>
</tbody>
</table>

B. Non-Metallic Restrained Joint Pipe and Couplings for PVC C-900/C-905 RJ Type Connections:

- Certain Teed Corporation, Certa-Lok C-900/RJ
  - 4” – 12” Class 305 (DR-14)

  Certa-Lok C-905/RJ
  - 16” Class 235 (DR-18)

D. Fitting Restraint (MJ):
### MANUFACTURER

#### MATERIAL

<table>
<thead>
<tr>
<th></th>
<th>PVC C-900/C-905, DR-14/DR-18</th>
<th>Ductile Iron</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBBA Iron Sales, Inc.</td>
<td>2000 PV (Only C-900)</td>
<td>Megalug1100</td>
</tr>
<tr>
<td>Ford/Uni-Flange</td>
<td>UFR-1500-C 14”- 24”</td>
<td>Series 1400</td>
</tr>
<tr>
<td>Star Pipe Products (Domestic)</td>
<td>StarGrip Series 4000 (3”-12”)</td>
<td>StarGrip Series 3000 (3”-12”)</td>
</tr>
</tbody>
</table>

**E. Restrained Flange Adapters:**

<table>
<thead>
<tr>
<th></th>
<th>PVC C-900</th>
<th>Ductile Iron</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBBA Iron Sales, Inc.</td>
<td>2100 Megaflange</td>
<td>2100 Megaflange</td>
</tr>
<tr>
<td>Ford/Uni-Flange</td>
<td>900</td>
<td>200, 400, 420</td>
</tr>
</tbody>
</table>

**D 132.03 MEASUREMENT AND PAYMENT:** There is no pay item for joint restraint systems. The cost of furnishing and installing joint restraints shall be included with and considered fully subsidiary to the unit bid price of the items that they restrain: pipe, valves, fittings, Etc.
SECTION 134
FLOWABLE BACKFILL
(Controlled Low Strength Material)

D-134.1 Description: Furnish and place flowable backfill for trench, hole, or other void without consolidation.

D-134.2 Materials.

A. Cement. Furnish cement conforming to D-504.02

B. 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 the aggregate gradation chart below.

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4 in.</td>
<td>100</td>
</tr>
<tr>
<td>No. 200</td>
<td>0–30</td>
</tr>
</tbody>
</table>

Test fine aggregate gradation in accordance with Tex-401-A. Plasticity Index (PI) must not exceed 6 when tested in accordance with Tex-106-A.

C. Mixing Water. Use mixing water conforming to the requirements of TxDot Item 421, “Hydraulic Cement Concrete.”

D-134.3. Construction. Submit a construction method and plan, including mix design and shrinkage characteristics of the mix, for approval. Provide a means of filling the entire void area, and be able to demonstrate that this has been accomplished. Prevent the movement of any inserted structure from its designated location. If voids are found in the fill or if any of the requirements are not met as shown on the plans, remove and replace or correct the problem without additional cost to the City of Laredo. Unless otherwise shown on the plans, furnish a mix meeting the requirements of Sections 134.3.A, “Strength,” and 134.3.B, “Consistency.”

A. Strength. The 28-day compressive strength range, when tested in accordance with Tex-418-A, must be between 80 psi and 150 psi unless otherwise directed. 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.

B. Consistency. Design the mix to be placed without consolidation and to fill all intended voids. Fill an open-ended, 3-in.-diameter-by-6-in.-high cylinder to the top to test the consistency. Immediately pull the cylinder straight up. The correct consistency of the mix must produce a minimum 8-in.-diameter circular spread with no segregation. When necessary, use specialty type admixtures to enhance the flowability, reduce shrinkage, and reduce segregation by maintaining solids in suspension.
Mix the flowable fill using a central-mixed concrete plant, ready-mix concrete truck, pug mill, or other approved method. Cure test specimens in accordance with Tex-447-A. The laboratory will sample, make, and test all specimens.

**D-134.4 Placement**

The controlled low strength material shall be placed directly into the excavation. The CLSM shall be placed in a uniform manner that will prevent voids in or segregation of the material. Foreign material which falls into the trench prior to and during placing of the CLSM shall be immediately removed. The CLSM shall have consistency, workability, plasticity, flow characteristics and pumpability (when required) such that the material when placed is self-compacting.

Mechanical compaction or vibration may be used to consolidate around structures, pipes, multiple conduits, etc. when directed by the engineer, otherwise no mechanical compaction or vibration shall be required.

When CLSM is used for backfill around water or sanitary sewer pipes install zero PI sand or gravel 12” above the top of the pipe. When CLSM is used for backfill around conduits, the CLSM shall be placed equally on both sides of conduit to prevent lateral displacement. Also, the CLSM shall be placed in lifts. The height of each lift shall not exceed the depth that will cause floating of the pipe or conduit. When placing the CLSM in greater lift depths, sufficient anchorage shall be provided so the pipe or conduit will not float.

The minimum clear distance between the outside of the pipe or conduit and the side of the excavation (each side) shall be 12 inches.

When CLSM is used behind retaining walls, the depth of each lift shall be limited so it will not induce hydraulic loads greater than the design loads.

For long trenches or installations which require a large amount of CLSM, bulkheads of wood, dirt, sand bags, etc. can be used to control the material’s flowability. The bulkhead shall be removed prior to the continuation the backfilling.

A minimum of 24 hours shall elapse prior to backfilling the remaining portion of the trench with other backfill material in accordance with Section 102, “Excavation and Backfill for Utilities”.

**D-134.5 Measurement:** This item will be measured by the cubic yard of material placed when indicated as a separate pay item. Measurement will not include additional volume caused by slips, slides, or cave-ins resulting from contractor’s operations.

**D-134.6 Payment:** When indicated as a separate pay item, the materials furnished and work performed will be paid for at the unit price bid as measured. This price is full compensation for furnishing, hauling, placing the materials, equipment, tools, labor, and incidentals. When the Project Manual, plans or other specifications indicate the use of flowable backfill as incidental to another pay item, no direct payment for the material will be made.
**SECTION 136**

**CEMENT-STABILIZED BACKFILL**

**D-136.1. Description:** When shown on the plans, backfill the excavation to the bottom of pavement base with cement-stabilized sand or caliche.

**D-136.2 Materials:**

A. **Cement:** Cement shall consist of Type I Portland Cement conforming to ASTM C150

B. **Sand:** Zero P.I. sand as aggregate for cement-stabilized backfill. Use only approved aggregate up to the bottom of existing pavement section base.

C. **Caliche**

D. **Water:** Water shall be clean and clear, free of oils, acids, alkalis, organic matter or other deleterious substances and shall conform to the requirements of ASTM C94.

**D-136.3 Execution:**

Sand/caliche-cement Mixture Product. The mixture shall consist of a minimum of two (2) sacks of Portland cement per cubic yard based on the dry weight of the aggregate. The mixture shall contain sufficient water to hydrate the cement (not flowable).

The cement, sand/caliche and water shall be mixed in a pugmill type mixer, which meets the approval of the Engineer. It shall be mixed for a minimum period of two minutes per batch. No mixing will be allowed on street surface.

**D-136.4 Placement:**

Place cement-stabilized backfill equally along the sides of structures to prevent strain on or displacement of the structure. Fill voids when placing cement-stabilized backfill. Use hand operated tampers if necessary to fill voids.

The sand cement mixture shall be placed in maximum eight (8) inch thick lifts, loose measure, and thoroughly rodded and tamped around the pipe, boxes, structures, bridge approaches and paving sections. Placement and compaction shall be performed in a manner that will thoroughly fill all voids without placing undue strain on or displacement of the structure.

Cement stabilized sand backfill below the top of sewers, manholes, inlets or other structures shall be placed equally along all sides of the structure. Cement stabilized sand backfill/bedding shall be placed in a manner that will completely fill all voids in the trench. Should compaction be required to fill all voids in the areas described, hand operated tampers may be used.

Materials not placed and not compacted within four (4) hours after mixing shall be rejected.

Do not place or compact sand/caliche-cement mixtures in standing or free water.

**D-136.5 Performance:**
Random samples of the delivered product will be taken in the field at the direction of the Engineer and tested. A minimum of one (1) sample per week or job shall be taken at random to represent a production that is less than one hundred (100) tons per week. Two (2) samples per week shall be taken at random to represent a production greater than one hundred (100) tons per week. The Engineer shall have the option to obtain additional samples for testing.

**D-136.6 Measurement:** When specified or shown on the plans as a pay item will be measured by the cubic yard. Measurement will not include additional volume caused by slips, slides, or cave-ins resulting from contractor’s operations

**D-136.6 Payment:** When indicated as a separate pay item, the materials furnished and work performed will be paid for at the unit price bid as measured. This price is full compensation for furnishing, hauling, placing the materials, equipment, tools, labor, and incidentals. When the Project Manual, plans or other specifications indicate the use of cement stabilized sand as incidental to another pay item, no direct payment for the material will be made.
SECTION 140
CUT, PLUG, AND ABANDONMENT OF WATER LINES

PART 1   GENERAL

1.01   SECTION INCLUDES

   A. Cut, plug, and abandonment of water lines.

1.02   MEASUREMENT AND PAYMENT

   A. Unit Prices:

   B. Payment for cut, plug, and abandonment of water lines is on a unit price basis for each cut, plug, and abandonment performed.

   C. Refer to Section C-9 – Measurement and Payment.

1.03   SUBMITTALS

   A. Submit product data for proposed plugs and clamps for approval.

PART 2   PRODUCTS

2.01   MATERIALS

   A. Concrete for Reaction Blocks: conforming to requirements of Section 104 – PVC Water Pipe.

   B. Plugs and Clamps: Applicable for type of pipe to be plugged.

PART 3   EXECUTION

3.01   APPLICATION

   A. Do not begin cut, plug, and abandonment operations until replacement water line has been constructed, disinfected, and tested, and service lines have been transferred to replacement water line.

   B. Install plug, clamp, and concrete reaction block and make cut at location shown on Drawings.

   C. Main to be abandoned shall not be valved off and shall not be cut or plugged other than at supply water line or as shown on Drawings.

   D. After water line to be abandoned has been cut and plugged, check for other sources feeding abandoned water line. When sources are found, notify the City immediately. Cut and plug abandoned water line at point of other feed as directed by the City.

   E. Plug or cap ends or openings in abandoned water line in manner approved by the City.
F. Remove and dispose of surface identifications such as valve boxes and fire hydrants. Valve boxes in improved streets, other than shell, may be filled with concrete after removing cap.

G. Backfill excavations in accordance with Section 102 - Excavation and Backfill for Utilities.

H. Restore surface.

END OF SECTION
WET CONNECTIONS TO EXISTING WATER LINES

SECTION 142
WET CONNECTIONS TO EXISTING WATER LINES

PART 1   GENERAL

1.01   SECTION INCLUDES

   A. Making wet connections to existing water lines.

1.02   MEASUREMENT AND PAYMENT

   A. Measurement: Wet connections to existing water lines shall be per each for each pipe diameter.

   B. Payment for wet connections to existing water lines shall include all labor, equipment, and materials to perform wet connections as indicated in the Drawings.
SECTION 202
PVC SEWER PIPE

D-202.01. GENERAL

1. Submittals:

A. Test Results: Include results of tests with shipment of materials. Furnish 2 additional copies of test results to Engineer.

B. Submit in accordance with the Standard General Conditions and Supplementary Conditions.

C. Contractor shall submit all final testing reports for deflection testing and for low pressure air testing of sewer pipe in accordance with Section B- Testing Sewer Systems.

D. Any deviations from the standards shall be approved by the Director of Utilities in writing.

D-202.02. PRODUCTS

1. Polyvinyl Chloride (PVC) Sewer Pipe

A. All 4”- 15” PVC Sewer Pipe and Fittings used in this contract shall be made of plastic, meeting the requirements of: ASTM D3034. All 4”- 15” PVC sewer pipe, service saddles and fittings shall be SDR- 26. All 18”- 27” PVC Sewer Pipe and Fittings used in this contract shall be made of plastic, meeting the requirements of: F679, PS-115.

B. Fittings:

1. Fittings such as saddles, elbows, tees, and wyes shall be of material and construction corresponding to and have joint design compatible with adjacent pipe.

2. Provide submittals for approval of adapters for transitions to other types of pipe.

C. Pipe Joints:

1. Rubber Gasket: Bell and spigot joint, sealed by a rubber gasket so assembly will remain watertight under conditions of service including movements resulting from expansion, contraction, settlement, and deformation of pipe. Gaskets shall conform to ASTM C361.

D. Pipe Markings: Mark at intervals of 5 feet or less with following.

1. Manufacturer's name or trademark.
2. Nominal pipe size.
3. PVC cell classification, for example 12454-B.
4. Legend, "Type PSM SDR-26 PVC Sewer Pipe".
5. ASTM D3034
6. Extrusion date, period of manufactured or lot number.
E. Fitting Markings

1. Manufacturer's name or trademark.
2. Nominal size.
3. Material designation "PVC".
4. PSM type.
5. ASTM D3034

F. Dimensions:

1. Dimensions of pipe shall be in accordance with Table 1, except wall thickness may be not less than 97% of specified minimum.

2. Average wall thickness shall meet minimum wall thickness requirements of Table 1.

<table>
<thead>
<tr>
<th>PIPE SIZE (IN)</th>
<th>AVERAGE O.D. (IN)</th>
<th>NOM. I.D. (IN)</th>
<th>MIN. T. (IN)</th>
<th>MIN. E (IN)</th>
<th>MIN. D (IN)</th>
<th>APPROX. WEIGHT (LBS/FT)</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>4.215</td>
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<td>4.863</td>
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<td>6</td>
<td>6.275</td>
<td>5.793</td>
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<td>7.239</td>
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<tr>
<td>8</td>
<td>8.400</td>
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<td>4.75</td>
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<td>10</td>
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<td>9.692</td>
<td>0.404</td>
<td>6.00</td>
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<td>11.538</td>
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<td>15</td>
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<td>0.588</td>
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<td>* 30 or greater, submit for approval</td>
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</table>

TABLE 1
PVC SEWER PIPE DIMENSIONS

SDR 26 (PS 115) ASTM D3034

<table>
<thead>
<tr>
<th>PIPE SIZE (IN)</th>
<th>AVERAGE O.D. (IN)</th>
<th>NOM. I.D. (IN)</th>
<th>MIN. T. (IN)</th>
<th>MIN. E (IN)</th>
<th>MIN. D (IN)</th>
<th>APPROX. WEIGHT (LBS/FT)</th>
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<tbody>
<tr>
<td>18</td>
<td>18.071</td>
<td>17.261</td>
<td>0.671</td>
<td>8.00</td>
<td>21.581</td>
<td>28.49</td>
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<tr>
<td>21</td>
<td>22.047</td>
<td>20.349</td>
<td>0.791</td>
<td>9.50</td>
<td>25.443</td>
<td>----</td>
</tr>
<tr>
<td>24</td>
<td>24.803</td>
<td>22.891</td>
<td>0.889</td>
<td>9.60</td>
<td>28.627</td>
<td>----</td>
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<tr>
<td>27</td>
<td>27.953</td>
<td>25.799</td>
<td>1.002</td>
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<td>32.261</td>
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<td>PS 115, ASTM F679</td>
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<th>MIN. T. (IN)</th>
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* 30 or greater, submit for approval

2. Source Quality Control

A. Testing:

1. Tests conducted by approved testing agency shall be performed to determine the following.
a. Pipe dimensions:
   1) Average outside diameter.
   2) Average inside diameter.
   3) Minimum and average wall thickness.
b. Pipe stiffness at 5% deflection.
c. Pipe flattening for PVC sewer pipe: Deflect pipe to 60% deflection. Remove load and examine specimen for evidence of splitting, cracking or breaking.

2. Conduct tests on random sampling basis covering representative extrusion dates making up Project of each individual pipe size.

3. Tests reports shall show results of these tests and conformance to ASTM requirements.

**D 202.03 EXECUTION**

1. **Installation**

   A. Trench, backfill, and compaction shall be done in accordance with Section 102, "Excavation and Backfilling for Utilities".

   B. Rubber Gasket Joint:
      1. Immediately before making joint, lubricate outside of gasket and inside of bell of groove of last pipe with approved manufacturer lubricant.
      2. Assure gasket and ends of pipe are clean and free of sand and gravel.
      3. Introduce spigot or tongue of pipe being laid, with gasket in place, into bell or groove end of previously laid pipe.
      4. Carefully set pipe to line and grade, and join pipes per manufacturer recommendations.
      5. Use jack or "come-along" to ensure joints are tights.

2. **Field Quality Control**

   A. Pipe shall be subject to rejection for failure to conform to requirements of Specifications or following:
      1. Any fractures or cracks.
      2. Chips or imperfections.
      3. Defects indicating improper proportioning, mixing, and molding.
      4. Variations of more than 1/8 in./lin.ft. in alignment of pipe intended to be straight.
      5. Damaged ends, where such damage prevents making satisfactory joint.
      7. Manufactured date exceeding one year.

   B. Specially fabricated fittings, stubs, or pipe sections, shall be submitted for approval by Engineer prior to manufacture.

3. **Measurement**

   PVC sewer pipe will be measured for payment in linear feet for the various sizes and types
shown on the plans along the horizontal centerline of the pipe no deduction will be made for manholes or fittings.

4. **Payment**

Plastic sewer pipe will be paid for at the unit price per linear foot, complete in place, as provided in the proposal and contract. The contract price per linear foot shall be the total compensation for furnishing of all labor, materials, tools, equipment, and incidentals necessary to complete the work, including excavation, granular embedment material, backfill, and disposal of surplus materials, in accordance with plans and specifications.
SECTION 206
SERVICE CONNECTION

D-206.01 DESCRIPTION: This Specification shall govern for the furnishing, excavating, laying, or placing, and backfilling, shoring, and other operations necessary to the installing of all sanitary sewer services.

D-206.02 MATERIALS:

1. Polyvinyl Chloride (PVC)

PVC pipe and fittings 6 inch (6”) through 12 inch (12”) diameter shall be in accordance with Section 102.

2. Flexible tap saddles

Flexible 6” tap saddles shall be made of PVC meeting the requirements of ASTM D 5926 and shall be used on existing clay sewer pipe only.

D-206.03 EXECUTION: Sewer connections shall be provided for each dwelling and lot to be served and shall be a minimum of 6 inch (6") diameter. The location of each sewer connection shall be clearly in the construction drawings by indicating northing and easting. The as built plans shall include the location of each sewer connection by clearly indicating northing, easting and elevation.

All new sewer construction shall include pre-manufactured wyes for sewer connections according to Detail No. 206-1 thru 206-3. Saddles will only be allowed for connection to existing sewer lines. Saddles shall be installed by cutting the pipe with a tapping machine. Connection shall be either with a saddle tap or a slip-line taps according to Detail No. 206-4.

Service connection branches shall be plugged with a pipe stopper manufactured for such service. The stopper shall be capable of sustaining without failure or leakage.

The lowest floor elevation of any structure to be served by gravity shall be a minimum of four feet (4’) above the invert elevation of its sewer connection at the sewer main.

For existing structures, connection to the public sewer with plumbing fixtures located on a floor of the structure that is not four feet (4’) or more above the sewer main as specified above shall not be allowed unless a written waiver is obtained from the Utilities Department Director or a pumping operation is utilized.

Sewer connections shall not be tied directly into an interceptor sewer (18” or greater) unless specifically approved by the Utilities Director.
The minimum and maximum slope for a 6” sewer lateral shall be 0.50% and 12.35% respectively. The following are not permitted:

1) Attaching sewer service connections to the vertical portion of the cleanout constructed at the property line or easement line.
2) Drop connections on the portion of the lateral in the right of way or in a sanitary sewer easement.

For projects involving the construction of new sewer mains, the sewer lateral to the property line or easement line shall be constructed and tested with the sewer mains.

After acceptance by the City, the plumbing contractor shall construct the sewer lateral from the building to the tested sewer lateral, then construct a cleanout at the property or easement line and connect it to the tested portion of the lateral.

When specifically approved by the Director, a portion of the cleanout at the property line or easement line to within three feet (3’) of the ground surface and a portion of the sewer lateral on the private property past any utility easements may be constructed and tested with the sewer mains, provided that a means of protecting the cleanout and/or extended sewer lateral is provided.

A sanitary sewer lateral table shall be included in the construction plans. The table will include stationing, the inverts of the lateral at the main and elbow, invert at the property or easement line, and depth at the property or easement line as well as Northing and Easting.

**D-206.04 CLEANOUTS:** A six-inch (6”) cleanout shall be provided at one foot (1’) from the property line within the R.O.W or easement line for each service connection.

Lateral backwater valves shall be installed on sewer laterals serving buildings with basements or floors located below the top of the wet well elevation of the nearest wastewater pumping station.

Connection of roof downspouts, exterior foundation drains, areaway drains, basement drains and other sources of surface runoff and groundwater directly or indirectly to a sanitary sewer is prohibited.

**D-206.05 BACKFILL:** All trenches and excavations in this section shall be in accordance with, Section 102.

**D-206.06 CONCRETE CUSHION, CRADLE, OR PROTECTION:** Concrete cradle, cushion, or protection where required, shall be constructed as shown on the plans. Where a condition arises which requires the installing of such concrete cushions or cradle or protection, not shown on the plans, such installation shall be made only on the written instructions of the Engineer; such instruction shall designate the location, shape, type, and manner of construction.
Where concrete cradle or cushion is constructed beneath the sewer pipe, the sub-grade shall be prepared to the dimensions and form as shown on the plans. Concrete cradle, cushion, or protection shall be placed in a dry trench unless, in the opinion of the Engineer, such a method is not practicable. Where the concrete is placed in a wet trench the work shall be done strictly as directed or approved by the Engineer.

**D-206.07 MEASUREMENT:** All sewer laterals, and stubs, shall be measured in accordance with the above specifications per each complete in place, of the size, type, depth constructed, and accepted by the Engineer. Concrete cradle or concrete encasement protection will be measured by the linear foot along the center of the pipe where it has been installed in accordance with the details shown on the plans.

**D-206.08 PAYMENT:** All sewer laterals, and stubs, shall be paid for at the unit price bid per each complete in place, of the size, type, and depth constructed, which price shall be full compensation for furnishing all labor, material, and equipment, for all hauling, excavation, shaping of trench bottom, bracing, sheeting, for all installation, backfilling, tamping of backfill, and for all clean-up and incidentals necessary to furnish sewer services complete in place.
SECTION 208
FIBERGLASS REINFORCED PLASTIC MANHOLES

D-208.01 MATERIALS
Fiberglass reinforced plastic manholes shall be in accordance with ASTM D3753 “Glass Fiber- Reinforced Polyester Manholes” and the requirements of this specification. The inside diameter of the manhole barrel shall be either 48” or as indicated in the plans. A concentric reducer over the barrel shall have an inside diameter of 30 inches. The minimum wall thickness for all manholes regardless of depth shall be ½” (.480”).

D-208.02 GOVERNING STANDARDS
1. ASTM D3753 - Standard specifications for glass fiber reinforced polyester manholes.
2. ASTM D2412 - Test method for external loading properties plastic pipe by parallel-plate loading.
3. ASTM C581 - Practice for determining chemical resistance of thermosetting resins.
4. ASTM D2584 - Test method for ignition loss of cured reinforced resins.
5. ASTM D695 - Test method for compressive properties of rigid plastics.
7. ASTM D2583 - Test methods for indentation hardness of rigid plastics by means of barcol impressor.

The contractor shall furnish the manufacturer’s certificate that the material meets the standards set forth herein. All fiberglass manhole sections shall be identified with the manufacturer’s name, identification number, and manhole length.

Fiberglass – Reinforced Polyester Manholes shall include a 6’ X 6’ reinforced concrete collar in accordance to Detail 208-4.

D-208.03 MANHOLE RINGS AND COVERS
All manhole rings and covers for streets shall have a clear opening of no less than 30” labeled SANITARY SEWER and CITY OF LAREDO with emblem (EJIW 41430043A01 or approved equal) and shall have the seating surface of ring machined to secure a snug fit.

The castings for manhole rings and covers shall be as detailed on drawings. They shall be grey iron castings boldly filleted at angles and the rises shall be sharp and perfect. The casting shall be true to pattern, form, and dimensions, free from cracks, sponginess, blow holes, or other pouring faults affecting their strength and value for the service intended. Surfaces of the castings shall bee free from burnt on sand and shall be reasonable smooth. Runners, risers, fins, and other cast-on places shall be removed from the surface.

D-208.04 EXCAVATION
The contractor shall be all necessary excavation for the various manholes. Such excavation shall be of sufficient size as to permit the proper installation of the base and wall forms, and allow room for stripping of such forms. All such excavation shall conform to the size and dimensions as shown on the drawings, plus a maximum of four (4) feet to permit working room. Care shall be taken to insure that the excavation is not carried to a greater depth that required. If it becomes necessary to shore the walls and also permit the construction of the manhole itself without necessitating the removal of any
shoring until such time as the entire manhole is completed. No shoring shall be left or back filled around, unless authorized by the Engineer. Shoring shall remain in place for at least twenty-four (24) hours after the masonry or concrete work has been completed.

D-208.05 GENERAL CONSTRUCTION METHODS
All manhole work shall be completed and finished in a careful and workmanlike manner, special care being given to sealing the joints around all pipe that extend through the wall of the manhole. Joints for sewer pipe for line and drop connections in sizes 8”-15” shall be made by means of InsertaTee watertight compression connection or approved equal as shown in the plans and details. Install in accordance with the manufacturer’s written instructions. Connections for pipe larger that 15” shall be made using a pre-approved connection. Install in accordance with the manufacturer’s written instructions after finishing of wall has additional concrete to shape or form on the drawing. Where old manholes are to be adjusted to meet new lines and grades, all old masonry or concrete shall be thoroughly cleaned and wetted before joining any new masonry or concrete to it. All work on manholes shall be done in a workmanlike manner and in conformity with the usual practice used for such work. All materials for adjusting old manholes shall conform to the requirements set out in these specifications for manhole work.

D-208.06 BACKFILLING
The backfilling around the outside of manholes shall commence as soon as the concrete or masonry has been allowed to cure the required time and the forms and shoring have been removed. Such backfill shall be placed in layers of not more than six inches and shall be thoroughly tamped before the next layer is installed. It is anticipated that the backfilling shall be either hand or mechanically tamped. Whichever method is used, care must be exercised to insure that the backfill is thoroughly compacted to the density shown on the drawings. When a density is not shown on the drawings, compaction shall be 90% standard proctor density (ASTM D-690). Unless shown otherwise on the drawings suitable material selected from the excavation shall be used for backfill. Material must be subject to approval by the Engineer.

D-208.07 DROP MANHOLES
Drop manholes shall consist of construction of a standard sanitary sewer manhole with one standard drop connection on one side only when 24 inches above the manhole invert, as shown in the detail drawings. All material used in the drop connection shall conform to the requirements of the pertinent specifications.

D-208.08 MEASUREMENT
This item will be measured by each individual structure completed. The depth will measure from the flow line to the top of the rim. The size shall be the nominal inside diameter. This item includes but, is not limited to the following:
① Structural Excavation;
② Loading, hauling, and disposing of all excess material;
③ Furnishing all labor and materials;
④ Placing and compacting all backfill;
⑤ Final Grading.

D-208.09 PAYMENT
This item will be paid for at the Contract unit price bid per each structure for the various sizes, types and various depths of manholes complete and in place as shown in the drawings and specified herein.
SECTION 210
CONCRETE MANHOLES

210.01 DESCRIPTION: This item shall govern construction of manholes complete in place and the materials used therein, including excavation, installation, backfilling and surface restoration. It shall also include furnishing and installing rings, covers, appurtenances and any pumping, and drainage necessary to complete work. Wastewater manholes shall be acceptance tested by the Contractor.

The Contractor shall submit descriptive information and evidence that the materials and equipment the Contractor proposes for incorporation into the Work is of the kind and quality that satisfies the specified functions and quality.

MATERIALS

210.02 MATERIALS and COMPONENTS:

(1) Cast in place concrete shall be Class A, and precast concrete shall be Class I. All interior surfaces of wastewater manholes shall have a solvent-free 100% solids, ultra high build epoxy coating (Raven 405, Standard epoxy coating 4553, Reliner MSP, Carboline plasite 4500S) or be otherwise acceptably protected from the acidic effects of municipal wastewater. Backfill or over excavated areas shall be in accordance with Section 102.

(2) Mortar: Mortar shall be composed of one part Portland cement, one part masonry cement (or ¼ part hydrated lime), and sand equal to 2-1/2 to 3 times the sum of the volumes of the cement and lime used. The sand shall meet the requirements for “Fine Aggregate” as given in Section 406 “Concrete for Structures”.

(3) Reinforcement: Reinforcing steel shall conform to the requirements of Section 410, “Reinforcing Steel”. Secondary, non-structural steel may be replaced by collated fibrillated polypropylene fibers acceptable to the Engineer in cast-in-place wastewater manholes.

(4) Brick: Brick for ring adjustment courses or for wastewater manholes shall be prohibited.

(5) Ring and Covers: Rings and covers shall conform to the requirements as described on the Std. Details.

   Replacement Rings and Covers, 30” (clear opening) diameter Lids: This ring and cover shall be used for the replacement of broken rings and covers, Minor Manhole Adjustment, or as otherwise directed by the Engineer.

   Rings and Covers, 30” (clear opening) diameter Lids: This ring and cover should be used for all new manhole construction, except as otherwise directed by the Engineer.

(6) Pipe-to-Manhole: Precast bases shall have flexible, resilient and non-corrosive boot connector’s or ring water stops acceptable to the Engineer confirming to the requirements of ASTM C 923 on all wastewater pipe connections.
Concrete Manholes

(7) Precast Grade Ring: Rings shall be reinforced Class A concrete

Precast Grade Rings, 30-1/2” Inside Diameter: This adjustment ring shall be used only for adjusting existing manholes with 30 inch lids and for Wastewater Access Device. Inside to outside diameter dimension of ring shall be 6” with a thickness of 3” to 6”.

Precast Grade Rings 35” Inside Diameter: This adjustment ring shall be used for new manhole construction with 32” lids. Inside to outside dimensions of ring shall be 6” with a thickness of 4” to 6”.

(8) New manhole Construction and Minor Manhole Adjustment:

New manhole construction and minor manhole adjustments shall be performed as indicated on plans and shall consist of adding precast reinforced concrete rings to adjust the manhole to final grade.

For new manhole construction, the maximum vertical allowable ring adjustment shall be limited to 12” (the maximum includes the depth of the ring casting). For existing manhole adjustments that fall within the limits of overlay and street reconstruction projects, the maximum vertical allowable shall be limited to two feet (the maximum includes the depth of the ring casting). All other existing manholes shall have a maximum allowable ring adjustment of one foot (the maximum includes the depth of the ring casting). Any adjustment that will exceed these requirements shall be accomplished as indicated on the standard detail, and as described below in (9) “Major Manhole Adjustment”. All manholes located in flooded areas shall have bolted down covers and vents in accordance with TCEQ requirements.

(9) Major Manhole Adjustment:

Any adjustment that exceeds the requirements of 18” adjustments shall be accomplished as indicated on plans and shall consist of any combination of removing the concrete rings, and/or the manhole cone section, and/or the straight riser section of the manhole to bring the manhole to final grade. All manholes located in flooded areas shall have bolted down covers and vents in accordance with TCEQ requirements.

(10) Waterproofing Joint Materials: O-ring and wedge seals for the joints of all wastewater manholes, when indicated, shall conform to the requirements of ASTM C443. Cold applied preformed plastic gaskets for wastewater manholes shall be as specified by Engineer. Connections between reinforced concrete wastewater manhole structures and pipe shall meet the requirements of ASTM C923.

210.03 CONSTRUCTION: All manholes shall have a minimum inside diameter of 48 inches for pipe up to 15” diameter and minimum 60 inches for pipes up to 27” diameter. Manhole base section shall be appropriately increased to accommodate all converging pipe. A minimum horizontal clearance of 12 inches shall be maintained between adjacent pipes. Pipe ends within the base section shall not be relied upon to support overlying manhole dead and live load weights. All wastewater branch connections to new or existing main shall be made at manholes with the influent pipe crown installed at the elevation of the effluent pipe crown or above. Where lines enter the manhole up to 24 inches
above the flow line of the outlet, the invert shall be sloped upward to receive the flow, thus preventing splashing or solids deposition. Where the spring line of an influent pipe is 24 inches or more above the spring line of the effluent pipe, a drop manhole shall be used. Construction of extensions to existing system shall require placement of new manholes at locations indicated or directed by the Engineer. Unless otherwise indicated, wastewater manholes shall have concentric cones, except on manholes over large mains where an eccentric cone shall be situated to provide access to an invert ledge.

Manholes shall be founded to the established elevations on uniformly stable subgrade. Unstable subgrade shall be over excavated a minimum of 12 inches and replaced with a material acceptable to the Engineer. Precast base units shall be founded and leveled on 6" (inch) coarse aggregate bedding. The cast-in-place concrete cradle shall be poured against undisturbed trench walls up the pipe’s spring line.

All adjustments shall be completed prior to the placement of the final surface.

Manhole components to be reused shall be carefully removed and the contact areas shall be cleaned of all mortar, concrete, grease and sealing compounds. Any items broken in the process of removal and cleaning shall be replaced in kind by the Contractor of this expense.

If the adjustment involves raising the elevation of the top of the manhole in accordance with these specifications, the top of the concrete ring shall be cleaned and built up vertically to the new elevation, using new or salvage concrete rings and the ring and cover installed with the top surface conforming to the proposed grade.

Cast-in-place foundations shall have a minimum depth of 12 inches at the invert flowing. The widths of all manhole inverts shall be specifically sized for the connecting pipes. Inverts shall be “U” shaped with a minimum depth of a minimum fall of 0.10 of a foot between the inlet and outlet. The lowermost riser section may be set in the concrete while still green, after which the foundation shall be, cured a minimum of 24 hours prior to proceeding with construction of the manhole up to 12 feet in depth. The foundation shall be cured an additional 24 hours prior to continuing construction above the 12 foot level. Manhole shall be measured from the invert flow line to the finish surface elevation.

Wastewater manhole having cast in place foundations may be constructed over existing wastewater pipes, except polyvinyl chloride (PVC), and the top half of the pipe removed to facilitate invert construction. The manhole shall rise from the spring line elevation of the pipe, approximately one inch of each 12 inches of run (8%). Wastewater manholes with lines larger than 15 inches shall require precast bases; manholes constructed over in-service mains however, may be built on cast-in-place foundations if the flow cannot be interrupted. Precast and cast-in-place wastewater junction boxes shall be allowed only where indicated on the plans or acceptable to the Engineer. The floor of the manhole also, shall rise outwardly from the spring line on a slope at 1:12 (8%).

Wastewater lines, except reinforced concrete pipe, set in cast-in-place foundations, shall require a water stop seal or gasket acceptable to the Engineer around the outside perimeter of the pipe. It shall be approximately centered under the manhole section wall.

Cast-in-place manholes, junction boxes and flat-slab transitions shall be reinforced Class A concrete. All structural concrete work shall conform to Section 406, “Concrete Structures”. Forms will be required for all cast-in-place walls above the foundation. Where the surrounding material can be
Concrete Manholes

Backfilling for manholes shall conform to the density requirements of Section 102. Manhole construction in roadways may be staged to facilitate base construction. Manholes constructed to interim elevations shall be covered with steel plates of sufficient thickness to support vehicular traffic. Steel plates on wastewater manholes shall be set in mortar to minimize inflow.

Manholes shall be completed to finish elevation prior to placement of the roadway’s finish surface. The excavation for construction of manhole construction shall be backfilled with cement stabilized sand (2 sacks per cubic yard) up to the bottom of Portland Cement pavement slabs or to within two (2) inches of finish elevation of asphalted concrete pavements. The cement-stabilized sand shall be a minimum of 12 inches thick.

When rings and covers are set to grade, the inside and outside of the concrete rings shall be wiped with mortar so placed as to win a durable water-tight joint smooth and even with the manhole cones section. No grouting shall be performed when the atmospheric temperature is at or below 40 degree F, and when necessary, because of a sudden drop in temperature, joints shall be protected against freezing for at least 24 hours.

210.04 ACCEPTANCE TESTING OF WASTEWATER MANHOLES: Manholes shall be tested in accordance with Section 218.

(1) Test by the Vacuum Methods: Shall not be acceptable unless recommended by Engineer and authorized by the Utilities Director.

(2) Test by the Infiltration Method.

All manhole testing shall be performed by Exfiltration Method of testing described below. This method may only be used when ground water is not present. If ground water is present a Vacuum Test may be used only if directed by the Engineer. All backfilling and compaction shall be completed prior to the commencement of testing.

(a) Procedures:

1. Manhole section interiors shall be carefully inspected; units found to have through-wall lift holes, or any penetration of the interior surface by inserts provided to facilitate handling, will not be accepted. Coating shall be applied after the testing unless coating is applied before field assembly, or at the factory. All lift holes and exterior joins shall be plugged with an acceptable non-shrink grout. No grout shall be placed in horizontal joints.

2. After cleaning the interior surface of the manhole, the Contactor shall place and inflate pneumatic plugs in all of the connecting pips to isolate the manhole; sealing pressure within the plugs shall be as recommended by the plug manufacturer.

3. Concrete manhole shall be filled with water or otherwise thoroughly water for a period of 24 hours prior to testing.

4. At the start of the test, the manhole shall be filled to the top with wetted. The test time shall be 1 hour (60 minutes). The Construction Inspector must be present for observation during the entire time of the test. Permissible loss of water in the 1 hour test time is 0.025 gallons per diameter foot, per foot of manhole depth. For a 4-foot diameter manhole, this
quantity converts to a maximum permissible drop in the water lever (from the top of the manhole cone). Of 0.05 inches per foot of manhole depth (0.5 inches for a 10 foot deep manhole).

(3) Failure to Pass the Test (Records of Tests)

If the manhole fails to pass the initial test method as described in (2) Test by the Exfiltration Method and, if allowed, (1) Test by the Vacuum, or if visible groundwater leakage into the manhole is observed, the Contractor shall locate the leak. If necessary by disassembly of the manhole, checking gaskets and replacing if necessary, relubrication, and re-assembly, or Contractor may install an acceptable exterior joint sealing product (recommended by Engineer and approved by Utilities Director) on all joints and then retested. If any manhole fails the vacuum and/or exfiltration tested twice, the Contractor shall consider replacing that manhole. If the Constrictor chooses to attempt to repair that manhole, the manhole must be retested until it passes. In no case shall cold applied preformed plastic gasket be used for repair. Records of all manhole testing shall be made available to the Engineer at the close of each working day, or as otherwise directed. Any damaged or visually defective products, or any products out of acceptable tolerance shall be removed from the site.

At a minimum, test Records shall include the following and shall be part of the Project records turned in with the acceptance package:

- Name of the manhole manufacturer
- Date tested/date re-tested
- Passed/failed and state what was done to correct the problem
- Location/station of manhole
- Type of Coating
- Any repairs made to the joints.

(4) Inspection:

The Engineer shall make visual inspection of each manhole after it has passed the testing requirements and is considered to be its final condition. The inspection shall determine the completeness of the manhole; any defects shall be corrected to the Engineer’s satisfaction. All testing shall be performed at the presence of a Utilities Inspector.

210.05 MEASUREMENT: All manholes and the type indicated shall be measured as each unit, size and depth complete in place.

New manholes constructed to interim elevations to facilitate stage construction shall be measured as one unit regardless of the number of interim elevation constructed. All labor, materials and other expenses necessary for the stage construction shall be considered subsidiary to the completed unit.

210.06 PAYMENT: Payment for completed manholes of the type, size and depth indicated shall be made at the unit price bid for each including all labor, equipment, materials, time and incidentals necessary to complete the work.
SECTION 214  
SANITARY SEWER CLEANOUTS

D-214.01 DESCRIPTION: This Specification shall govern for the furnishing, excavating, laying, or placing, and backfilling, shoring, and other operations necessary to the installing of all sanitary sewer cleanouts. Cleanout connections shall be provided at the end of the sanitary sewer main and shall be a minimum of 8 inch (8”) diameter. The location shall be clearly indicated on the construction drawings.

D-214.02 MATERIALS:

Cast iron boot and cover shall be in accordance to ASTM A48 Class 30B.

PVC pipe and fittings 6 inch (6”) through 12 inch (12”) diameter shall conform to Section 202.

D-214.03 EXECUTION: An eight-inch (8”) cleanout shall be provided outside of the pavement or as approved by the Utilities Director at one foot (1’) from the property line within the R.O.W., easement line or as indicated on the plans. A cast iron cleanout cover shall be placed over every cleanout for the main line as per Detail No.

D-214.04 BACKFILL: All trenches and excavations in this section shall be in accordance with, Section 102.

D-214.05 CONCRETE CUSHION, CRADLE, OR COLLAR: Concrete cradle, cushion, or collar, shall be constructed as shown on the plans. Where concrete cradle or cushion is constructed beneath the sewer pipe, the sub-grade shall be prepared to the dimensions and form as shown on the plans. Concrete cradle, cushion, or collar shall be placed in a dry trench unless, in the opinion of the Engineer, such a method is not practicable. Where the concrete is placed in a wet trench, the work shall be done strictly as directed or approved by the Engineer.

D-214.06 MEASUREMENT: All sewer cleanouts shall be measured in accordance with the above specifications per each complete in place, of the size, type, depth constructed, and accepted by the Engineer.

D-214.07 PAYMENT: All sewer cleanouts, shall be paid for at the unit price bid per each complete in place, of the size, and type constructed, which price shall be full compensation for furnishing all labor, material, and equipment, for all hauling, excavation, shaping of trench bottom, bracing, sheeting, for all installation, backfilling, tamping of backfill, and for all clean-up and incidentals necessary to furnish sewer services complete in place.
SECTION 216
ADJUSTING MANHOLES, CLEANOUTS, AND INLETS

D-216.01 DESCRIPTION: This item shall govern for the furnishing of materials and for adjusting, abandoning, or capping existing sewer manholes, cleanouts, or inlets where required by the plans. Manholes, cleanouts, and inlets shall be adjusted to positions and/or elevations as shown on the plans or as ordered by the Engineer and in accordance with these specifications.

D-216.02 MATERIALS: Manholes, cleanouts, or inlet rings, plates, grates, covers in good condition removed from the manholes, cleanouts, and inlets in the process of abandonment, capping, or adjustment may be re-used upon approval from the engineer.

D-216.03 CONSTRUCTION: Manholes, cleanouts, or inlet rings, covers, plates, and grates shall be removed carefully and the contact areas shall be cleaned of all mortar and grease. Rings, covers, plates, or grates broken in the process of removal and cleaning shall be replaced in kind by the Contractor at his expense.

If the adjustment involves lowering the top of a manhole, cleanout, or inlet, a sufficient depth of concrete shall be removed to permit reconstruction on a batter not exceeding one (1) inch horizontal to two (2) inches vertical. The manhole or inlet ring, cover, plate, or grate shall then be installed with top conforming to the proposed new surface of street or grading as the case may be.

If the adjustment involves raising the elevation of the top of manhole, cleanout, or inlet, the top course shall be cleaned of mortar and built up vertically to the new elevation using new Class "A" Concrete as per section 504, and the ring, cover, plate, or grate installed with top conforming to the proposed new surface of street or grading as the case may be.

If abandonment of an inlet, cleanout, and manhole is required, it shall be removed completely to a depth one foot below the bottom of the trench. In each instance, the bottom of the trench shall be restored to grade by backfilling and compacting by the methods provided herein for backfill.

If capping of a manhole, cleanout, or inlet is required by the plans, capping shall be in accordance with the details shown on the plans.

D-216.04 MINOR ADJUSTMENTS: New concrete manhole and existing manhole adjustments shall be in accordance to Section 210.02 (7) and 210.02 (8). New fiberglass manhole and existing fiberglass manhole adjustments shall be done using a multi-purpose rubber composite adjustment riser (18” max) and fiberglass kit approved by the manufacturer.

D-216.05 MAJOR ADJUSTMENTS: Concrete and fiberglass manhole adjustments in accordance to Section 210.02 (9)

D-216.06 MEASUREMENT: Manholes, cleanouts, or inlets completely adjusted, abandoned, or capped as prescribed above, will be measured by the unit of each manhole, cleanout, or inlet adjusted. The excavation and backfill involved will not be measured for payment.
D-216.07 PAYMENT: Each manhole, cleanout, or inlet adjusted, measured as prescribed above, complete in accordance with these specifications, will be paid for at the unit price bid for "Adjusting Manholes", "Adjusting Cleanouts", and "Adjusting Inlets", which price shall be full compensation for furnishing all required materials, including backfill as required, excavation, tools, labor, equipment, and incidentals required to complete the work.
SECTION 218
TESTING SEWER SYSTEM

D-218.01 GENERAL

1. Summary

A. Section Includes:
   1. Deflection testing of sanitary sewer lines.
   2. Leakage testing of sanitary sewer lines.
   3. Leakage testing of sanitary sewer manholes.

B. Measurement and Payment:
   1. Include costs for testing in appropriate unit prices bid for sewer line construction.

2. Submittals

A. Submit in accordance with Standard General Conditions and Supplementary Conditions.

B. Copies of all test results shall be submitted to the Engineer prior to acceptance of sewer system.

D-218.02 PRODUCTS (N/A)

D-218.03 EXECUTION

1. GENERAL

A. Commence test procedures when following condition are met.
   1. Pipe section to be tested is clean and free of dirt, sand, water or other foreign material.
   2. Pipe system shall be isolated from the existing waste water system.
   3. Pipe section to be tested has backfill placed and compacted

B. Repair visible leaks in manholes and sewers regardless of results of leakage tests.

C. Notify Engineer and City of Laredo Utilities Department in writing 48 hours before beginning tests.

D. Contractor shall furnish and pay for all water required for testing.

2. Deflection Testing of Sanitary Sewer Lines

A. Perform tests on sewer pipe in presence of Engineer and City of Laredo Utilities Inspector.

B. Provide necessary test mandrel, cable, reeling equipment, and other materials and equipment required to perform tests. Provide cable at each end of test mandrel to allow withdrawal if mandrel becomes stuck.

C. Deflection Tests shall be performed on all flexible pipes. For pipelines with inside diameters less than 27 inches, a rigid mandrel shall be used to measure deflection.
1. Mandrel sizing. The rigid mandrel shall have an outside diameter (OD) equal to 95% of the inside diameter (ID) of the pipe. The inside diameter of the pipe, for the purposes of determining the outside diameter of the mandrel, shall be the average outside diameter minus two minimum wall thicknesses for OD controlled pipe and the average inside diameter for ID controlled pipe, all dimensions shall be per appropriate standard. Statistical or other "tolerance packages" shall not be considered in mandrel sizing.

2. Mandrel design. The rigid mandrel shall be constructed of a metal or a rigid plastic material that can withstand 200 psi without being deformed. The mandrel shall have nine or more "runners" or "legs" as long as the total number of legs is an odd number. The barrel section of the length at least 75% of the inside diameter of the pipe. A proving ring shall be provided and used for each size mandrel in use.

3. Method options. Adjustable or flexible mandrels are prohibited. A television inspection is not a substitute of the deflection test. Mandrels with removable legs or runners may be accepted on a case-by-case basis.

D. The test shall be performed without mechanical pulling devices. Sewer is considered to have passed deflection test if mandrel can be drawn through sewer system being tested without aid of mechanical assistance.

E. If excessive force is required or mandrel fails to pass through, sewer shall have failed deflection test.

F. The test shall be conducted after the final backfill has been in place at least 30 days. No pipe shall exceed a deflection of 5.0%. If a pipe should fail to pass deflection test, the problem shall be corrected and a second test shall be conducted after the final backfill has been in place and additional 30 days. Correct failed sewers by excavating sewer a point of failure and for distance of 10 ft on either side, allowing sewer to return to its original round cross-section and backfill according to Specifications. Remove and replace sewers failing to return to original round cross-section or failing second deflection test at not cost to Owner. Do not use devices to generate internal pressures or vibrations to correct failed sewers.

3. Leakage Testing of Sanitary Sewer Lines

A. Tests:
   1. Pressure test sanitary sewer pipe 24 inches or smaller in diameter using low pressure air test.

B. General:
   1. Conduct tests in presence of Engineer and City of Laredo Utilities Inspector.
   2. Provide piping connections between section of line being tested and air supply, test pressure equipment, weirs, meters, certified pressure gauge, and other equipment, materials, and facilities necessary to make specified test.
   3. Provide bulkheads, blocking, bracing or other temporary sectionalizing devices that may be required.
   4. Remove temporary sectionalizing devices after test complete.

C. Low Pressure Air Test
   1. General:
a. Conduct required low pressure air test as specified herein.
b. Plug pipe outlets with test plugs. Brace each plug securely to prevent blowouts during air test.
c. Add air slowly.
d. Pressurizing equipment shall include regulator set to avoid over-pressuring and damaging line.
e. Safety pressure test in accordance with OSHA requirements.

2. Air Test Procedures:
   a. The procedure for the low pressure air test shall conform to the procedures described in ASTM C-828, ASTM C-924, ASTM F-1417, or other appropriate procedures, except for testing times.
   b. The test times shall be as outlined in this section. For sections of pipe less than 36 inch average inside diameter, 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:

   \[ T = \frac{0.085 \times D \times K}{Q} \]

   \( T \) = time for pressure to drop 1.0 pound per square inch gauge in seconds;
   \( K = 0.0049 \times D \times L \), 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 feet internal surface shall be used.

Since a \( K \) value of less than 1.0 shall not be used, there are minimum testing times for each pipe diameter as follows:

<table>
<thead>
<tr>
<th>Pipe Diameter (inches)</th>
<th>Minimum Time (seconds)</th>
<th>Length for Minimum Time (feet)</th>
<th>Time for Longer Length (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>340</td>
<td>398</td>
<td>0.855 (L)</td>
</tr>
<tr>
<td>8</td>
<td>454</td>
<td>298</td>
<td>1.520 (L)</td>
</tr>
<tr>
<td>10</td>
<td>567</td>
<td>239</td>
<td>2.374 (L)</td>
</tr>
<tr>
<td>12</td>
<td>680</td>
<td>199</td>
<td>3.419 (L)</td>
</tr>
<tr>
<td>15</td>
<td>850</td>
<td>159</td>
<td>5.342 (L)</td>
</tr>
<tr>
<td>18</td>
<td>1,020</td>
<td>133</td>
<td>7.693 (L)</td>
</tr>
<tr>
<td>21</td>
<td>1,190</td>
<td>114</td>
<td>10.471 (L)</td>
</tr>
<tr>
<td>24</td>
<td>1,360</td>
<td>100</td>
<td>13.676 (L)</td>
</tr>
</tbody>
</table>
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 test period, then the test shall continue for the entire test duration as outlined in this subparagraph or until failure.

c. Provide calibrated and certified test gauge at remote test plug.

1. Gauge air pressure within test section and attach to test plug by sufficient length of hose to place gauge at ground surface. In case of test frames for individual joint testing, gauge to be remote from air supply.

d. Proceed with test after sewer and lateral installation, including backfilling, is complete and lines cleaned. Proceed as follows:

1. Flush and clean prior to conducting low pressure air test.

2. Isolate section of sewer line to be tested by means of inflatable stoppers of other suitable test plugs. One plug shall have inlet tap, or other provision, for connecting hose to portable air control source.

3. If test section is below groundwater level, determine height of groundwater above spring line of pipe at each end of test section and compute average. For every foot of groundwater above pipe spring line, increase gauge test pressure by 0.43 lb/sq. in.

4. Connect air hose to inlet tap and portable air control source. Air equipment shall consist of necessary valves and pressure gauges to control rate at which air flows into test section and to enable monitoring of air pressure within test section. Testing apparatus shall also be equipped with pressure relief device to prevent possibility of loading test section with full capacity of compressor.

5. Add air slowly to test section until pressure inside pipe is raised to 4.0 psig greater than average back pressure that may be over pipe.

6. After pressure of 4.0 psig obtained, regulate air supply so pressure is maintained between 3.5 and 4.0 psig (above average groundwater back pressure) for period of 2 min. This allows air temperature to stabilize in equilibrium with temperature of pipe walls. Pressure will normally drop slightly until temperature equilibrium is obtained. During this period, check plugs with soap solution to detect plug leakage.

7. Determine rate of air loss by time pressure drop method. After 2-min air
stabilization period, air supply is disconnected and the test pressure is allowed to decrease to 3.5 psig. Time required for test pressure to drop from 3.5 to 2.5 psig is determined if rate of air loss is within allowable time limit. If time is equal to or greater than times indicated in tables, pipe line shall be deemed acceptable.

8. Upon completion of test, open bleeder valve and allow air to escape. Plugs shall not be removed until air pressure in test section is released. During this time, no one shall be allowed in trench or manhole while pipe is being decompressed.

e. Repair sewers failing air test by removing and replacing defective pipe sections or by other approved methods at contractors cost.

1. Retest until acceptable test results obtained to be paid by contractor.

D-218.04. LEAKAGE TESTING OF SANITARY SEWER MANHOLES

A. After completion of manhole construction, all sealing or rehabilitation, all manholes shall be tested for water tightness and leakage separately and independently of wastewater lines by hydrostatic exfiltration testing.

B. Plug influent and effluent lines, including services lines, with suitability-sized pneumatic or mechanical plugs. Ensure plugs are properly rated for pressures required for test. Follow manufacturer's safety and installation recommendations. Place plugs a minimum of 6 inches outside of manhole walls. Brace inverts to prevent lines from being dislodged if lines entering manhole have not been backfilled.

C. Hydrostatic Exfiltration Testing:

1. Hydrostatic exfiltration testing shall be performed as follows: all wastewater lines coming into any manhole shall be sealed with an internal pipe plug, and then the manhole shall be filled with water and maintained full for at least one hour

   a. The maximum leakage for hydrostatic testing shall be 0.025 gallons per foot diameter per foot of manhole depth per hour.

2. If water loss exceeds amount tabulated above, locate leaks, complete repairs necessary to seal manhole and repeat test procedure until satisfactory results are obtained.

3. For concrete manholes, a wetting period of 24 hours may be used prior to testing in order to allow saturation of the concrete.

D. Repair sewers failing air test by removing and replacing defective pipe sections or by other approved methods at contractors cost.
**SECTION 226**
**PIPE CLEANING AND CCTV INSPECTION**

**D-226.01 DESCRIPTION:** This Item shall govern the cleaning and Closed Circuit Television (CCTV) inspection of sanitary and storm sewer mains before assessment, rehabilitation and final acceptance of a system. The Contractor shall do the televising. The City reserves the right to re-televise any new sanitary sewer/storm drain work after the placement of pavement or permanent trench resurfacing, but before acceptance by the Engineer, to determine the existence and extent of any foreign material or obstructions such as, but not necessarily limited to, cement grout, wood, rocks, sand, concrete, or pieces of pipe, and any structural deficiencies or sags precipitated by the permanent resurfacing operations or other Contract Work.

The Contractor shall notify the Engineer and Utility Inspector five (5) working days in advance of the anticipated date of the televising. Five (5) working days shall be allowed for the Engineer to review each individual video recording of each and every storm drain documented on that particular recording. In the event that any deficiencies or sags are discovered by the Engineer, either by the Contractor’s televising or the City’s re-televising, Five (5) working days shall be allowed for the Engineer to determine whether the deficiencies or sags are repairable in place. If the Engineer determines that the deficiencies or sags are not repairable in place, the affected portion(s) shall be reconstructed in accordance with these Specifications.

The Contractor shall not be entitled to any additional working days due to delays resulting from the correction of any deficiencies or sags, repairable or non-repairable in place, as determined by televised inspections and the Engineer.

**D-226.02 GENERAL:** The CCTV inspection work must be completed by a certified National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) trained operator(s) using established PACP coding and observations.

1. General Requirements:

   a. The video operator must have at least one (1) year of experience with a project of a similar nature.
   b. Video shall be submitted to the Municipality on DVDs with high quality color in a format reviewable by the Municipality.
   C. Video recordings that are out of focus shall be cause for rejection of the recordings and Contractor shall re-televising at no additional cost to the Owner.
   d. The Contractor shall notify the Engineer five (5) Municipal working days prior to televising.
   e. The Contractor shall turn over the original video recordings to the Engineer immediately after recording.
   f. Televising shall be done in one direction for the entire length between manholes; each section shall be isolated from the remainder of the pipe as required. Sufficient water shall be supplied to cause drainage within the isolated section prior to televising.
   g. Pipe must be clean and free of dirt, rock, gravel, debris, or any other material or obstruction that will hinder the CCTV inspection.
h. For underground storm drain conduit installations, the maximum operation tolerance for a
sag shall be one-hundredth foot (0.01’) per inch of pipe diameter. No sag shall be longer than
sixty feet (60’). When CCTV inspection is used to check for sag, a calibrated readable device
acceptable to the Engineer shall be used to measure the depth of sag.
i. The Contractor shall not be entitled to any additional working days due to delays in
securing the CCTV services of a private vendor.

D-226.03 EQUIPMENT:

1. CCTV inspection equipment shall consist of a monitoring unit and self-contained camera
with pan, tilt and zoom capability. This equipment shall be specifically designed and
constructed for such inspection purposes. The camera shall be mounted on a crawler or
adjustable skids and have a height adjust to facilitate the inspection of different sizes of pipe
and to allow for visual judgment of ovality by centering the camera within the pipe. The
camera shall be self-operative in one hundred percent (100%) humidity conditions. Focal
distance shall be adjustable through a range of from one inch (1”) to infinity. The camera
shall be waterproof and shall have a remote controlled self-contained lighting system capable
of producing effective illumination for all sizes of pipe. The lighting system shall be capable
of lighting the entire periphery of the pipe. The remote reading footage counter shall be
accurate to within one-half percent (0.5%) over measured distance of the particular section
being inspected and shall be displayed on the television monitor. The equipment shall be
capable of providing a clear digital recording of the interior of the pipes. An inclinometer
which gives a profile of the pipeline must be used for all new pipe inspections or on existing
pipe at the discretion of the Engineer. The camera, television monitor and other components
of the video system shall be capable of producing a minimum three hundred and fifty (350)
line resolution color video picture. The equipment shall be capable of televising the entire
length in one direction. When televising storm drains the camera shall be capable of scanning
the joints for three hundred and sixty degrees (360°).

2. High velocity pipe cleaning equipment shall be constructed for ease and safety of operation.
The equipment shall have a selection of nozzles capable of scouring the interior of the size
range of pipe indicated on the plans.

3. Debris removal equipment shall consist of a vacuum tanker unit capable of removing typical
sewage debris accumulated by the pipe cleaner at the manholes.

4. Solid debris cutting equipment shall be hydraulically driven by the sewer cleaner. The
equipment must have circular saw-tooth blades in sizes consistent with the pipe being
cleaned.

D-226.04 CCTV INSPECTION REPORTS:

1. Audio and written documentation shall accompany all DVD(s) submitted to the Engineer.
DVD(s) shall have printed labels with location information, date format information, and other descriptive information. The voice recording of the DVD(s) shall make brief but informative comments on data of significance, including, but not limited to, the locations of unusual conditions, type and size of connection, collapsed section, the presence of scale and corrosion, and other discernible features.

The DVD(s) shall include the following:

<table>
<thead>
<tr>
<th>Data View</th>
<th>Audio</th>
<th>Written</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report No. (including DVD number(s))</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Date of CCTV inspection</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Current weather conditions</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MQA Storm Drain Grid page number</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Upstream and downstream manhole structure numbers, storm drain access point or station numbers.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GPS coordinate locations for- upstream and downstream manholes and/or any other storm drain access points. GPS receivers shall provide sub-meter accuracy</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Location, size, type, and length of pipe.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Direction of flow and measurement (“From” manhole/storm drain access point/station number “To” manhole/storm drain access point/station number</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Tape Counter Footage (current distance along reach)</td>
<td>X</td>
<td>Beginning &amp; End</td>
</tr>
<tr>
<td>Sketch showing the street and cross streets where the TV inspection was made</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Description and location of each defect</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Description and location of each connection</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
2. A digital video shall be provided accompanied by an inspection report. This report shall be in accordance with the NASSCO defect codes. A sample inspection report and corresponding digital data file shall be submitted for review prior to starting the project. The report shall be a record of the exact location of each leak or fault discovered by the inspection - e.g. open joints, broken, cracked, deformed or collapsed pipe, and presence of grease, roots, debris, accumulation, obstruction, infiltration, water depth variations and other points of significance. The reference location for distance measurements shall be the centerline of the launch manhole (Station 0+000). If the inspection includes an intermediate manhole, station shall be reset to 0+000 in the center of the intermediate manhole.

3. All videos shall be in digital MPEG format that is compatible with the City of Laredo inspection software. Recorded picture quality and definition shall be to the satisfaction of the City.

4. The report shall include the location of all service connections together with a statement of opinion as to whether or not the service connections are subject to joint infiltration. Intrusions of service connections into the main line shall be noted with reference to the degree of intrusion.

5. Photographs of sewer defects and service connections shall be taken. The photographs shall be coordinated with the written report by reference numbers. A minimum of one photograph per line or manhole-to-manhole segment shall be taken to show a representative view of the workmanship.

5. Each manhole-to-manhole section of pipe shall be located on the report form in such a way as to be readily identifiable. Identify such items as name of subdivision, street names, manhole numbers, type of pipe, joint length, direction of flows, pipe diameter, manhole depth, inspection date, names of the inspection technician, persons viewing, and video identification numbers. Lot and block numbers for all services shall be provided.

6. Two copies of the final CCTV report with corresponding video shall be provided to the City within two weeks after the completion of the inspection. Media submitted shall become the property of the City.

7. All digital media shall be numbered and cross-indexed to the written report. Video footage shall indicate the size of the sewer, the manhole-to-manhole segment being inspected, plus the street address or location.

8. To insure photographic quality in reports, color printers shall be used.

D-226.05 EXECUTION:

1. Pipe Cleaning
   1.1. Acceptance of pipe and manhole cleaning shall be made upon review of the corresponding video inspection.
   1.2. Block debris at downstream manhole to prevent contamination of the downstream mains. Sludge, dirt, sand and other debris resulting from the cleaning operations shall be removed from the downstream manhole of the section being cleaned. Passing material from the section being cleaned to the downstream pipe section shall not be permitted.
1.3. The liquid portion of material removed at the manholes shall be decanted back into the pipe. The solid and semi-solid material removed at the manholes shall be disposed of at a designated site as approved by the City of Laredo.

2. Traffic Control
2.1. Interference to the normal flow of traffic shall be kept to a minimum.
2.2. Traffic control equipment shall conform to the TMUTCD Manual for Temporary Traffic Control.

3. Closed Circuit Television Inspection Procedures

3.1. The CCTV inspection shall provide a fill record of the condition of the pipes, manholes and appurtenances along the designated section of sewers. This shall include all installation and material defects. The CCTV inspection shall use inclinometer testing that is compatible to the City’s software.
3.2. For new construction, completely wet the pipe with clean water to fill any sags prior to inspection.
3.3. The Contractor shall not attempt a CCTV inspection if water levels in the pipe obstruct the cameras view unless instructed by the City.
3.4. Traveling speed of the camera in the pipeline to be as follows:
   3.4.1. 0.33 ft/s for pipelines less than 8” diameter
   3.4.2. 0.5 ft/s for 8” to 12” diameter
   3.4.3. 0.66 ft/s for over 12” diameter or
   3.4.4. Will not exceed a traverse rate of 30 ft/min.
3.5. Position camera lens centrally in the pipeline with a positioning tolerance of plus or minus 10% off the vertical centerline axis of the pipeline.
3.6. During the inspection, the camera operator shall pan the camera to focus on observable deficiencies in the pipe that may be located off-center to the direction of camera travel. This shall include but not be limited to all services, joints to the top, left or right, cracks and fractures or surface deterioration of the pipe walls. Pan and tilt into each service connection.
3.7. Upon completion the Contractor shall provide inspection reports and digital media as detailed in Section 3.0 above.
3.8. Manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interface with proper documentation of the pipe conditions shall be used to move the camera through the pipe. If, during the televising operations, the television camera will not pass through an entire manhole section or access point section, the Contractor shall reset the equipment in a manner so that the inspection can continue opposite the obstruction. If the television camera encounters an obstruction within a section not accessible to a manhole or access point point, the Contractor shall remove the obstruction by excavation or other appropriate means, replace whatever pipe is necessary, and re-televise the entire section.
3.9. Whenever non-remote powered and controlled winches are used to pull the television camera through the line, telephones, radios, or other suitable means of communication shall be set up between the two manholes or access points of the section being inspected to ensure that adequate communications exist between members of the crew.
3.10. The importance of accurate distance measurements is emphasized. Measurement for
location of defects shall be above ground by means of a meter device Marking on the cable, or the like, which would require interpolation for depth of manhole or storm access points, is not acceptable. The accuracy of the measurement shall be checked daily by use of a walking meter, roll-a-tape, or other suitable device. Measurements shall be from center to center of each manhole or access point. Unless permission is given by the Engineer to do otherwise. Distance shall be shown on the video data view at all times.

3.11. The City, or a City approved contractor, can excavate a pipe in order to free lodged camera equipment at the expense of the Contractor

D-226.06 MEASUREMENT:

Measurement for all sizes of pipe shall be based on the horizontal distances and shall be from center to center of manholes, from the center of manholes to center of catch basins, from center of manholes to center of cleanout “wye”, and from center of manhole to end of pipe including flared end sections. Televising pipe is considered incidental to the pay item and no separate payment shall be made.
PART 1  GENERAL

1.01  SUMMARY

A. Provide all labor, supervision, tools, plant, equipment, appliances and materials to perform all operations in connection with diversion pumping. The purpose of diversion pumping is to provide continuous sewer service to user of sewer systems while maintenance or construction operations are in progress. The Contractor shall maintain sewage flow to prevent backup and/or overflow into adjacent ditches, storm sewers and waterways.

B. The Contractor shall be responsible for all required bulkheads, pumps, piping, plugs, hoses, etc., to maintain sewer flow and prevent backups and overflows.

1.02  COORDINATION

A. The Contractor shall coordinate diversion pumping work with the City. Provide the City at least 24-hour notice to prior to start of diversion pumping.

1.03  PAYMENT

A. The Contractor shall be paid on a lump sum basis for diversion pumping. The cost of setup, installation, operation and maintenance of all diversion pumps system and any other items necessary to perform work are included in the lump sum payment. No other payments shall be made relating to diversion pumping.

1.04  SUBMITTALS

A. Submit a diversion pumping plan for review by the Utilities Department prior to installation. Show location, number and size of pumps, size and types of hoses or bridges piping, location of downstream discharge. Show any special features for pipes or hoses cross roadways, temporary trenches, support bridges. Provide 24 hour emergency contact person and phone number.

B. The diversion pumping system shall have primary and backup pumps on site and connected by a Y-connection for quick transfer of sewage flow to the backup pump in the event that the primary pump fails.

PART 2  PRODUCTS

2.01  GENERAL

A. Diversion pumping equipment shall be designed for the type of work for which it is required.

2.02  PIPING

A. All piping, joints and accessories shall be designed to withstand at least twice the maximum system pressure, or a minimum of 50 psi, whichever is greater. During diversion pumping, no
sewage shall be leaked, dumped or spilled in or onto any area outside the existing sanitary sewer system. When diversion pumping operations are complete, all piping shall be drained into the sanitary sewer prior to disassembly.

2.03 PUMPS

A. Size and locate the pumps as necessary to divert flows and prevent backup or overflows. Provide one primary and one backup pump at the location for diversion pumping. The primary and backup pumps shall be sound attenuated unit with a rated sound level of 69dBA at 30 feet when pump is operating.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. The Contractor shall have an experienced operator on site to monitor the operation, adjust pumps, make repairs, and report problems when the pumps are operating. Do not allow sewage to leak, dump, or spill into or onto areas outside of existing sewer systems. When diversion pumping operations are completed, drain sewage within piping into sewer system prior to disassembly.

3.02 OVERFLOWS

A. In the event sewage accidentally drains into the drainage system or street, the Contractor shall immediately stop the overflow, notify the City, and take the necessary action to clean up and disinfect the spillage to the satisfaction of the City. If sewage is spilled onto public or private property, the Contractor shall wash down, clean up and disinfect the spillage to the satisfaction of the City. Any and all overflows shall be reported to the Texas Commission on Environmental Quality (TCEQ) and the Environmental Protection Agency (EPA) by the Contractor within 24 hours.

END OF SECTION
SECTION 236
REMOVAL AND ABANDONMENT OF SEWERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal and abandonment in place of existing sewers, junction structures, manholes, and force mains.

1.02 MEASUREMENT AND PAYMENT

A. Unit Prices.

1. Payment for removal of existing sewers shall be per linear foot for each diameter of sewer being removed. Measurement will be along centerline of sewer from centerline to centerline of manholes.

2. Payment for removal of sewer manholes or junction structures shall be per each manhole or junction structure removed.

3. Payment for grout fill and abandonment of existing sewers, including boxes and elliptical shaped sewers, is on linear foot basis for each diameter of sewer being abandoned. Measurement will be along centerline of sewer from centerline to centerline of manholes.

4. Payment for grout fill and abandonment of sewer manholes or junction structure is by each manhole or junction structure abandoned in conformance with this Section.

5. Payment will be full compensation for all material, equipment, and labor required for complete abandonment grouting, including air venting, testing, temporary plugs, PVC pipes and incidentals.

6. Acceptability of grout material is based on achieving average strength within range of 75 to 150 psi as defined in Paragraph 2.01B.1. Grout that is out of range after placement may be accepted with price adjustment of 1.0 percent price deduction for each psi average compressive strength below 75 psi and 0.5 percent price deduction for each psi average compressive strength above 150 psi, as applicable to material volume represented by test series. Shrinkage in grout material placements shall be remedied by Contractor according to Paragraph 3.04H without additional compensation.

1.03 DEFINITIONS

A. Removal. Sewer piping, manhole, and junction structure removal consists of completely removing and properly disposing of existing materials.

B. Abandonment. Sewer abandonment consists of demolition and removal of portion of manholes existing within specified depth of surface, and abandonment in place of sewer lines and manholes as specified in this Section.
Removal and Abandonment of Sewers

C. Flowable Fill. Flowable fill (abandonment grout) shall be controlled low-strength material consisting of fluid mixture of cement, fly ash, aggregate, water and with admixtures as necessary to provide workable properties. Placement of flowable fill may be by grouting techniques in sewer pipes or other restricted areas, or as mass placement by chutes or tremie methods in unrestricted locations with open access. Long-term hardened strength shall be within specified range.

D. Ballast. Large aggregate either replaced with voids subsequently filled with flowable fill injected by grouting method; or in areas with open access, placed individually and sequentially at same time as flowable fill placement.

E. Backgrouting. Secondary stage pressure grouting to ensure that voids have been filled within abandoned sewer. Backgrouting will only be required at critical locations indicated on Drawings or if there is evidence of incomplete flowable fill placements.

1.04 REFERENCE STANDARDS

D. ASTM C 937 - Standard Specification for Grout Fluidifier for Pre-placed Aggregate Concrete.
F. ASTM C 1017 - Standard Specification for Chemical Admixture for Use in Producing Flowing Concrete.

1.05 SUBMITTALS

A. Flowable fill mix design report:

1. Flowable fill type and production method. Describe if fill will be mixed to final proportions and consistency in batch plant or if constituents will be added in transit mixer at placement location.

2. Use of ballast. Provide percentage of ballast of total placement and size limits for ballast if fill is intended to be used with ballast.

3. Aggregate gradation of fill. Aggregate gradation of mix (excluding ballast) shall be used as pilot curve for quality control during production.

4. Fill mix constituents and proportions including materials by weight and volume, and air content but excluding ballast. Give types and amounts of admixtures including air entrainment or air generating compounds.
Removal and Abandonment of Sewers

5. Fill densities and viscosities, including wet density at point of placement.

6. Initial time of set.

7. Bleeding and shrinkage.

8. Compressive strength.

B. Technical information for equipment and operational procedures including projected slurry injection rate, grout pressure, method of controlling grout pressure, bulkhead and vent design, and number of stages of grout application.

C. Experience record for proposed crew, showing minimum of 100 cubic yards of flowable fill placed using proposed or similar equipment and methods.

D. At least 60 days prior to commencing abandonment activities, submit plan for abandonment, describing proposed grouting sequence, bypass pumping requirements and plugging, if any, and other information pertinent to completion of work.

PART 2 PRODUCTS

2.01 FLOWABLE FILL

A. Design Mix Criteria. Provide design of one or more mixes to meet design criteria and conditions for placement. Present information required by Paragraph 1.05B in mix design report including following:

1. Cement: ASTM C 150, Type I or II. Volume and weight per cubic yard of fill. Provide minimum cement content of 100 pounds per cubic yard.

2. Fly Ash: ASTM C 618, Class C or F. Volume and weight per cubic yard of fill. Provide minimum fly ash content of 200 pounds per cubic yard.

3. Potable Water: Volume and weight per cubic yard of fill. Amount of water determined by mix design testing.

4. Aggregate Gradation: 100 percent passing 3/8-inch sieve and not more than 10 percent passing No. 200 sieve. Mix design report shall define pilot gradation based on following sieve sizes: 3/8-inch, Nos. 4, 8, 16, 30, 50, 100, and 200. Do not deviate from pilot gradation by more than plus or minus 10 percentage points for any sieve for production material.

5. Aggregate Source Material: Screened or crushed aggregate, pit or bank run fine gravels or sand, or crushed concrete. If crushed concrete is used, add at least 30 percent of natural aggregate to provide workability.

6. Admixtures: Use admixtures meeting ASTM C 494 and ASTM C 107 as needed to improve pumpability, to control time of set, and reduce bleeding.

7. Fluidifier: Use fluidifier meeting ASTM C 937 as necessary to hold solid constituents in suspension. Add shrinkage compensator if necessary.
Removal and Abandonment of Sewers

8. Performance Additive: Use flowable fill performance additive, such as Darafill or approved equal, to control fill properties.

B. Flowable Fill Requirements.

1. Unconfined compressive strength: minimum 75 psi and maximum 150 psi at 56 days as determined based on an average of three tests for same placement. Present at least three acceptable strength tests for proposed mix design in mix design report.


4. Water bleeding for fill to be placed by grouting method in sewers: not to exceed 2 percent according to ASTM C 940.

5. Minimum wet density: 90 pounds per cubic foot.

2.02 BALLAST

A. Ballast Material: Natural rock or concrete pieces with minimum size equal to at least 10 times maximum aggregate size of flowable fill and maximum size of 24 inches. Maximum dimension shall not be more than 20 percent of minimum dimension of space to be filled.

B. Ballast Composition: Free of regulated waste material.

PART 3 EXECUTION

3.01 PREPARATION

A. Have fill mix design reports and other submittals required by Paragraph 1.05 accepted by the City prior to start of placement. Notify the City at least 24 hours in advance of grouting with flowable fill.

B. Select fill placement equipment and follow procedures with sufficient safety and care to avoid damage to existing underground utilities and structures. Operate equipment at pressure that will not distort or imperil portion of work, new or existing.

C. Clean sewer lines and video with closed circuit television to identify connections, locate obstructions, and assess condition of pipe. Locate previously unidentified connections, which have not been redirected and reconnected as part of this project, and report them to the City. During placement of fill, compensate for irregularities in sewer pipe, such as obstructions, open joints, or broken pipe to ensure no voids remain unfilled.

D. Perform demolition work prior to starting fill placement. Clean placement areas of sewers and manholes of debris that may hinder fill placement. Remove excessive amounts of sludge and other substances that may degrade performance of fill. Do not leave sludge or other debris in place if filling more than 2 percent of placement volume. Dispose of waste material in compliance with Section 128 - Disposal of Waste Material and Salvageable Material.

E. Remove free water prior to starting fill placement.
Removal and Abandonment of Sewers

3.02 EQUIPMENT

A. Mix flowable fill in automated batch plant and deliver it to site in ready-mix trucks. Performance additives may be added at placement site if required by mix design.

B. Use concrete or grout pumps capable of continuous delivery at planned placement rate.

3.03 DEMOLITION OF SEWER MANHOLES, PIPELINE STRUCTURES, AND FORCE MAINS PRIOR TO ABANDONMENT

A. Remove manhole frames and covers and castings.

B. Demolish and remove precast concrete adjustment rings and corner section, or brick and mortar corbel and chimney, or other pipeline structure, to minimum depth of 4 feet below finished grade. Structure may be removed to greater depth, but not deeper than 18 inches above crown of abandoned sewer.

C. If adjacent sewer lines are not to be filled, place temporary plugs in each line connecting to manhole, in preparation for filling manhole.

3.04 INSTALLATION

A. Abandon sewer lines by completely filling sewer line with flowable fill. Abandon manholes and other structures by filling with flowable fill, together with ballast as applicable, within depth of structures left in place.

B. Place flowable fill to fill the volume between manholes. Continuously place flowable fill from manhole to manhole with no intermediate pour points, but not exceeding 500 feet in length.

C. Have filling operation performed by experienced crews with equipment to monitor density of flowable fill and to control pressure.

D. Temporarily plug sewer lines which are to remain in operation during pouring/pumping to keep lines free of flowable fill.

E. Pump flowable fill through bulkheads constructed for placement of two 2-inch PVC pipes or use other suitable construction methods to contain flowable fill in lines to be abandoned. These pipes will act as injection points or vents for placement of flowable fill.

F. Place flowable fill under pressure flow conditions into properly vented open system until flowable fill emerges from vent pipes. Pump flowable fill with sufficient pressure to overcome friction and to fill sewer from downstream end, to discharge at upstream end.

G. Inject flowable fill through replaced ballast using grouting equipment and series of grout pipes discharging at bottom of placement, allowing fill to rise through ballast effectively filling all voids. Alternatively, sequentially place individual pieces of ballast at same time as flowable fill is placed. Do not fill with ballast more than 50 percent of volume at any level, to prevent nesting and void formation.

H. Remediate placement of flowable fill which does not fill voids in sewer, in manhole or other structures, or where voids develop due to excessive shrinkage or bleeding of fill, by using
pressure grouting either from inside sewer or from surface. Pressure grout shall conform to Section 322 - Tunnel Grout.

I. Plug each end of force main being abandoned.

J. Backfill to surface, above pipe or structures left in place, with flowable fill in restricted areas, compacted bank run sand in unrestricted areas to be paved or select fill in unrestricted areas outside of pavement.

K. Collect and dispose of excess flowable fill material and other debris in accordance with Section 128 – Disposal of Waste Material and Salvageable Material.

3.05 FIELD QUALITY CONTROL

A. Provide batch plant tickets for each truck delivery of flowable fill. Note on tickets addition of admixtures at site.

B. Check flow characteristics and workability of fill as placement proceeds.

C. Obtain at least three test cylinders for each placement area for determination of 56-day compressive strength and bleeding. Acceptance of placement will be based on average strength of three tests.

D. Record volume of ballast together with flowable fill placement for same space to demonstrate that voids have been filled.

3.06 PROTECTION OF PERSONS AND PROPERTY

A. Provide safe working conditions for employees throughout demolition and removal operations. Observe safety requirements for work below grade.

B. Maintain safe access to adjacent property and buildings. Do not obstruct roadways, sidewalks or passageways adjacent to work.

END OF SECTION
SECTION 302
STRUCTURAL EXCAVATION AND BACKFILL

D-302.01 DESCRIPTION: This item shall consist of doing the excavation for the placing of structures; for the disposal of all material obtained from such excavation; for the backfilling around completed structures to the finished grade as called for on the plans. Work to be done shall include all the necessary pumping or bailing, sheeting, drainage, and the construction and removal of any required cofferdams. Unless otherwise provided, the work included herein shall provide for the removal of old structures or portions thereof, trees, and other obstructions necessary to the proposed construction.

D-302.02 DEFINITIONS: "Common Structural Excavation" shall include the removal of all materials regardless of its nature.

D-302.03 USE OF EXPLOSIVES: When the use of explosives is necessary for the prosecution of the work, the Contractor shall use the utmost care not to endanger life or property. All explosives shall be stored in a secure manner, and all storage places shall be marked clearly "DANGEROUS EXPLOSIVES". The method of storing and handling explosives and highly flammable materials shall conform to Federal and State laws and regulations. Contractor shall provide permit from the appropriate agency. The Contractor shall not use explosives until he has taken the necessary legal precautions to save the Owner against any claims arising from such use of explosives.

CONSTRUCTION METHODS

D-302.04 EQUIPMENT: All equipment necessary and required for the proper construction of structures and appurtenances shall be on project site in first class working condition and shall be approved by the Engineer before construction is permitted to start.

The Contractor shall provide hand tamping devices and pneumatic tampers as may be necessary to obtain the proper compaction for the bed and backfill as specified.

D-302.05 COMMON EXCAVATION: Common excavation shall be done in accordance with the lines and depths indicated on the plans or as established by the Engineer. Unless written permission to the contrary is given by the Engineer, no excavation shall be made outside a vertical plan three feet from the footing lines and parallel thereto.

In order that the Engineer may judge the adequacy of a proposed foundation, the Contractor, if requested, shall make soundings to determine the character of the subgrade materials. The maximum depth of such soundings will not be required to exceed five (5) feet below the proposed footing grade; it is the intent of this provision that soundings shall be made at the time the excavation in each foundation is approximately complete.

The final elevation to which a foundation is to be constructed shall be as shown on the plans or as raised or lowered by written order of the Engineer when such alterations are judged proper to satisfactorily comply with the design requirements for the structure. Should it be found necessary in the judgment of the plans, the necessary alterations in the details of the structure shall be accomplished in a manner as directed by the Engineer.
When a structure is to rest on an excavated surface other than rock, special care shall be taken not to disturb the bottom of the excavation and the final removal of the foundation material to grade shall not be performed until just before the footing is placed.

**D-302.06 ROCK EXCAVATION:** All material encountered, regardless of its nature, shall be included as common structural excavation.

Unless written permission to the contrary is given by the Engineer, no excavation shall be made outside a vertical plane 3 (three) feet from the footing lines and parallel thereto.

Rock foundation material shall be freed from all loose material, cleaned and cut to a firm surface either level, stepped, or serrated as directed by the Engineer. All seams shall be cleaned out and filled out with concrete at the time the footing is placed.

**D-302.07 EXCAVATED MATERIAL:** Excavated material required to be used for backfill may be deposited by the Contractor in storage piles at points convenient for rehandling. The location of storage piles shall be subjected to the approval of the Engineer who may require that survey points or lines be kept free from any obstruction.

Excavated material not required for backfill shall be disposed of by the Contractor as directed by the Engineer or as specified herein. If, in the opinion of the Engineer, the bottom of the ditch consists of unstable soil, this soil shall be removed from the full width of the trench and replaced with a pit-run gravel. Pit-run gravel shall vary in size from 3/4" to 3 1/2". The material shall be free from large amounts of organic material such as grass, roots, etc. The Engineer shall determine the depth of removal or unstable soil and the amount of backfill necessary. The cost of removing this unstable soil and replacing it with approved material shall be covered by a supplemental agreement. The sides of the trench shall be vertical unless otherwise approved by the Engineer. The Contractor shall install such trench bracing and sheeting as is necessary to protect the excavation also as required for the safety and to conform with governing laws.

Unless otherwise provided, the bracing and sheeting shall be removed by the Contractor after the backfilling has been replaced to a point at least 12 (twelve) inches above the top of the structure. In no case shall any sheeting or bracing be removed until the backfilling conditions have been met. The cost of bracing and sheeting shall be included in the unit price per linear foot for the structures.

The Contractor shall take adequate precautions to prevent damage to all existing utilities. Any utility lines cut or damaged shall be repaired or restored to their former condition.

**D-302.08 DEWATERING TRENCH:** Removal of water may be accomplished by bailing, pumping, or by a well-point installation as conditions warrant. Pumping or bailing from any excavation shall be done through or alongside any concrete being placed. No pumping or bailing will be permitted during the placing of concrete or for a period of at least 24 hours thereafter, unless it is done from a suitable sump separated from the concrete work by a watertight wall.

1. Minor water seepage or pockets of saturated soil may be effectively controlled through bailing or pumping. This control shall be accomplished without removing any adjacent
soil that could weaken or undermine any access pit, its supports, or other nearby structure.

2. Larger volumes of ground water shall be controlled with one or more well points or with staged deep wells. Well points and staged deep well pumping systems shall be installed and operated without damage to property or structures, and without interference with the rights of the public, owners of private property, pedestrians, vehicular traffic, or the work of other contractors. Any pumping methods used for de-watering and control of ground water and seepage shall have properly designated filters to ensure that the adjacent soil is not pumped along with the water. Well diameter, well spacing and the pump’s pumping rate, shall provide adequate draw down of the water level. Wells shall be located to intercept ground water that otherwise would enter the access pit excavation and interfere with the work. Upon removal of a well, the hole shall be filled and grouted according to the specifications identified as flowable fill, and plug drill holes as directed by the Engineer.

3. Existing storm sewers shall only be used to discharge water from the dewatering operation in accordance with a permit obtained from the appropriate storm sewer owner. Filters or sediment control devices shall be required to ensure that the existing system is not adversely affected by construction debris or sediment.

4. If grouting is used to prevent ground water from entering the area of the access pit, the grouting shall be installed without damage to property or structures and without interference with the rights of the public, owners of private property, pedestrians, vehicular traffic, or the work of other contractors. The material properties of the grout shall conform to the specifications identified as flowable fill.

D-302.09 BEDDING: The structure shall be bedded as shown on plans on fine granular materials over an earth foundation accurately shaped to fit the lower part of the structure exterior for at least 15% of its overall height. Selected material from excavation or borrow shall then be placed along both sides of the structure equally in layers not more than six (6) inches thick and compacted by mechanical tamps or rammers for the remainder of the lower 30% of the overall height of the structure.

D-302.10 BACKFILLING: As soon as practicable, all portions of excavation not occupied by the permanent structure shall be backfilled. Backfill material shall be free from large or frozen lumps, wood or other extraneous material, placed in successive layers of not more than 6" in depth (loose measurement) for the full width of the cross section. The material and the layers shall have the proper moisture content before tamping or rolling. Wetting or drying of the material and manipulations to secure a uniform moisture content throughout the layer will be required. Should the material be too wet to permit proper compaction or rolling, all work on all positions of the fill thus affected shall be corrected. Unless otherwise provided by the plans or special provisions, hand tamping will not be accepted as an alternate for mechanical compaction.

As a general rule, material used in filling or backfilling the portions described in this paragraph shall be an earth free of any appreciable amount of gravel or stone particles more than 4 (four) inches in greatest dimension and of a gradation that permits thorough compaction. When, in the opinion of the Engineer, such material is not readily available, the use of rock or gravel mixed with earth will be permitted provided no particles larger than 12 (twelve) inches in the greatest and 6 (six) inches in the
least dimensions may be used. The percentage of fines shall be sufficient to fill all voids and insure a uniform and thoroughly compacted mass of proper density. **No backfill shall be placed adjacent to or over single and multiple boxes until the top slab has attained 500 psi flexural strength.**

All backfill as specified above shall be compacted to not less than 95% of the maximum density at optimum moisture content as determined by procedures set out under Tex-113-E or Tex-114-E. The compaction shall extend to the entire depth of each layer as specified or shown on the plans and the backfill, when completed, shall be a homogenous and uniformly compacted mass. **Water jetting in backfill operations will not be permitted.**

**D-302.11 CLEANING AND RESTORATION OF SITE:** After the backfill is completed, the Contractor shall notify the Environmental Services Department before the disposal of all surplus material, dirt, and rubbish from the site and shall restore all disturbed areas to their original condition. After all work is completed, the Contractor shall remove all tools and other equipment used by him, leaving the entire site free, clear, and in good condition.

**D-302.12 MEASUREMENT AND PAYMENT** No separate measurement or payment will be made under this item, but all such work done shall be deemed a subsidiary obligation of the Contractor, and as having been taken into account and included in the price bid for the complete job.
SECTION 304
REINFORCED CONCRETE STORM DRAIN PIPE

D-304.01 DESCRIPTION: This item shall consist of reinforced concrete storm drain pipe of types, sizes, and classes shown on the plans furnished and existing in the field. This specification also deals with existing, conflicting pipelines discovered during construction requiring replacement.

MATERIALS

D-304.02 REINFORCED CONCRETE STORM DRAIN PIPE: Reinforced concrete storm drain pipe shall be tongue and groove pipe and shall meet the requirements of ASTM Designation C76-59T, Class 3, with either Type A or Type B Wall, and 24” diameter minimum. Extra strength pipe shall meet the requirements of ASTM Designation C76-59T, Class 4, with either Type A or Type B Wall or latest ASTM Standards. Where pipe is installed with a cover of 12” or less, it shall be Class 4 with Type "A" Wall.

Causes for Rejection: Pipe shall be subject to rejection for failure to conform to any of the specification requirements. Individual sections of pipe may be rejected because of any of the following:

(a) Fractures or cracks passing through the shell, except for a single end crack that does not exceed the depth of the joint.
(b) Defects that indicate imperfect proportioning, mixing and molding.
(c) Surface defects indicating honeycombed or opened texture.
(d) Damaged ends, where such damage would prevent making a satisfactory joint.
(e) Pipe sections not installed in accordance to the lines and grades shown on the plans.

Repairs: Pipe may be repaired if necessary, because of occasional imperfections in manufacture or accidental injury during handling and will be acceptable if, in the opinion of the Engineer, the repairs are sound and properly finished and cured and the repaired pipe conforms to the requirements of the specifications.

Rejections: All rejected pipe shall be plainly marked by the Engineer/Inspector and shall be replaced by the Contractor with pipe which meets the requirements of these specifications. Such rejected pipe shall be removed immediately from the site of work.

D-304.03 JOINTS MATERIAL: Reinforced concrete drain pipe joints shall be constructed to Ram-Nek, rubber O-rings, or approved equal.

D-304.04 CONCRETE: Concrete used for pipe cradles shall meet the requirements of Class "C" concrete (3600 psi), as set out in the section titled "CONCRETE" of these specifications. This
CONSTRUCTION METHODS

D-304.05 EQUIPMENT: All equipment necessary and required for the proper construction of sewers and appurtenances shall be on project site in first class working condition and shall be approved by the Engineer before construction is permitted to start.

The Contractor shall provide such hand tamping devices and pneumatic tampers as may be necessary to obtain the proper compaction for the pipe and backfill as specified.

D-304.06 EXCAVATION:

(a) Common: Common excavation shall consist of all excavation and shall be carried out to neat lines as specified and shown on the plans. If the excavation is carried out to a point below the required depth, this portion of the trench shall be filled at the Contractor's expense with selected material approved by the Engineer and thoroughly compacted to the specified elevation of the pipe bed.

(b) Rock: Rock excavation shall consist of the removal of boulders and detached rock 1/2 cubic yards in volume or greater, and all rock in ledges or masses which can be removed only by the use of bars, sledges, mechanical hammers, or by blasting.

The sides of the trenches shall be excavated to neat lines of the required width and no rock masses shall be allowed to extend into these lines. The bottom of the trench shall be excavated horizontally to a depth of at least one-half the diameter of the pipe, or a minimum of 6 (six) inches greater than the finished grade of the pipe bed. After removal of all broken material from the trench, this portion of the trench shall be filled with clean, dry sand, or an equivalent granular material to the elevation of the pipe bed.

When the use of explosives is necessary for the prosecution of the work, the Contractor shall use the utmost care not to endanger life or property. All explosives shall be stored in a secure manner and all storage places shall be clearly marked "DANGEROUS EXPLOSIVES". The method of storing and handling explosives and highly flammable materials shall conform to Federal, State, and local laws and regulations. The Contractor shall not store or use explosives until he has taken the necessary legal precautions to save the Owner against any claims arising from such possession or use of explosives, with permission secured from the Engineer.

(c) General: Excavated material not required or acceptable for backfill shall be disposed of by the Contractor as directed by the Engineer, or as specified herein. If, in the opinion of the Engineer, the bottom of the ditch consists of unstable soil, this soil shall be removed from the full width of the trench and replaced with a pit run gravel or pipe cradles. Pipe cradles shall be constructed in accordance with Division D, Section 304, Paragraph D-304.11, "CRADLES", of these specifications. Pit run gravel shall vary in size from 3/4" to 3-1/2". The material shall be free from large amounts of organic material such as grass, roots, etc. The Engineer shall determine the depth of removal of unstable soil and the amount of backfill necessary. The cost of removing this unstable soil and
replacing it with approved material shall be covered by supplemental agreement.

The sides of the trench shall be vertical unless otherwise approved by the Engineer. Spaces for the construction of pipe joints shall be excavated accurately to size so that the barrel supports the entire weight of the pipe and so that no less than 3/4 of the length of the barrel is in continuous contact with the bed. Joint holes shall be large enough to permit easy working under the bottom of the pipe. The bottom of the ditch shall be shaped as shown on the plans.

The Contractor shall install such trench bracing and sheeting as is necessary to protect the excavation, and as required for safety and to conform with governing laws. Such installations shall be governed by the requirements set forth under Division D, Section 802, "SHEETING AND BRACING", and pursuant to the Trench Safety Law of the State of Texas.

Unless otherwise provided, the bracing and sheeting shall be removed by the Contractor after the backfilling has been replaced to a point at least 12 (twelve) inches above the top of the pipe. In no case shall any sheeting or bracing be removed until the backfilling conditions have been met. The cost of bracing and sheeting shall be included in the lump sum price per foot of pipe in the Trench Safety bid item.

The Contractor shall take adequate precautions to prevent damage to all existing utilities. Any utility lines cut or damaged shall be repaired and restored to their former condition as specified by the respective utility.

D-304.07 TUNNELING: If approved by City Engineer, refer to Division D, Section 220

D-304.08 EXCAVATION IN STREETS: Excavation in streets, together with the implementation and maintenance of the traffic control plan where specified and the restoration of the pavement riding surface shall be in accordance with plan details or as required by other specifications included in the contract.

Pavement shall be restored as per Division D, Section 522 and 534.

D-304.09 REMOVING OLD STRUCTURES: When old inlets or manholes are encountered and no plan provision is made for adjustments or connection to the new sewers, such manholes and inlets shall be removed completely to a depth one (1) foot below the bottom of the trench. In each instance, the bottom of the trench shall be restored to grade by backfilling and compacting by the methods provided hereinafter for backfill. Where the trench cuts through storm or sanitary sewers which are known to be abandoned, these sewers shall be cut flush with the side of the trench and blocked with a concrete plug in a manner satisfactory to the Engineer.

D-304.10 DEWATERING TRENCH: Sewers shall not be constructed or laid in a trench in the presence of water. All water shall be removed from the trench sufficiently prior to the sewer placing operation to insure a dry, firm bed on which to place the sewer, and the trench shall be maintained in such unwatered condition until all concrete and mortar is set. Removal of water may be accomplished by bailing, pumping, or by a well-point installation as conditions warrant.
In the event that a trench cannot be dewatered to the point where the pipe subgrade is free from mud, or it is difficult to keep the reinforcing steel clean in cast-in-place monolithic sewers, a seal shall be used in the bottom of the trench. Such seal shall consist of a lean concrete mixture (not less than three (3) sacks of cement per cubic yard), with a minimum depth of three (3) inches.

D-304.11 CRADLES: When, in the opinion of the Engineer, the natural fill material forming the bottom of the trench does not offer a suitable foundation for the pipe, he shall determine the location and dimensions of the necessary supporting cradles which must be added. These design details shall be shown on plans furnished to the Contractor, who will carry out the required work under the Engineer's direction. Payment for any additional work incurred in this operation shall be covered by Supplemental Agreement.

D-304.12 CONNECTIONS: When a pipe to pipe connection is proposed, the connecting pipe outside diameter in no case shall exceed one half the inside diameter of the main storm drain. All connections shall provide a suitable concrete collar as per details 304-1 thru 304-3. Connections that lay on a pipe joint will not be allowed.

D-304.13 INSTALLATION AND BACKFILL:

1. Bedding material shall consist on granular material such as gravel, pea gravel and any other material approved by the engineer. Place bedding to the depths shown on the Standard details or project plans. The bedding shall be spread manually around the pipe to provide uniform bearing.

2. Pipe installation shall start at the outlet end unless otherwise authorized, with the spigot or tongue end pointing downstream, and precede towards the inlet end with the abutting sections properly matched, true to the established lines and grades. Lower sections of pipe into the trench without damaging the pipe or disturbing the bedding and sides of trench. Prevent the bedding material from entering the pipe as is laid. Carefully clean the ends of the pipe before the joint material is applied. Once the pipe is in place, fill the lift holes with the precast concrete plugs.

Lay multiple lines of reinforced concrete pipe with the center lines of individual barrels parallel. Unless otherwise shown on the plans, use the clear distances between outer surfaces of adjacent pipes shown on the table.

<table>
<thead>
<tr>
<th>Equivalent Diameter</th>
<th>Min. Clear Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 in.</td>
<td>11 in.</td>
</tr>
<tr>
<td>30 in.</td>
<td>1 ft. 1 in.</td>
</tr>
<tr>
<td>36 in.</td>
<td>1 ft. 3 in.</td>
</tr>
<tr>
<td>42 in.</td>
<td>1 ft. 5 in.</td>
</tr>
<tr>
<td>48 in.</td>
<td>1 ft. 7 in.</td>
</tr>
<tr>
<td>54 in.</td>
<td>1 ft. 11 in.</td>
</tr>
<tr>
<td>60 to 84 in.</td>
<td>2 ft.</td>
</tr>
</tbody>
</table>
3. Backfill:

3.1. Trench shall not be backfilled until the installed pipe conforms to the requirements specified. Any trench improperly backfilled, or where settlements occurs, shall be reopened to the depth required for proper compaction, then refilled and compacted with the surface restored to the required grade and compaction. No trench more than 300 feet shall be kept open without backfill.

3.2. Initial (primary) backfill to a point of 12 inches above the top of pipe shall be done as follows:

3.2.1. Suitable excavated material placed in uniform lifts not more than 6 inches in depth and shall be compacted to the density specified herein. The maximum dry density and optimum moisture shall be determined as per TxDOT Tex-114-E. Test for in place density shall be in accordance with TxDOT Tex-115-E within 24 hours after compaction. Each lift shall be compacted to the required density and moisture as shown bellow, unless otherwise shown on the plans:

<table>
<thead>
<tr>
<th>Subgrade Material</th>
<th>Density</th>
<th>Moisture Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>PI ≤ 20</td>
<td>≥ 95% of Max Dry Density</td>
<td>± 2% of Opt. or greater</td>
</tr>
<tr>
<td>PI &gt; 20</td>
<td>≥ 95% of Max Dry Density</td>
<td>≥ Opt. Moisture</td>
</tr>
</tbody>
</table>

3.2.2. Cement stabilized Sand. When shown on the plans, backfilled the excavation with cement stabilized sand backfill as per Division D Section 134. Prevent the pipe from being displaced during the placement and prevent the backfill from entering the pipes. There is no separate item for cement stabilized sand, unless shown on the plans as a separate pay item.

3.2.3. Flowable Backfill. When shown on the plans, conform with Division D Section 136. There is no separate item for cement stabilized sand, unless shown on the plans as a separate pay item.

3.2.4. Select Fill or Flexible Base (gravel, caliche, crushed limestone).

Clean gravel approved by the engineer may be used for backfill from the bottom of the trench to the top of the pipe. The gravel shall be placed no to exceed 10 inches in depth and lightly tamped to consolidate the mass against pipe and earth surfaces.

Flexible base material (caliche, crushed limestone) may be used from the bottom of the trench to 12 inches above the top of the pipe or to the bottom of the street base in lifts no to exceed 8 inches. Material shall contain the required moisture to obtain the density for each layer to no less of 95% of the maximum dry density.

3.3. Secondary Backfill. After the initial backfill has been completed at a point of 12 inches above the top of pipe, the material for secondary backfill shall be placed in uniform layers no more than 10 inches in depth (loose measurement) and shall be compacted to the required density specified herein. Excavation material used for secondary backfill.
shall comply with the following unless shown on the plans:

**Secondary Backfill**

<table>
<thead>
<tr>
<th></th>
<th>PI ≤ 20</th>
<th>PI &gt; 20</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subgrade Mat.</strong></td>
<td>≥ 95% Max Dry Dens.</td>
<td>≥ 95% Max Dry Dens.</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>≥ 95% Max Dry Dens.</td>
<td>≥ 95% Max Dry Dens.</td>
</tr>
<tr>
<td><strong>Moisture Cont.</strong></td>
<td>± 2% of Opt. or greater</td>
<td>≥ Opt. Moisture</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>PI ≤ 20</th>
<th>PI &gt; 20</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subgrade Mat.</strong></td>
<td>≥ 90% Max Dry Dens.</td>
<td>≥ 90% Max Dry Dens.</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>≥ 90% Max Dry Dens.</td>
<td>≥ 90% Max Dry Dens.</td>
</tr>
<tr>
<td><strong>Moisture Cont.</strong></td>
<td>± 2% of Opt. or greater</td>
<td>≥ Opt. Moisture</td>
</tr>
</tbody>
</table>

3.4. Water jetting in this backfill operation **will not be permitted.**

**D-304.14 BACKFILL-UTILITIES:** Cover between the top of a sanitary sewer pipe and the concrete pipe bottom shall be at least 2 feet unless otherwise shown on the plans.

**D-304.15 TELEVISING PIPE:** New storm drains up to 48” in diameter shall be inspected by closed circuit television (CCTV) after completion of trench backfill, all apurtrances, connections, and structures installed as well as finish grading, but prior to the placement of pavement or permanent trench resurfacing, to determine the existence and extent of any obstructions, structural deficiencies, joint installation or sags as per Division D Section 226.

**D-304.16 MEASUREMENT:** The footage of pipe shall be paid for on a unit price basis and shall be the number of linear feet of pipe in place measured along the centerline of the pipe between the ends of the pipe or between the interior wall of manholes or junction boxes. The several sizes of pipe shall be measured separately. No separate measurement or payment shall be made for "rock excavation".

**D-304.17 PAYMENT** The number of linear feet of pipe determined as provided in above paragraph shall be paid at the contract unit price for each linear foot of the various sizes. The price bid shall be considered to include all labor, materials, and equipment rentals necessary to complete the work as specified, as well as for excavation, hauling, backfill, testing, all barricades, lights, and other protective devices necessary to adequately preserve the safety of limb, life, and property, and incidentals necessary to complete the unit, as shown on the plans and as described in the specifications.
SPECIAL PROVISION TO SECTION 304
REINFORCED CONCRETE STORM DRAIN PIPE

Remove Section D-304.09 Removing Old Structures and replace with the following:

D-304.09 REMOVING AND ABANDONING EXISTING STORM MANHOLES AND PIPE

When indicated in the Drawings, remove or cut, plug, and abandon existing storm drain manholes and piping.

When old inlets or manholes are encountered and no plan provision is made for adjustments or connection to the new sewers, such manholes and inlets shall be removed completely to a depth one (1) foot below the bottom of the trench. In each instance, the bottom of the trench shall be restored to grade by backfilling and compacting by the methods provided hereinafter for backfill. Where the trench cuts through storm or sanitary sewers which are known to be abandoned, these sewers shall be cut flush with the side of the trench and blocked with a concrete plug in a manner satisfactory to the Engineer.

Add the following to Section D-304.16 Measurement:

Abandonment of existing storm drain manholes shall be per each.

Removal of existing storm drain manholes shall be per each.

Cut, plug, and abandonment of existing storm drain pipe shall be per each for each diameter.

Removal of existing storm drain pipe shall be per linear foot for each diameter.

Add the following to Section D-304.17 Payment:

Payment for abandonment of existing storm drain manholes shall include all labor, materials, and equipment to abandon existing manholes.

Payment for removal of existing storm drain manholes shall include all labor, materials, and equipment to remove and dispose of existing manholes.

Payment for cut, plug, and abandonment of existing storm drain pipe shall include all labor, materials, and equipment to abandon existing storm drain pipe.

Payment for removal of existing storm drain pipe shall include all labor, materials, and equipment to remove and dispose of existing storm drain pipe.
SECTION 308
HIGH DENSITY POLYETHYLENE STORM DRAIN PIPE

D-308.01 GENERAL: This Item shall govern for the furnishing and installing of all thermoplastic pipe for constructing thermoplastic pipe culverts or thermoplastic storm sewer mains, laterals, and stubs. The pipes shall be of the sizes, types, design and dimensions shown on the plans and shall include all connections and joints to new or existing pipes, sewer, manholes, inlets, headwalls and other appurtenances as may be required to complete the work.

A private system using HDPE pipe up to the property line, may enter the public right of way to connect with a public storm sewer at a structure. However, HDPE pipe is not allowed to be installed underneath public streets. Do not utilized HDPE pipe in closed storm sewers.

D-308.02 MATERIALS: Pipes within the R.O.W. shall be Type “S” with watertight joint and not to exceed 36" diam. Unless otherwise specified on the plans or herein, thermoplastic pipe and joint fittings shall conform to the following:

(a) High density polyethylene pipe and fittings shall meet the requirements as in AASHTO M 294.

(b) Raw Materials. The pipes and the fittings shall be manufactured from virgin PE compounds, which conform to the requirements of cell class 335400C as defined and described in ASTM D 3350, except that carbon black content shall not exceed 5%. PE compounds shall meet the Environmental Stress Crack Resistance according to the SP-NCTL test set forth in AASHTO M 294.

(c) Designation of Type. The HDPE pipes used for gravity flow drainage applications shall be of Type S (outer corrugated wall with smooth inner liner) or Type D (inner and outer smooth walls braced circumferentially or spirally with projections or ribs).

(d) Section Properties. Minimum wall thickness of the inner walls of Type S pipe and inner and outer walls of Type D pipe shall be as specified in Section 7.2.2 of AASHTO M 294. The pipe stiffness at 5% deflection, when determined in accordance with ASTM designation D 2412, shall be as specified in Section 7.4 of AASHTO M 294.

D-308.04 JOINTS: Joints shall be installed such that the connection of pipe sections will form a continuous line free from irregularities in the flow line. Joints shall conform to one of the following:

- Watertight Joints — Joints meeting the requirements of ASTM 3212.

D-308.05 END SECTIONS: Provide non flammable end sections of the minimum length shown in the table I for each exposed pipe end. Minimum length shown in the table refers to the portion of pipe completely embedded into the embankment or natural ground. All exposed and mitered pipe sections shall consist of the same non-flammable material.
Unless otherwise specified on the plans, non-flammable end sections shall be corrugated metal as described in Section 306, reinforced concrete as described in Section 304, or other non-flammable material deemed acceptable by the City.

Table I
Minimum length of Non-flammable End Section

<table>
<thead>
<tr>
<th>Normal Pipe Diameter (in.)</th>
<th>Minimum length of End Section (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>36</td>
<td>6</td>
</tr>
</tbody>
</table>

D-308.06 APRONS: Provide non-flammable aprons consisting of concrete rip-rap or other approved material at each exposed pipe end. Limits of apron shall be as Drawing No.

D-308.07 CONSTRUCTION METHODS: The location of private driveway and side road pipe shall be constructed at locations shown on the plans or as directed by the Engineer.

Only trench installation of thermoplastic pipe will be permitted. No portion of the pipe shall project above the existing ground level.

(1) Excavation. All excavation shall be in accordance with the requirements of “Excavation and Backfill for Structures”. The width of the trench for pipe installation shall be sufficient, but no greater than necessary, to ensure working room to properly and safely place and compact haunching and other embedment materials. The space between the pipe and trench wall must be wider than the compaction equipment used in the pipe zone.

When Type I backfill is used, the minimum trench width is the pipe outside diameter plus 12 inches.

When Type II or Type III backfill is used, the minimum trench width shall be as specified in Table II.

Table II
Minimum Trench Width

<table>
<thead>
<tr>
<th>Normal Pipe Diameter</th>
<th>Minimum Trench Width (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>54</td>
</tr>
<tr>
<td>30</td>
<td>66</td>
</tr>
<tr>
<td>36</td>
<td>78</td>
</tr>
</tbody>
</table>
(2) **Installation in Embankment.** If any portion of the pipe projects above the existing ground level, an embankment shall be constructed as shown in the plans or as directed by the Engineer for a distance outside each side of the pipe location of not less than five times the diameter and to a minimum elevation of 2 feet above the top of the pipe. The trench shall then be excavated to a width as specified above.

(3) **Shaping and Bedding.** The pipe shall be bedded in a foundation of compacted cohesionless material, such as crushed stone, or pea gravel, with a maximum size not exceeding 3/8”’. This material shall extend a minimum of 6 inches below the outermost corrugations or ribs, and shall be carefully and accurately shaped to fit the lowest part of the pipe exterior for a least 10 percent of the overall height. When requested by the Engineer, the Contractor shall furnish a template for each size and shape of pipe to be placed for use in checking the shaping of the bedding. The template shall consist of a thin plate or board cut to match the lower half of the cross section of the pipe.

(4) **Handling and Storage.** Store pipe above ground on adequate blocking, keep pipe clean and fully drained at all times during storage. Handling and storage of thermoplastic pipe shall be in accordance with the pipe manufacturer’s instructions. Proper facilities shall be provided for hoisting and lowering pipe into the trench without damaging the pipe or disturbing the bedding or the walls of the trench.

(5) **Laying Pipe.** Unless otherwise authorized by the Engineer, the laying of pipes on the bedding shall be started at the outlet end with the separate sections firmly joined together. Proper facilities shall be provided for hoisting and lowering the section of pipe into the trench without damaging the pipe or disturbing the bedding and the sides of the trench. Any pipe which is not in alignment or which shows any undue settlement after laying shall be removed and relayed at the Contractor’s expense.

Multiple installation of thermoplastic pipe shall be laid with the center lines of individual barrels parallel. Unless otherwise indicated on the plans, the following clear distances between outer surfaces of adjacent pipes shall be maintained:

<table>
<thead>
<tr>
<th>Nominal Pipe Diameter</th>
<th>Min. Clear Distance Between Pipes</th>
</tr>
</thead>
<tbody>
<tr>
<td>24”</td>
<td>17”</td>
</tr>
<tr>
<td>30”</td>
<td>20”</td>
</tr>
<tr>
<td>36”</td>
<td>23”</td>
</tr>
</tbody>
</table>

(6) **Reuse of Existing Appurtenance.** When existing appurtenances are specified on the plans for reuse, the portion to be reused shall be severed from the existing culvert and moved to the new position previously prepared, by approved methods. Connections shall conform to the requirements for joining sections of pipes as indicated herein or as shown on the plans. Any headwalls and any...
aprons or pipe attached to the headwall that are damaged during moving operations shall be restored to their original condition at the Contractor’s expense. The Contractor, if he so desires, may remove and dispose of the existing headwalls and aprons and construct new headwalls at his own expense, in accordance with the pertinent specifications and design indicated on the plans or as furnished by the Engineer.

(7) **Connections and Stub Ends.** Connections of pipe sewer to existing sewers or sewer appurtenance shall be as shown on the plans or as directed by the Engineer. The bottom of the existing structure shall be mortared or concreted if necessary, to eliminate any drainage pockets created by the new connection. Where the sewer is connected into existing structures, which are to remain in service, any damage to the existing structure resulting from making the connection shall be restored by the Contractor to the satisfaction of the Engineer. Stub ends, for connections to future work not shown on the plans, shall be sealed by installing watertight plugs into the free end of the pipe.

**D-308.08 BACKFILLING:** Backfill from the pipe bedding up to 1 foot above the top of the pipe is critical for the successful performance of the pipe. Pipe backfill provides necessary structural support to the pipe and controls pipe deflection. Special emphasis is to be placed upon the need for obtaining uniform backfill material and uniform compacted density throughout the length of the pipe, so that unequal pressure will be avoided. Care should be taken to insure proper backfill under the pipe in the haunch zone.

1. Primary backfill material shall meet the following specifications:

   - Type I - Backfill shall consist of flowable fill in accordance with Division D Section 134, “Flowable Backfill”. The flowable backfill shall be placed across the entire width of the trench and shall maintain a minimum depth of 12 inches above the pipe. A minimum of 24 hours shall elapse prior to backfilling the remaining portion of the trench with other backfill material.

   - Type II - Backfill shall consist of cement stabilized backfill in accordance with Division D Section 136. Cement stabilized backfill shall be placed and compacted to ensure that all voids are filled completely.

   - Type III - Backfill shall consist of hard, durable, clean granular material that is free of organic matter, clay lumps, and other deleterious matter. Such backfill shall meet the gradation requirements shown in Table II. The backfill material shall be placed along both sides of the completed structure(s) to a depth of 12 inches above the pipe. The backfill shall be placed in uniform layers not exceeding 6 inches in depth (loose measurement), wetted if required, and thoroughly compacted between adjacent structures and between the structure and the sides of the trench. Until a minimum cover of 12 inches is obtained, only hand operated tamping equipment will be allowed within vertical planes 2 feet beyond the horizontal projection of the outside surfaces of the structure.
Table IV  
Gradation Requirements for Type III Backfill Material

<table>
<thead>
<tr>
<th>Sieve Number</th>
<th>Percent Retained (cumulative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>0 - 5</td>
</tr>
<tr>
<td>7/8 inch</td>
<td>0 - 35</td>
</tr>
<tr>
<td>1/2 inch</td>
<td>0 - 75</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>0 - 95</td>
</tr>
<tr>
<td>No.4</td>
<td>35 - 100</td>
</tr>
<tr>
<td>No. 10</td>
<td>50 - 100</td>
</tr>
<tr>
<td>No. 200</td>
<td>90 - 100</td>
</tr>
</tbody>
</table>

If Type III backfill is utilized, filter fabric shall be placed between the native soil and the backfill. Filter fabric shall conform to the requirements of DMS-6200, Type 1.

2. Secondary backfill shall be in accordance with Division D Section 304.13.3.3

D-308.09 PROTECTION OF PIPE: Unless otherwise shown on the plans or permitted in writing by the Engineer, no heavy earth moving equipment will be permitted over the structure until a minimum of 4 feet of compacted fill (permanent or temporary) has been placed over the top of the structure. Prior to adding each new layer of loose backfill material, until a minimum of 12 inches of cover is obtained, an inspection will be made of the inside periphery of the structure for local or unequal deformation caused by improper construction methods. Evidence of such will be reason for such corrective measures as may be directed by the Engineer.

Pipe damaged by the Contractor shall be removed and replaced by the Contractor at no additional cost.

Maximum deflection (reduction of the barrel base inside diameter) is 5%. Time of measurement shall be not less than 30 days following completion of installation and backfill. Contractor shall notify the engineer for testing.

D-308.10 REINSTALLATION: Deflections in excess of 5% may require the pipe to be removed and new pipe installed.

D-308.11 FIELD QUALITY CONTROL & TESTING:

a) All storm sewer shall be inspected by City inspectors prior to backfilling the pipe.

b) Mandrel testing (or other approved method) shall be required when visual inspection reveals excessive deflection as determined by the City. Testing shall be at the expense of the contractor.

D-306.12 TELEVISING PIPE: New storm drains up to 36” in diameter shall be inspected by closed circuit television (CCTV) after completion of trench backfill, all apurtrances, conectors, and structures installed as well as finish grading, but prior to the placement of pavement or permanent
trench resurfacing, to determine the existence and extent of any obstructions, structural deficiencies, or sags as per Division D Section 226.

**D-308.13 MEASUREMENT:** This Item will be measured by the linear foot. Such measurements will be made between the ends of the barrel along its flow line, exclusive of safety end treatments. For multiple pipes, the measured length will be the sum of the lengths of the barrels, measured as prescribed above.

**D-308.14 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 “Thermoplastic Pipe” of the size, joint type and backfill type specified. This price shall be full compensation for furnishing, hauling, placing and joining of pipes; for all connections to new or existing structures; for moving and reusing headwalls where required; for removing and disposing of portions of existing structures as required; for cuffing of pipe ends on skew; and for all labor, tools, equipment and incidentals necessary to complete the work.
SECTION 312
MANHOLES AND INLETS

D-312.01 DESCRIPTION: This item shall consist of manholes and inlets, complete in place constructed of required materials in accordance with these specifications and at the locations and on conformity with the lines, grades, and dimensions shown on the plans or as required by the Engineer. Drainage junction boxes are classified as manholes.

MATERIALS

D-312.02 PRECAST RINGS, THROAT SECTIONS, AND THROAT RINGS: Precast manhole rings shall be a minimum of four feet in diameter and five inches thick and a maximum of six feet in diameter. Throat sections shall be five inches thick and 2.5 feet in length. Throat rings shall be two feet in diameter and five inches thick. Alternate designs other than precast are to be designed and sealed by a Texas licensed professional engineer.

D-312.03 MORTAR: The mortar for precast rings shall be composed of one part of Portland Cement and two parts mortar sand by volume. Portland cement shall conform to the requirements of ASTM Designation C-150, Type I. Sand shall conform to the requirements of AASHTO Specification M-45. The water shall be clean and free from injurious amounts of sewage, oil, acid, strong alkalis and other vegetable matter.

D-312.04 CONCRETE: Reinforced concrete used in manholes shall conform to the requirements of Class "A" Concrete, under the specification contained herein Division D Section 504 for "CONCRETE". Manholes may be either pre-cast or cast-in-place depending on the design, same requiring the approval of the City Engineer prior to installation.

D-312.05 CAST IRON FRAMES AND COVERS: All castings shall be true to form and dimensions and shall be free from inclusions of foreign matter, casting faults, injurious blow holes, cracks, sponginess, and other defects rendering them unsuitable.

Finished frames and covers shall have the bearing surfaces machined or ground so that there will be no variation that will permit rocking or rattling and the diameter of the cover will be such as to fit the frame without wedging. The machined sets of frames and covers shall be marked in such a way that they can be properly matched for assembly in the field.

Castings shall conform to AASHTO Designation M 306-89 (2000). Castings shall include labeling of manhole type on manhole covers, such as “STORM DRAIN”. Manhole covers shall bear the ‘CITY OF LAREDO” name for all storm drain for proper identification. Casting covers and rings shall be as manufactured by East Jordan Iron Works or approved equal.

D-312.06 INLET UNITS: Inlet units shall be installed in conjunction with the construction or concrete curb and gutter. Prior to placing concrete for curb and gutter, the inlet units shall be set securely in position. Openings for the inlets and recesses in curb and gutter, as indicated on the plans, shall be formed in conjunction with the curb and gutter forms. Concrete for curb and gutter adjacent to the inlet shall be placed using care to secure thoroughly compacted concrete around the
inlet and formed openings and recesses without displacement of the inlet units in the forms.

CONSTRUCTION METHODS

D-312.07 GENERAL: Construct manholes and inlets as soon as is practicable after pipe lines into or through the manhole or inlet locations are completed. All concrete work shall be performed in accordance with the requirements of the item, "Concrete Structures", unless otherwise specified. Forms will be required for all concrete walls except where the nature of the surrounding material may be trimmed to a smooth, vertical face (the outside form for concrete bases supporting brick walls may be omitted with the approval of the Engineer).

Care shall be taken when connecting to the manhole several pipes with an angle less than 90 degrees between them. Minimum clear distance between two wall penetrations shall be 12 in. or half diameter of the smaller penetration, whichever is greater. See Detail No.

D-312.08 EXCAVATION:

(a) Excavation shall conform to Division D Section 302. The Contractor shall do all excavation for structures to the lines, grades, and elevations shown on the plans or staked by the Engineer. The excavation shall be sufficient size to permit the placing of a full width and length of the structure shown, plus such additional sizes to allow for forms.

(b) The Contractor shall do all bracing, sheeting, or shoring necessary to perform and protect the excavation in the structure or as required for safety to conform with governing laws. The cost of bracing, sheeting, and shoring shall be included in the unit price bid for this structure.

(c) Unless otherwise provided, bracing, sheeting, or shoring involved in the construction of this item shall be removed by the Contractor after completion of the structure. The removal shall be performed in such a manner as not to disturb or mar finish or masonry. The cost of removal shall be included in the unit price bid for the structure.

(d) After each excavation is completed, the Contractor shall notify the Engineer to that effect, and concrete and reinforcing steel shall be placed after the Engineer has approved the depth of excavation and the character of the foundation material.

D-312.9 CONCRETE STRUCTURES: Shall be in accordance with Division D Section 406

All invert channels shall be constructed and shaped accurately so as to be smooth, uniform, and cause minimum resistance to flow. The interior floor shall be sloped downward toward the outlet.

D-312.10 INLET AND OUTLET PIPES: Inlet and outlet pipes shall extend through the walls of the structures for sufficient distance beyond the outside of the surface to allow for connections, but shall be cut off flush with the wall on the inside surfaces unless otherwise directed. A concrete collar shall be placed around the pipe so as to prevent leakage and to form a neat connection. Detail No.
Care shall be taken when connecting a pipe in skew to an inlet box to avoid braking the corners and top & bottom beams of the box.

**D-312.11 INVERTS:** The inverts passing out or through the manhole or inlet shall be shaped and routed across the floor of the manhole or inlet as shown on the plans. This may be accomplished by adding and shaping mortar or concrete after the base is cast or by placing the required additional material with the base.

**D-312.12 THE PLACEMENT AND TREATMENT OF CASTING, FRAMES, AND FITTINGS:** All castings, frames, and fittings shall be placed in positions indicated on plans, or as directed by the Engineer and shall be set in true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or anchor bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until all the mortar or concrete is set.

When frames or fittings are to be placed upon previously constructed masonry, the bearing surfaces of the masonry shall be brought true to line and grade and present an even bearing surface in order that the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds or anchored to the masonry as indicated on the plans or as directed and approved by the Engineer. All units shall be set firm and secure.

When concrete structures are so located as to be within the paved areas of the street, the finish top of these structures shall match existing grades.

**D-312.13 BACKFILLING:**

(a) After a structure has been completed, the area around it shall be filled with approved material in accordance with the Division D Section 302, "STRUCTURAL EXCAVATION AND BACKFILL". Fill shall be made to the elevations shown on the plans or ad directed by the Engineer.

(b) No backfill material shall be placed against any structure until permission is given by the Engineer. In the case of the concrete, such permission preferably shall not be given until the concrete has been in place for 14 days and tested in a laboratory conforming to the requirements of ASTM Designation C-42. All water must be removed from excavation before backfilling is done unless otherwise directed by the Engineer.

(c) Fill in place shall be deposited on all sides of the structure at the same time and to approximately the same elevation. Special care shall be taken to prevent any wedging action against the structure and all slopes, bounding or within the area to be backfilled, will be stepped or serrated to prevent wedge action.

(d) All backfill shall be compacted as per Division DSection 302.

(e) Backfill shall not be measured for direct payment. Performance of this work is not payable directly but shall be considered a subsidiary obligation of the Contractor covered under the contract unit price for the structure involved.
D-312.14 CLEANING AND RESTORATION OF SITE: After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt shall be disposed of as ordered by the Engineer. The Contractor shall restore all disturbed areas to their original condition.

After all work is completed, the Contractor shall remove all tools and other equipment used by him, leaving the entire area free, clear, and in good condition. The performance of the work described in this section is not payable directly, but shall be considered as a subsidiary obligation of the Contractor, covered under the contract unit price for each manhole and inlet.

D-312.15 MEASUREMENT: The number, types and nominal sizes of manholes and inlets shown on the plans shall be measured per each unit complete in place and accepted by the Engineer.

D-312.16 PAYMENT: The number of units of manholes and inlets determined as provided in above paragraph shall be paid at the contract unit price for each of the various types and nominal sizes of manholes and inlets as called for on the Bid Schedule, which price and payment shall constitute full compensation for furnishing all materials, for placing and finishing, for all excavation and hauling, for all backfill, for setting and anchoring any frame, cover, for all labor, equipment, tools, and incidentals necessary to complete the unit, as shown on the plans and as described in the specifications.
SECTION 316
CONCRETE ENCASEMENT, CRADLES, SADDLES, AND COLLARS

D-316.01 DESCRIPTION: This Item shall govern for placing concrete encasement, cradles, saddles, and collars, when called for the Project plans or as directed by the Engineer.

D-316.02 MATERIALS: Concrete: All concrete shall be class “A” and conform to the provisions of Division D Section 504 or shall be of the class noted on the plans.

D-316.03 CONSTRUCTION METHODS:

1. Concrete Encasement: When concrete encasement is show on the plans or when directed by the Engineer, the trench shall be excavated and fine graded to a depth conforming with details and sections shown on the plans. The pipe shall be supported by precast concrete blocks of the same strength as the concrete for encasement and securely tied down to prevent floatation. Encasement shall then be placed to a depth and width conforming with details and sections shown on the plans.

2. Concrete Cradles: When concrete cradles are shown on the plans or when called for by the Engineer, the trench shall be prepared and the pipe supported in the same manner as described in this specification and shall be constructed in accordance with details and sections shown on the plans.

3. Concrete Saddles: When shown on the plans or when directed by the Engineer, pipe to receive concrete saddle shall be backfilled in accordance with Division D Section 302, "Structural Excavation, and Backfill" to the spring line and concrete placed for a depth and width conforming with details and sections shown on the plans.

4. Concrete Collars: When shown on the plans or when directed by the Engineer, concrete collars shall be constructed in accordance with details and sections shown on the plans. See details No.

D-316.04 MEASUREMENT: "Concrete Encasement, Cradles, Saddles, and Collars", will be measured by the cubic yard of accepted work calculated based on the lines and dimensions shown on the plans, complete in place. Reinforcing, if required, shall not be measured for payment.

D-316.05 PAYMENT: "Concrete Encasement, Cradles, Saddles, and Collars", will be paid for at the unit price bid per cubic yard, which price shall be full compensation for furnishing and placing all materials, manipulation, labor, tools, equipment, and incidentals necessary to complete the work.
Delete Section D-316.04 Measurement and replace with the following:

D-316.04 MEASUREMENT:

Concrete encasement, cradles, saddles, and collars will not be measured for payment and shall be considered subsidiary to the related work item.

END OF SECTION
SECTION 404
GENERAL CONSTRUCTION AND PREPARATION OF SITE

D-404.01 INTENT OF PLANS AND SPECIFICATIONS: The intent of the plans and specifications is to prescribe a complete work or improvement which the Contractor undertakes to do so, in full compliance with the plans, specifications, special provisions, proposal, and contract. The Contractor shall do all work as provided in the plans, specifications, special provisions, proposal, and contract, and shall do such additional work as may be considered necessary to complete the work in a satisfactory and acceptable manner. The Contractor shall furnish all labor, tools, materials, machinery, equipment, and incidentals necessary to the prosecution of the work.

D-404.02 DESCRIPTION OF SITE: This item shall consist of the preparation of site for construction operations by the removal and disposal of all obstructions which are not otherwise provided for in the plans and specifications.

Such obstructions shall be considered to include removal of sections of existing utility lines (water, sewer, & force main), existing fences/gates, and other such materials as shown on the plans including concrete slabs.

This item shall include the removal of obstructions in accordance with the item "Clearing and Grubbing", Section 402. It is the intent of this item to provide for the disposal of all objectionable materials not specifically provided for elsewhere in the plans/specifications. All materials to be salvaged by the Owner shall be properly disposed of by the contractor as directed.

D-404.03 FINAL CLEAN-UP: Upon the completion of the work and before acceptance and final payment will be made, the Contractor shall clean and remove from the site of the work, surplus and discarded materials, temporary structures, and debris of every kind. Contractor shall leave the site of the work in a neat and orderly condition. Surplus and waste materials removed from the site of the work shall be disposed of at locations satisfactory to the Engineer. Grounds around any structures shall be dressed to final grade as shown on plans.

D-404.04 COORDINATION OF PROJECT: The plans, these specifications, the proposal, special provisions, and all supplementary documents are intended to describe a complete work and are essential parts of the contract. A requirement occurring in any of them is binding. In case of discrepancies, figured dimensions shall govern over specifications; and plans and quantities shown on the plans shall govern over those shown in the proposal. The Contractor shall not take advantage of any apparent error or omission in the plans and specifications, and the Engineer shall be permitted to make such corrections or interpretations as may be deemed necessary for the fulfillment of the intent of the plans and specifications. In the event the Contractor discovers an apparent error or discrepancy, Contractor shall immediately call this to the attention of the Engineer.

D-404.05 COOPERATION OF CONTRACTOR: The Contractor shall give to the work the consistent attention necessary to facilitate the progress thereof, and he shall cooperate with the Engineer, his inspectors, and with other contractors in every way possible.

D-404.06 MATERIALS-GENERAL: The materials shall be the best procurable, as required by the plans, specifications, and special provisions. The Contractor shall not start delivery of materials until...
the Engineer has approved the source of supply. Only materials conforming to these specifications shall be used in the work, and such materials shall be used only after approval has been given by the Engineer and only so long as the quality of said materials remains equal to the requirements of the specifications.

The Contractor shall furnish approved materials from other sources, if for any reason the product from any source at any time before commencement or during the prosecution of the work proves unacceptable. After approval, any material which has become mixed with or coated with dirt or any other foreign substances during its delivery and handling will not be permitted to be used in the work.

**D-404.07 MATERIALS-STORAGE:** Any and all materials, such as cement, lime, mill work, or other materials or equipment subject to deterioration by exposure to weather or other factors, shall be stored in such a manner to protect them from deterioration or damage preceding the time they become a permanent part of final structure.

**D-404.08 MEASUREMENT AND PAYMENT:** All work performed will NOT be paid directly but shall be included in the unit price bid for other items of construction. Price shall be full compensation for furnishing and placing all materials, manipulation, labor, tools, equipment, and incidentals necessary to complete the work.
SECTION 406
CONCRETE STRUCTURES

D-406.01 GENERAL: This item shall consist of reinforced concrete structures built in accordance with the design requirements and details shown on the plans and in conformity with the requirements herein.

MATERIALS

D-406.02 CONCRETE: Concrete shall conform to the requirements of Section D-504. Unless otherwise specified on the plans or in the proposal.

D-406.03 REINFORCING STEEL: Reinforcing steel shall conform to the requirements of Section D-410. Wire mesh reinforcement shall conform to the requirements of ASTM Designation A185.

D-406.04 STRUCTURAL STEEL: Structural steel shall conform to the requirements of ASTM Designation A-36.

D-406.05 EXPANSION JOINT MATERIAL:
(a) Pre-molded expansion joint material shall conform to the requirements of Division D, Section 414, titled, EXPANSION JOINT MATERIALS.

(b) Poured joint material shall conform to requirements of Federal Specifications SS-S-156, SS-S-159, or SS-S-164.

D-406.06 FORM MATERIAL:
(a) Form lumber for all exposed concrete surfaces shall be CM concrete form lumber, Southern Yellow Pine or approved equal, S4S, grade marked in accordance with the latest grading rules of the Southern Pine Association. Form lumber not otherwise specified shall be No. 2 Common Southern Yellow Pine, S4S.

(b) Plywood form shall be of Douglas Fir Plywood, 5 ply, and at least 3/4” thick, conforming to the grading rules as required under State Department of Highways and Public Transportation Specifications.

CONSTRUCTION METHODS

D-406.07 REINFORCEMENT:

(a) Reinforcing shall be detailed, fabricated, and erected in accordance with Manual of Standard Practice for Detailing Reinforced Concrete Structures (ACT 315-57). Shop drawings shall be submitted in triplicate for engineering approval prior to fabrication. All reinforcement shall be entirely free from rust, scale, grease, or other coating which might destroy or reduce its bond with concrete.

(b) Spacing: Unless otherwise indicated, the clear distance between parallel bars shall be not less
than one and one-half times the diameter of round bars. In no case shall the distance between bars be smaller than the maximum size of the aggregates.

**c) Protective Covering:** Reinforcement shall be protected by the thickness of concrete indicated on the plans. Unless otherwise specified, the protective coverings over reinforcement shall not be less than the maximum size of aggregates.

**d) Splicing and Lapping:** As per section D-410

**e) Supports:** All reinforcement shall be secured in place true to the lines and grades, indicated by the use of metal supports, spacers, or ties approved by the Engineer. Such supports shall be of sufficient number and strength to maintain the reinforcement in place throughout the concreting operations. The use of pebbles, pieces of broken stones or brick, metal pipe and wooden blocks shall not be permitted.

**D-406.08 FORMS:**

**a) General:** Forms shall conform to the shape, lines, and dimensions of the members of structures, as called for on the plans and shall be substantial and sufficiently tight to prevent leakage of mortar. All details of form construction shall be subject to the approval of the Engineer and permission to place concrete will not be given until all such work is complete to his satisfaction.

**b) Braces and Ties:** Forms shall be properly braced and tied together so as to maintain position and shape. Metal form of an approved type shall be used to hold forms in place. Such ties shall be of a type especially designed for use in connection with concrete work and shall have provision to permit easy removal of the metal to a depth of at least one-half inch from the surface of the concrete. The use of wire from ties will not be permitted except for minor or special form areas where the use of rigid type metal ties would be impracticable. Where wire ties are used, all wires upon removal of the forms shall be cut back at least one-half inch from the face of the concrete.

**c) Curved Surface:** In the case of exterior exposed curved surfaces, the Contractor shall use such forming as may be necessary to provide smooth forms of uniform curvature.

**d) Coating:** Plywood forms and plywood form lining shall be mill-oiled according to standard practice recommended by the Douglas Fir Plywood Association. Form lumber for all other exposed surfaces shall be coated with approved non-staining mineral oil which shall be applied shortly before the concrete is deposited. In general, all forms shall be thoroughly wetted before the concrete is placed.

**e) Cleanouts:** At the time of placing concrete, the forms shall be clean and entirely free from all chips, dirt, sawdust, and other extraneous matter. For narrow walls and other locations where access to the bottom of the forms is not readily obtainable otherwise, adequate cleanout openings shall be provided.

**f) Chamfers:** Unless otherwise shown on the plans, fill forms at all sharp corners and edges with triangular chamfer strips measuring ¾ in. on the sides. Dress wood molding on all faces. Make
molding for chamfers strips of materials of a grade that will not split when nailed and that can be maintain to true line without warping.

D-406.09 PLACING CONCRETE-GENERAL:

(a) Supervision: The Contractor shall give the Engineer sufficient notice before starting to place concrete in any unit of the structure to permit the inspection of forms, reinforcing steel, and preparation for placing. Concrete shall not be placed in footings until the character of the foundation has been approved by the Engineer and permission has been given to proceed. When footings can be placed in dry foundation pits, forms may be omitted, if desired by the Contractor and approved by the Engineer, and the entire excavation filled with concrete to the top of the footing. Where this procedure is followed, no measurement for payment will be made for concrete placed outside of the footing dimensions shown on the plans.

(b) Placing: Place concrete according to TxDOT item 420. All concrete shall be placed before its initial set has occurred. The operation of depositing and compacting the concrete shall be conducted so as to form a compact, dense, impervious mass of uniform texture which shall show smooth faces on all surfaces. Each part of the forms shall be filled by depositing the concrete directly as near its final position as possible. The coarse aggregate shall be worked back from the face and the concrete forced under and around the reinforcement bars without displacing them. Depositing large quantities at one point in the forms and running or working it along the forms will not be permitted. Concrete in columns shall be placed monolithically unless otherwise provided. An interval of not less than 4 hours shall elapse between the placing of concrete above the tops of the columns or walls to allow shrinkage. Concrete in walls, columns, and deep foundations shall be placed in a manner that will avoid separation of the aggregates or displacement of the reinforcement. Suitable chutes or vertical pipes shall be provided.

(c) Vibrating: All concrete shall be placed with the aid of mechanical vibrating equipment unless otherwise directed. Vibration shall be transmitted directly to the concrete, and in no case shall it be transmitted through the forms of reinforcing steel. The duration of vibration shall at any location be held to the minimum necessary to produce thorough compaction. Vibration shall be supplemented by hand spading to insure the flushing of mortar to the surface of all forms.

(d) Construction Joints: Construction joints shall be formed as shown on the plans. In all cases where they are not shown on the plans, they shall be formed as directed by the Engineer. Where indicated or required dowel rods shall be used. Before placing is resumed, all water and laitance shall be removed and the concrete shall be cut away, if necessary, to insure a strong dense concrete at the joint. In order to secure adequate bond, the surface of all concrete already in place shall be cleaned and roughened and shall then be spread with a 1/2 inch layer of mortar of the same sand-cement ratio as is used in the concrete immediately before the new concrete is deposited.

D-406.10 FINISHING EXPOSED SURFACES: An ordinary surface finish shall be applied to all concrete surfaces either as a final finish or preparatory to a higher grade or class of finish. Higher grades and classes of finish shall be in accordance with TxDOT Item 427, "Surface Finishes for Concrete". Where neither a grade nor class of finish is specified, an ordinary surface finish shall be provided as follows:
After form removal, all porous or honeycombed areas and spalled areas shall be corrected by chipping away all loose or broken material to sound concrete. Holes and spalls caused by removal of metal ties, etc., as required by TxDOT Item 420, shall be cleaned and filled with adhesive grout or epoxy grout. Exposed parts of metal chairs on surfaces to be finished by rubbing shall be chipped out to depth of one-half inch and the surface repaired.

All fins, runs, drips, or mortar shall be removed from surfaces which remain exposed. Form marks and chamfer edges shall be smoothed by grinding and/or rubbing.

Grease, oil, curing compound, etc., shall be removed from surfaces requiring a higher grade of finish. Discolorations resulting from spillage or splashing of asphalt, paint, or other similar material shall be removed. Repairs shall be dense, well bonded, and properly cured, and when made on surfaces which remain exposed and do not require a higher finish, shall be finished to blend with the surrounding concrete. Unless otherwise specified on the plans, ordinary surface finish shall be the final finish for the following exposed surfaces: Inlets, manholes, and sewer appurtenances.

**D-406.11 FINISHING VERTICAL SURFACES (General):** After tie rods and bolts are removed, the holes shall be filled solid with cement mortar. Honeycomb and minor defects shall not be patched until approval has been given by the Engineer.

**D-406.12 REMOVAL OF FORMS:**

**(a) Finished Concrete:** Forms for surfaces required to be finished shall be removed when the concrete has aged not less than 1/2 nor more than 2 curing days after the concrete has been placed.

**(b) Unfinished Concrete:** Forms and false work may be removed when the concrete has attained a compressive strength of not less than 65 percent of the design strength except that forms for walls, columns, and sides of beams may be removed after 48 hours.

**(c) Curing Day:** The term "curing day" will be interpreted as any calendar day on which the temperature is above 50 F for at least 19 hours. In continued cold weather, the Engineer will determine when sufficient time has elapsed to permit the removal of forms and false work.

**D-406.13 DEFECTIVE WORK:** Any defective work discovered after the forms have been removed shall be repaired immediately. If the surface of the concrete is bulging, uneven, or shows excess honeycombing or form marks, which, in the opinion of the Engineer, cannot be repaired satisfactorily, the entire section shall be removed before the repair work is started. No extra compensation will be allowed for extra work or materials involved in repairing or replacing defective concrete.

**D-406.14 CURING:** Concrete shall be maintained in a moist condition for at least five (5) days after placement. Curing shall be commenced as soon as possible after the concrete has been finished. This shall be either by means of approved curing compound, sprinkling, or by damp curing by means of wet mats, sand, etc. Adequate protection shall be provided to prevent damage from extreme weather conditions shall they be either hot or cold temperatures, wind, or other conditions which
would cause evaporation of moisture from the fresh concrete. The ACI recommendations for hot or cold weather shall be followed.

**D-406.15 ADDITIONAL CONCRETE FINISH FOR EXPOSED SURFACES:** Concrete shall be finished pursuant to 2004 TxDOT Specification Item 427 or latest revision.

**D-406.16 CONCRETE STRUCTURE REPAIRS:** For all repairs, provide materials suitable for the appropriate horizontal, vertical or overhead application. Approval from the engineer for any proposed repair is required unless a repair material type is indicated in the plans. Remove unsound concrete, repair spalled or delaminated concrete, and replace concrete with repair materials. All concrete repairs shall be as per TxDOT Item 429, 2004 edition or latest revision.

**D-406.17 MEASUREMENT AND PAYMENT:** No separate measurement or payment will be made under this item, but all such work done shall be deemed a subsidiary obligation of the Contractor, having been taken into account and included in price bid for the complete job.
SECTION 410
REINFORCING STEEL

D-410.01 DESCRIPTION: This item shall provide for the furnishing and placing of bar reinforcing steel of the size and quantity designated for use in structures and other concrete items that require reinforcing steel as shown on the plans and in accordance with these specifications.

D-410.02 MATERIALS: Reinforcing steel shall conform to the requirement of Item 440, "Reinforcing Steel" of the TxDOT latest Provisions. Reinforcing steel bars produced outside of the United States are acceptable if such bar reinforcement conforms to the requirements of the ASTM Designations.

D-410.03 PLACING REINFORCEMENT: All steel reinforcing shall be accurately placed in the position shown on the plans and firmly held during the placing and setting of concrete. All reinforcement shall be inspected and approved before placement to be free from dust, rust, mill scale, paint, oil, or foreign material. When stored, it shall not be in direct contact with the ground. Bars shall be tied at all intersections. Distances from forms shall be maintained by means of stays, precast blocks, ties, hangers, metal chairs, or other approved supports. Blocks for holding reinforcement from contact with the form shall be precast concrete blocks of approved shape and dimensions or other equally suitable devices. The use of pebbles, pieces of broken stones or brick, metal pipe and wooden blocks shall not be permitted. Reinforcement in any sections shall be placed and then inspected and approved by the Inspector before the placing of concrete begins.

D-410.04 SPLACING AND LAPPING: Unless otherwise indicated, all spliced bars shall be staggered. Laps shall be in accordance with Table No. 1.

<table>
<thead>
<tr>
<th>Bar size No. (in)</th>
<th>Bar size No. (mm)</th>
<th>Uncoated Lap Length</th>
<th>Coated Lap Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>10</td>
<td>1 ft 4 in</td>
<td>2 ft 0 in</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
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<td>3 ft 3 in</td>
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<td>6</td>
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<td>10 ft 11 in</td>
</tr>
<tr>
<td>11</td>
<td>36</td>
<td>8 ft 11 in</td>
<td>13 ft 5 in</td>
</tr>
</tbody>
</table>

Note: bar size numbers (in.) are based on the number of eighths of an inch included in the nominal diameter of the bar. Bar size numbers (mm) approximate the number of millimeters included in the nominal diameter of the bar.
**D-410.05 MEASUREMENT AND PAYMENT:** No separate measurement or payment will be made under this item, but all such work done shall be deemed a subsidiary obligation of the Contractor, having been taken into account and included by him in price bid for the complete job.
SECTION 412
WELDED WIRE FABRIC

D-412.01 DESCRIPTION:  This item shall govern the furnishing and placing of the various sizes of welded wire fabric as indicated on the plans or as directed by the Engineer.

D-412.02 MATERIAL:  All welded wire fabric used in construction shall conform to the requirements of ASTM Designation A-185. It shall be 6 x 6- W2.9 x W2.9 welded wire fabric, plain electric welded reinforcing fabric or as indicated on the plans.

D-412.03 CONSTRUCTION METHODS:  All splices in the wire fabric shall overlap sufficiently to allow two (2) pairs or transverse wires to be tied together and no splices of less than six (6) inches will be permitted.

At the edge of the construction, the wire fabric shall not be less than one (1) inch nor more than three (3) inches from the edge of the concrete and shall have no wires projecting beyond the last member parallel to the edge of the concrete. The wire fabric shall be straightened to lie flat in place without bulges or excessive vertical displacement and shall be supported properly throughout to insure its proper position in the finished construction.

D-412.04 MEASUREMENT:  No measurement of welded wire fabric will be made.

D-412.05 PAYMENT:  No direct payment for furnishing and placing welded wire fabric will be made. All materials and labor required will be considered subsidiary to the item in which it is used and shall be included in the unit price bid for said item.
SECTION 416
EXPANSION JOINT MATERIALS

D-416.01 DESCRIPTION: This item shall govern for furnishing and placing of all expansion joint material as herein specified in the various items of these specifications or as shown on the plans or as directed by the Engineer.

D-416.02 MATERIAL: The material used for expansion joints shall conform to either of the following:

(1) Preformed Bituminous Fiber Material shall be formed from cane or other suitable fibers of a cellular nature securely bound together and uniformly impregnated with a suitable asphaltic binder and shall meet the requirements of the Standard Specifications for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction, ASTM Designation D-1751.

(2) Boards for expansion joints shall be obtained from Redwood or Cypress timber and shall be sound heartwood, free from sapwood, knots, clustered birds-eye, checks, and splits. Occasional sound or hollow birds-eye when not in clusters will be permitted provided the board is free from any other defects that will impair its usefulness as a joint filler.

D-416.03 CONSTRUCTION METHODS: All materials used shall extend the full depth of the concrete and shall be perpendicular to the exposed face. All joints shall be shaped to conform to the contour of the finished section in which they are installed. All material shall be a minimum of one-half (1/2") inch thick.

D-416.04 MEASUREMENT: Expansion Joint Materials will not be measured for payment.

D-416.05 PAYMENT: No direct payment will be made for Expansion Joint Materials. All material supplied and installed as specified herein shall be considered subsidiary work to the various items of these specifications calling for Expansion Joint Materials.
SECTION 418
MEMBRANE CURING

D-418.01 DESCRIPTION: This item shall consist of curing by the impervious membrane method of all curbs, sidewalks, drive approaches, concrete riprap, concrete structures, and other concrete as specified in the various items of these specifications or as indicated on the plans.

D-418.02 MATERIALS: The membrane curing compound shall comply with the requirements as set forth under "Membrane Curing, Type 2, White Pigmented" of the TxDOT latest provisions.

Type 1-D (Resin Base Only) is required for bridge slabs and top slabs of direct traffic culverts and all other surfaces that required a higher grade of surface finish.

D-418.03 CONSTRUCTION METHODS: The membrane curing compound shall be applied after the surface finishing has been completed, and immediately after the free surface moisture has disappeared. The surface shall be completely sealed with a uniform coating of the curing compound applied at the rate of coverage recommended by the manufacturer or as directed by the Inspector.

Do not apply membrane curing compound on projections of reinforcing steel or concrete that will later form a construction joint.

Do not apply membrane curing to dry surfaces. Dampen formed surfaces and surfaces that have been given a first rub so that they are moist at the time of application of membrane.

The liquid-membrane forming compound must not disintegrate, check, peel, or crack during the required curing period. It must not peel or pick up under traffic and must disappear from the surface of the cured concrete by gradual disintegration.

D-418.04 MEASUREMENT: "Membrane Curing" will not be measured for payment.

D-418.05 PAYMENT: The work and materials prescribed herein will not be paid for directly, but shall be included in the unit price bid for the items of construction in which these materials are used.
SECTION 422
CONDUITS

D-422.01 DESCRIPTION
This item shall govern for the furnishing and placing of conduit of the types and sizes indicated on the plans, including junction boxes, fittings, expansion joints, attachments, and incidentals.

D-422.02 MATERIALS
All conduit and fittings shall meet the requirements of the National Electrical Code and shall be listed by Underwriters Laboratories, and shall be marked in accordance with the applicable requirements of the NEC.

Junction boxes, expansion joints, and conduit fittings shall be fabricated from a material similar to the connection conduit unless indicated otherwise on the Plans and shall be listed by Underwriters Laboratories.

Rigid metal conduit shall be steel, hot dipped galvanized inside and outside. When tested in accordance with ASTM Designation: A 90, zinc coating shall be minimum of 1.5 ounces per square foot. Electronic metallic tubing and intermediate metal conduit shall be steel, hot dipped galvanized on the outside and protected on the inside with a suitable corrosion-resistant materials. Fittings shall be rain-tight. Set screw and pressure cast fittings will not be permitted.

Polyvinyl chloride and high-density polyethylene conduit shall meet the requirements of NEMA Standard TC-2 and UL 651, and the requirements of NEC for Rigid Nonmetallic Conduit. Unless otherwise noted on the Plans, PVC and HDP conduit shall be heavy wall (Schedule 40).

Flexible conduit shall liquid-tight metal meeting requirement of NEC and be UL-listed. Where conduit system metallic, all lengths of flexible metal conduit shall be fitted with bonding jumpers.

D-422.03 CONSTRUCTION METHODS
Conduit systems for new street crossings shall be installed prior to the subgrade compaction and the Curb & Gutter construction.
All conduit systems for street crossings shall be installed at least two (2’) feet away from the existing or future sidewalk or extended to the Right of Way line.

The conduit, junction boxes, fitting, and incidentals shall be placed in accordance with the lines, grades, details, and dimensions shown on the Plans, or as directed by the Engineer. Installation of conduit shall be in accordance with the requirements of NEC. Conduit placed for concrete encasement shall be secured and supported in such a manner that the alignment will not be disturbed during placement of the concrete. No concrete shall be placed until all of the conduit ends have been capped and all box openings closed.

For electrical conduits a 12” of clearance in all directions shall be used when close to any water carrier pipe.

Where conduit is treated in the field, a standard conduit cutting die with a 3/4 inch taper per foot
shall be used. Conduit placed on structures shall be firmly fastened with three (3) feet of each outlet box, junction box or fitting and at other locations as required by the NEC.

When required by the Engineer, immediately prior to installation of conductors or final acceptance, a spherical template having a diameter of not less than 75 percent of the inside diameter of the conduit shall be drawn through the conduit to insure that the conduit is free from obstruction. Than all conduit ends shall be closed using permanent type caps.

**D-422.04 SAMPLING AND TESTING**
When tests are required, sampling and testing will be in accordance with the Department's Manual of Testing Procedures.

**D-422.05 CURB MARKINGS**
The location, size, and purpose of all conduits shall be clearly marked on street curbs.

**D-422.06 MEASUREMENT**
Conduit of the types and sizes specified on the plans will be measured by the linear foot along the main line of the conduit except that flexible metal conduit will not be paid for directly but will subsidiary to the various pay items. No measurement will be allowed under this item for conduit used in circuit protector assemblies, service poles, transformer stations, or roadway illumination assembly foundations.

**D-422.07 PAYMENT**
Conduit, measured as provided under "Measurement", will be paid for at the unit price bid in linear feet for "Conduit", of the types and sizes specified, which prices shall each be full compensation for furnishing and installing all conduit, jacking, boring, excavation, backfilling, replacing pavement, or surface treatment and marking location of conduit; for furnishing and installing all fittings, outlet boxes, bends, expansion devices, junction boxes, attachment devices and incidentals, and for all labor tools, equipment and incidentals as necessary to complete the work.
SECTION 428
CONCRETE DRIVEWAYS

D-428.01 GENERAL: Applications for driveway permits shall be made in writing to the Building Development Services Department to construct, reconstruct, alter, remove, or replace any driveway section within the public R.O.W. (Right-of-way). The application shall include the location of the proposed improvements, together with a plot plan drawn to scale (or approved site plan) fully describing the nature of the proposed improvements and the locations as well as the traffic control plan. Construction of driveways within the R.O.W. shall be in compliance with ADA. Any existing obstructions as traffic signs, fire hydrants, street lights, etc. shall be relocated outside the proposed driveway at the owner’s expense. Water meters, water valves and manholes shall be relocated or adjusted as shown on plans.

All driveways shall intersect the public street at essentially right angles except that one-way limited movement driveways may intersect at angles no less than 45 degrees as shown in Detail No.

No entrance nor exit driveway or curb cut for any property shall be allowed within twenty feet (20’) from the intersecting property line at street intersection, measured along and parallel with the curb of such street Detail No.

Driveways within the ROW (right-of-way) shall not exceed a grade of 10%. Maximum “break over” angles, being the algebraic difference in successive grade changes, shall be 12% for summit conditions and 2% on sidewalk area, as shown in Detail No.

Minimum Thickness

<table>
<thead>
<tr>
<th>Type of Driveway</th>
<th>Concrete thickness including sidewalk area</th>
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</thead>
<tbody>
<tr>
<td>Residential</td>
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<tr>
<td>Commercial</td>
<td>7 inch</td>
</tr>
<tr>
<td>Industrial</td>
<td>8 inch</td>
</tr>
</tbody>
</table>

D-428.02 MATERIALS

A. Concrete: Conform to material and proportion requirements for concrete Section 504- Concrete and Section 406- Concrete Structures.

B. Reinforcing Steel: Conform to material requirements for welded wire fabric Section 410 - Reinforcing Steel.

C. Preformed Expansion Joint Material: Conform to material requirements for preformed
expansion joint material of Section 416- Expansion Joint Material.

D. Expansion Joint Filler: Conform to material requirements for expansion joint material of Section 406- Concrete Structures.

D-428.03 PREPARATION:

A. Identify and protect utilities which are to remain.
B. Protect living trees, other plant growth, and features designated to remain.
C. Conduct clearing and grubbing operation in accordance with Section 402 - Clearing and Grubbing.
D. Excavate subgrade to the line, grade and cross-section shown on plans. Remove soft spots and pumping soils and replace with fill material having a Plasticity Index between 7 and 20.
E. If there is an existing curb and gutter, saw cut the curb leaving the gutter radius or reconstruct as the existing.

D-428.04 PLACEMENT: Place and finish concrete in accordance with applicable portions of Section 406 - Concrete Structures. No exposed materials shall be allowed as finish surface within the R.O.W.

D-428.05 JOINTS: Install joints in concrete driveway in accordance with Section 406- Concrete Structures.

D-428.06 CONCRETE CURING: Cure concrete in accordance with Section 406- Concrete Structures.

D-428.07 PROTECTION: Conform to applicable requirements of Section 406- Concrete Structures.

D-428.08 MEASUREMENT AND PAYMENT: Payment for concrete driveways is on square foot basis. Refer to Division C, General Provisions, Section 9 Measurement and Payment for unit price procedures.
Remove Sections D-428.08 Measurement and Payment and replace with the following:

D-428.08 MEASUREMENT AND PAYMENT:
Measurement for concrete driveways is on a square foot basis. Measurement for removal and replacement of existing concrete driveways, when indicated as a pay item, is on a square foot basis.

Payment for concrete driveways shall include all labor, materials, and equipment necessary to complete the work. Payment for removal and replacement of existing concrete driveways shall include all labor, materials, and equipment necessary for removal and disposal of existing material and provide new concrete driveways.
SECTION 430
CONCRETE SIDEWALKS

D-430.01 GENERAL: Section includes reinforced concrete sidewalks and accessible ramps. Applications for sidewalk permits shall be made in writing to the Building Development Services Department to construct, reconstruct, alter, remove, or replace any sidewalk section within the R.O.W. (Right-of-Way). The application shall include the location of the proposed improvements, together with a plot plan drawn to scale (or approved site plan) fully describing the nature of the proposed improvements and the locations as well as the traffic control plan. Construction of sidewalks and accessible ramps shall be in compliance with ADA. Any existing obstructions as water meters, traffic signs, fire hydrants, water valves, street lights, etc. shall be relocated outside the proposed driveway at the owner’s expense.

D-430.02 REFERENCES:

A. ASTM C 31-Standard Practice for Making and Curing Concrete Test Specimens in the field.
C. ASTM C 42- Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
D. ASTM C 138 -Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
F. ASTM C 172 - Practice for Sampling Freshly Mixed Concrete.

D-430.03 SUBMITTALS: Submit certified testing results and certificates of compliance.

D-430.04 MATERIALS

A. Concrete: Conform to material and proportion requirements for concrete Section 406.
B. Reinforcing Steel: Conform to material requirements in section 410 & 412.
C. Reinforcing Fiberglass: Conform to material and proportion requirements as per Section 414. Approval from the City engineer is required.
D. Preformed Expansion Joint Material: Conform to material requirements for preformed expansion joint material of Section 416 - Expansion Joint Material.
E. Expansion Joint Filler: Conform to material requirements for expansion joint material of Section 406- Concrete Structures.
F. Forms: Use straight, unwrapped wood or metal forms with nominal depth equal to or greater
than the proposed sidewalk thickness. The use of 2” by 4” lumber as forms will be allowed.

EXECUTION

D-430.05 REPLACEMENT: Replace sidewalks and accessible ramps that are removed or damaged during construction as per this specification to the next joint. Provide replaced and new sidewalks with accessible ramps if sidewalk intersects curb at street or driveway as per the latest ADA standards.

D-430.06 PREPARATION:
A. Identify and protect utilities which are to remain.
B. Protect living trees, other plant growth, and features designated to remain.
C. Conduct clearing and grubbing operation in accordance with Section 402 - Clearing and Grubbing.
D. Excavate subgrade to the line, grade and cross-section shown on plans. Remove soft spots and pumping soils and replace with fill material having a Plasticity Index between 7 and 20.

D-430.07 PLACEMENT:
A. Setting Forms: Securely stake forms to line and grade. Maintain position during concrete placement.
B. Reinforcement: Install 6 x 6, W2.9 x W2.9 welded wire fabric or No. 3 reinforcing steel bars on 18-inch centers longitudinally and transversely. Lay longitudinal bars in walk continuously, except through expansion joints. Support reinforcement in manner to maintain reinforcement in center of slab vertically during placement.
C. Expansion Joints: Install expansion joints at 40’ to 80’ in accordance with Section 416 - Expansion Joint Material.
D. Place concrete in forms to specified depth and tamp thoroughly with “jitterbug” tamp, or other acceptable method. Bring mortar to surface. Where a sidewalk crosses a driveway, ensure that the sidewalk depth and reinforcement are not less than the driveway cross-sectional details shown on the plans.
E. Strike off to smooth finish with wood strike board. Finish smoothly with wood hand float. Brush across sidewalk with fine-haired brush. Exposed material shall not be allowed as finish surface.
F. Unless otherwise indicated on plans, mark off joints ¼ inch deep, at spacing equal to 5 feet and matching C&G joints. Use joint tool equal in width to edging tool.
G. Finish edges with tool having ¼ inch radius.
H. After concrete has set sufficiently, refill space along side of sidewalk to top of walk with
suitable material. Tamp until firm and solid. Dispose of excess material in accordance with Section 128 - Waste Material Disposal. Repair driveways and parking lots damaged by sidewalk excavation in accordance with Section 430.

**D-430.08 CURING:** Conform to requirements of Section 406 - Concrete Curing.

**D-430.09 FIELD QUALITY CONTROL:**

A. Testing will be performed under provision of Division C, General Provisions, Section 6 Control of Work and Materials.

B. Compressive Strength Test Specimens: Four test specimens for compressive strength test will be made in accordance with ASTM C 31 for each 30 cubic yards or less of sidewalk that is place in one day. Two specimens will be tested at 7 days. The remaining two specimens will be tested at 28 days. Specimens will be tested in accordance with ASTM C 39. Minimum compressive strength shall be 3000 pounds per square inch at 28 days.

C. Yield test for cement content per cubic yard of concrete will be made in accordance with ASTM C 138. If such cement content is found to be less than that specified per cubic yard, reduce batch weights until amount of cement per cubic yard of concrete conforms to requirements.

D. If the Contractor places concrete without notifying the laboratory, the City will have the concrete tested by means of a core test as specified in ASTM C 42. If the concrete does not meet the specification, the cost of the test will be deducted from payment due the Contractor.

E. Sampling of fresh concrete shall be in accordance with ASTM C 172.

F. Take slump tests when cylinders are made.

G. Concrete shall be acceptable if the average of the two 28 day compression tests is equal to or greater than the minimum 28-day strength specified.

H. If either of the two tests is less than the average of the two tests by more than 10 percent, that entire test shall be considered erratic and not indicative of the concrete strength. Core samples will be required of this concrete.

I. If any 28-day laboratory test indicates that concrete of low strength has been placed, the concrete in question shall be tested by taking cores as directed by the City Engineer may direct. At least three representative cores shall be taken and tested as specified in ASTM C 42. Cost for any additional testing required due to a failed test will be paid by the contractor.

**D-430.10 NONCONFORMING:** Remove and replace areas of sidewalk that fail compressive strength tests, with concrete of thickness shown on plans. Nonconforming sidewalk sections shall be replaced at no additional cost to the City.
**D-430.11 PROTECTION:** Maintain sidewalks in good condition until completion of work. Replace damaged sidewalks in accordance with Paragraph D-430.06 - Replacement.

**D-430.12 MEASUREMENT:** Sidewalks will be measured by the square foot or by the foot of different widths. Accessible ramps will be measured by each unit. The unit will consist of the curb ramp, landing, adjacent flares or side curb, and detectable warning surface as show on the plans.

**D-430.13 PAYMENT:** Will be paid by the unit price bid for concrete sidewalks for the depth specified and accessible ramps. This price is full compensation for surface preparation of base; materials; removal and disposal of excavated material; drilling and doweling into the existing concrete curb, sidewalk and pavement; repair of the adjacent street or pavement structure damaged by the operations; and equipment, labor, materials, tools and incidentals.
SECTION 432
STAMPED CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Stamped concrete.

1.2 REFERENCES
B. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete.

1.4 SUBMITTALS
A. Submit under provisions of Section C-17.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
D. Verification Samples: For each finish product specified, two samples, minimum size 12 inches (305 mm) square representing actual product, color, and patterns.
E. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
F. Applicator's Project References: Submit applicator's list of successfully completed stamped concrete projects, including project name and location, name of architect, and type and quantity of materials applied.

1.5 QUALITY ASSURANCE
A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.
B. Installer Qualifications: Minimum 2 year experience installing similar products.
1. Regularly engaged, for preceding 5 years, in application of stamped concrete of similar type to that specified.
2. Employ persons trained for application of stamped concrete.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and Handling Requirements:
   1. Store and handle materials in accordance with manufacturer's instructions.
   2. Keep materials in manufacturer's original, unopened containers and packaging until application.
   3. Store materials in clean, dry area indoors.
   4. Store materials out of direct sunlight.
   5. Keep materials from freezing.
   6. Protect materials during storage, handling, and application to prevent contamination or damage.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

B. Apply materials when air and surface temperatures are between 55 degrees F (13 degrees C) and 80 degrees F (27 degrees C).

C. Do not apply materials when rain, snow, or excessive moisture is expected during application or within 24 hours after application.

1.8 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS

2.1 MATERIALS

A. Contractor to provide stamped concrete in pattern and color to match existing stamped concrete along Flores Avenue.
PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive stamped concrete.
B. Notify Owner of conditions that would adversely affect application or subsequent use.
C. Do not begin preparation or application until unacceptable conditions are corrected.

3.2 PREPARATION

A. Protection of In-Place Conditions: Protect adjacent surfaces, areas, adjoining walls, and landscaping from contact with stamped concrete materials.
B. Preparation of Subgrade:
   1. Ensure subgrade is uniformly graded, compacted, and moistened.
   2. Ensure subgrade is free of standing water.
   3. Do not place concrete over soft, frozen, or muddy subgrade.
C. Concrete:
   1. Specified in Section 504 Concrete, unless otherwise specified in this section.
   2. Slump: Maximum 4 inches.
   3. Calcium Chloride: Do not use calcium chloride or admixtures containing calcium chloride.
   4. Fine and Course Aggregates:
      a. Non-reactive.
      b. Free of deleterious material.

3.3 APPLICATION

A. Apply stamped concrete materials in accordance with manufacturer's instructions at locations indicated on the Drawings.
B. Concrete Topping and Hardener:
   1. Apply concrete topping and hardener in accordance with manufacturer's instructions.
   2. Apply concrete topping and hardener to give complete and uniform coverage to concrete.
   3. Ensure uniform color results.
C. Integrally Colored Concrete: Design mix, batch, add colorant, place, finish, and cure concrete in accordance with integral concrete color manufacturer's instructions.
D. Colored Bond Breaker/Antiquing Release Agent: Release and imprint concrete with colored bond breaker/antiquing release agent in accordance with manufacturer's instructions.

E. Colorless Bond Breaker:
   1. Apply colorless bond breaker in accordance with manufacturer's instructions to bottom of stamping mats and on concrete surface, when concrete has reached plastic stage desirable for imprinting.
   2. Do not trowel or mix colorless bond breaker into plastic concrete surface.

F. Stamping Mats:
   1. Press stamping mats in accordance with manufacturer's instructions into concrete that has reached plastic stage desirable for imprinting.
   2. Use stamping mats to create patterns in concrete to match existing stamped concrete along Flores Avenue.

3.4 CURING

A. Cure concrete in accordance with manufacturer's instructions.
B. Apply curing compound in accordance with manufacturer's instructions.
C. Do not cure concrete using materials or methods harmful to concrete surface, including:
   1. Low-pressure or high-pressure steam.
   2. Burlap.
   4. Membrane paper.
   5. Water misting.
   6. Sodium-silicone-type hardeners.

3.5 CLEANING

A. Clean concrete in accordance with manufacturer's instructions.
B. Apply concrete cleaner in accordance with manufacturer's instructions to remove:
   1. Excess colored bond breaker/antiquing release agent.
   2. Efflorescence.
   3. Cement scale.
C. Apply concrete cleaner before sealing concrete surface.

3.6 SEALING

A. Seal concrete surfaces in accordance with manufacturer's instructions.
B. Apply sealer to clean and dry concrete surfaces in accordance with manufacturer's instructions after concrete has cured a minimum of 28 days.
C. Apply sealer uniformly over entire stamped concrete surface.
D. Do not allow traffic on finished sealed surfaces for the following periods after application:
1. Foot Traffic: Minimum 24 hours.
2. Heavy Traffic: Minimum 72 hours.

3.7 PROTECTION

A. Exterior Surfaces: Protect applied stamped concrete to ensure that, except for normal weathering, concrete will be without damage or deterioration at time of Substantial Completion.

PART 4 MEASUREMENT

Measurement of stamped concrete shall be per square yard.

PART 5 PAYMENT

Payment for stamped concrete shall include all labor, materials, and equipment required to provide stamped concrete. There shall be no separate payment for pavement reinforcement, dowels, or construction joints. Note that stamped concrete is an alternate bid item, further clarified in Section C-12 Alternates.

END OF SECTION
SECTION 502  
EXCAVATION AND EMBANKMENT OF STREETS

D-502.01 DESCRIPTION: This item shall consist of doing all required excavation within the limits of the roadway (except for excavation otherwise classified such as excavation for drainage structures, etc.): the removal and proper utilization or disposal of all excavated materials; the erection of all embankments; and the constructing, shaping, compacting, and finishing of all earthwork on the entire roadway and approaches thereto in conformity with the lines, grades, and typical sections as shown on the plans and established by the Engineer.

D-502.02 GENERAL: Soil material for street subgrade or embankment with a PI > 20 shall be stabilized as shown on the plans. The method shall be approved by the City Engineer. All material encountered of whatever nature within the limits indicated shall be removed and disposed of as directed. The Contractor shall inform and satisfy himself as to the character, quantity, and distribution of all material to be excavated. No payment will be made for any excavated material which is used for purposes other than required in the plans or proposal or as directed by the Engineer.

The rough excavation shall be carried to such depth that sufficient material will be left above the designated grade to allow for compaction. Likewise on embankments, sufficient material shall be placed above the designated grade to allow for compaction and settlement. Should the Contractor excavate below the designated lines, Contractor shall replace such material excavated with approved material in an approved manner and condition at own expense.

The Engineer shall have complete control over the excavation, moving, placing, and disposition of all material, and he shall determine the suitability of material to be placed in embankments.

Stakes set by the Engineer as provided in the "General Provisions" shall include only one set of offset alignment and grade stakes. All slope stakes, bluetops, and additional alignment stakes shall be furnished and set by the Contractor.

EQUIPMENT

D-502.03 GRADING EQUIPMENT: The Contractor may use any type of earth-moving equipment the contractor wishes to use or has available, provided such equipment is in satisfactory condition and of such capacity that the grading schedule as planned by the Contractor and approved by the Engineer can be maintained.

D-502.04 COMPACTING EQUIPMENT:

(a) Tamping rollers shall consist of two metal rollers, drums, or shells or 40 " minimum diameter, each not less than 42 " in length and unit-mounted in a rigid frame in such manner that each roller may oscillate independently of the other; and each roller, drum, or shell shall be surmounted by metal studs with tamping feet projecting not less than seven (7) inches from the surface of the drum and spaced not less than six (6) inches nor more than ten (10) inches measured diagonally from center to center.  The area of each tampering foot shall be not less than five (5) feet square inches nor more than eight (8) square inches. Each unit shall be provided with a suitable tamper foot cleaning device.
Where more than one rolling unit is used, the rolling units shall be pivoted on the main frame in a manner which will permit the rolling units to adapt themselves to uneven ground and to rotate individually. When empty, the weight of the roller shall be such that the unit pressure applied by the tamping foot in contact with the ground is not less than 120 pounds per square inch.

(b) Pneumatic rollers shall consist of not less than nine pneumatic tired wheels running on two axles in such manner that the rear group of tires will not follow in the tracks of the forward group and shall be mounted on a rigid frame provided with platform or body suitable for ballast loading. The front axle shall rotate around the kingpin so located that the roller may be turned within a minimum circle. The pneumatic tire roller under working conditions shall have an effective rolling width of approximately sixty (60) inches and shall give a minimum compression of three hundred and twenty-five (325) pounds per inch of width of tire trend.

(c) Smooth self-propelled rollers shall weigh at least ten tons and may be tandem or three-wheel type. The wheels of the roller shall be equipped with adjustable scrapers.

CONSTRUCTION METHODS

D-502.05 EXCAVATION: The excavation material shall be handled in such a manner as to allow the selected material to be properly placed in embankment and in the capping of the pavement subgrades as determined by the Engineer. Any suitable surplus material shall be stock-piled in approved areas for later use as directed by the Engineer.

The contractor shall make the distribution as indicated on the plans, and the widening or narrowing of the section or raising or lowering of the grade to avoid haul will not be permitted. During the process of excavation, the grade shall be maintained in such condition that it will be well drained at all times. When directed, temporary drains and drainage ditches shall be installed to intercept and divert surface water.

In cut areas, the top of the subgrade shall be scarified and compacted to a minimum depth of six (6) inches to not less than 95% compaction as per TEX. 113-E or 114-E, or ASTM 1557 or ASTM 698, as appropriate to the extent of at least 12” inches behind the back of the curb or edge of pavement. When the required density cannot be obtained, the material shall be undercut and replaced with suitable material as directed. The material placed to refill and undercut portion shall be handled and compacted as specified for embankments.

During compacting operations, water shall be added to the subgrade material. Such watering shall be done by approved methods and using approved equipment. This moisture shall not be more than 2% above or below the optimum. Approved subgrade shall be primed, cured and after primed will be covered with base within maximum seven (7) days.

D-502.06 BORROW: Borrow excavation shall consist of excavation made outside the normal grading limits to obtain material for the completion of embankments and for other purposes. It shall be the Contractor’s responsibility to locate and obtain the supply, and the Contractor shall notify the Engineer sufficiently in advance to permit tests and measurements to be made.
Excavation & Embankment of Streets                                          Page 3  of 4

All borrow pits shall be opened up immediately to expose the vertical face of various strata of acceptable material to obtain a uniform product. Borrow pits shall be excavated to regular lines to permit accurate measurements, and shall be drained and left in a neat and presentable condition with all slopes dress uniformly.

D-502.07 PREPARATION OF EMBANKMENT AREA: Immediately prior to the placing of material, the entire area upon which the embankment is to be placed shall be striped of all grass, weeds, brush and other organic materials, and shall be scarified and broken to a depth of six (6) inches. All roots, debris, large stones or objectionable material that would interfere with the compaction of fill will be moved and disposed of as directed. A thin layer (approximately three (3) inches) of fill material shall be spread over the scarified foundation, and the whole area compacted as required herein. When embankments are to be placed on natural slopes steeper than 3 to 1, horizontal benches shall be constructed as directed by the Engineer. Material excavated in the construction of such benches will be included in the total yardage of excavation.

D-502.08 CONSTRUCTION OF EMBANKMENTS: Embankments shall be formed of satisfactory materials placed in successive horizontal layers of not more than six inches in loose depth for the full width of the cross section. The material in the layers shall have the proper moisture content before rolling to obtain the required compaction. Wetting or drying of the material and manipulation to secure a uniform moisture throughout the layer shall be required. Should material be too wet to permit proper compaction, corrective work on all portions of the embankment thus affected shall be done with the proper equipment and methods approved by the Engineer.

Each layer placed as specified above shall be compacted to not less than the comparable density of the adjoining material. Compaction shall extend through the entire depth of each layer and the embankment, when complete, shall be homogeneous and uniformly compacted mass. The moisture shall not be more than 2% above or below the optimum.

Under all paved areas and for a depth of six inches below the surface of the subgrade, the embankment shall be compacted to not less than ninety-five percent of the maximum density as determined by procedures set out under TEX-113E or 114 -E to the extent of at least 12” inches behind the back of the curb or edge of pavement. Backfill behind back of curb shall be properly compacted. However, any areas inaccessible to a roller shall be consolidated and compacted with approved mechanical tampers. Stones or rock fragments larger than four inches in their greatest dimension will not be permitted in the top six inches of the embankment.

The Contractor shall be responsible for the stability of all embankments made under this contract and shall replace any portion which is the opinion of the Engineer has become displaced due to negligence on the part of the Contractor.

D-502.09 TRUENESS TESTS: In those areas upon which a sub-base or base course is to be placed, the surface of the subgrade shall be of such smoothness that when tested with a sixteen (16) foot straightedge, it shall show no deviation in excess of five- hundredths (0.05) of a foot from true grade as established by grade pins or hubs. In areas not under sub-base or base course, the surface shall not deviate more than one tenth (0.10) of a foot from true grade as established by grade pins or hubs.
D-502.10 COMPACTION TESTS: Subgrade materials shall be compacted to the required density and moisture content as shown below, unless otherwise shown on the plans:

The maximum dry density and optimum moisture content shall be determined in accordance with TxDOT Tex-113-E or Tex-114-E. Test for in place density shall be made in accordance with TxDOT Test-115-E and within 24 hours after compacting operations are completed. If the material fails to meet the density specified, it shall be re-worked as necessary to obtain the density and moisture required.

Materials

<table>
<thead>
<tr>
<th>PI</th>
<th>Max. Dry Density</th>
<th>Percentage of moisture</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 20</td>
<td>95%</td>
<td>2% of Optimum or grater</td>
</tr>
<tr>
<td>≥ 20</td>
<td>95%</td>
<td>≥ Optimum moisture</td>
</tr>
</tbody>
</table>

For materials with a PI > 20, just prior to placing any base materials or stabilization, the top 4 inches of compacted subgrade shall be tested for density and moisture content. If test show the density to be more than 2% below the specified minimum or the moisture content more than 3% above or below the specified minimum, the course shall be reworked as necessary to obtain the specified compaction and moisture content.

**MEASUREMENT**

D-502.10 ROADWAY EXCAVATION: The number of cubic yards of street excavation to be paid for shall be computed by the method of average end areas. The width of these areas shall be the distance measured from edge of asphalt to edge of asphalt or from back of curb to back of curb plus two (2.0) feet. The depth shall be that staked in the field by the Engineer.

D-502.11 BORROW EXCAVATION: The number of cubic yards of "Borrow Excavation" to be paid for shall be computed by the method of average and areas. The width of these areas shall be the distance measured from back of curb to back of curb plus two (2.0) feet. The depth shall be that staked "in the field by the Engineer."

D-502.12 EMBANKMENT: No separate measurement for embankment will be made.

D-502.13 HAUL: No separate measurement of haul will be made other than that specifically approved in the plans.

**PAYMENT**

D-502.14 STREET EXCAVATION: The cubic yards of street excavation measured as provided in these specifications will be paid for at the contract unit price per cubic yards (dense measurement) for "Street Excavation" which payment shall constitute full compensation for excavation, haul, embankment, watering and compaction; and for furnishing all materials, labor and equipment for
doing the work as specified herein and to the liens and grades shown on the plans. Payment for fifty percent (50%) of street excavation will be paid at the time initial excavation (rough grading) is completed. The balance of fifty percent (50%) is to be paid when the street subgrade is tested and approved.
SECTION 504
CONCRETE

D-504.01 DESCRIPTION: These specifications shall govern for the materials used, for the storing, measuring, and handling of materials, and for the proportioning and mixing of Portland Cement Concrete.

MATERIALS

D-504.02 CEMENT: Portland Cement shall conform to the requirements of the latest revision of ASTM Designation C150, Type 1, or Type II. Only one brand or kind of cement shall be used in any one structure except as permitted in writing by the Engineer. All cement shall be delivered in bags plainly marked with the brand and name of the manufacturer.

D-504.03 COARSE AGGREGATE: The coarse aggregate shall conform to the requirements of the latest revision of ASTM Designation C-33 and ASTM Designation D-448. Coarse aggregate for the various classes of concrete shall conform to the requirements of the following table:

<table>
<thead>
<tr>
<th>Aggregate Grade No.</th>
<th>Nominal Size</th>
<th>2-1/2&quot;</th>
<th>2&quot;</th>
<th>1-1/2&quot;</th>
<th>1&quot;</th>
<th>3/4&quot;</th>
<th>1/2&quot;</th>
<th>3/8&quot;</th>
<th>No. 4</th>
<th>No. 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>21/2</td>
<td>0</td>
<td>0</td>
<td>15-50</td>
<td>-</td>
<td>60-80</td>
<td>-</td>
<td>-</td>
<td>95-100</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>11/2</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>-</td>
<td>30-65</td>
<td>-</td>
<td>70-90</td>
<td>95-100</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>-</td>
<td>10-40</td>
<td>40-75</td>
<td>-</td>
<td>95-100</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>-</td>
<td>40-75</td>
<td>-</td>
<td>90-100</td>
<td>95-100</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3/4</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>-</td>
<td>40-75</td>
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<td>90-100</td>
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<td></td>
</tr>
<tr>
<td>6</td>
<td>1/2</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>30-60</td>
<td>85-100</td>
<td>95-100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3/8</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5-30</td>
<td>75-100</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>No.4</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>35-60</td>
<td>90-100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Numbers in parenthesis indicate that these gradations conform to corresponding ASTM gradation form ASTM C-33.

The amount of deleterious substances in coarse aggregate shall not exceed the following percentages by weight:

<table>
<thead>
<tr>
<th>Material removed by decantation</th>
<th>1.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shale, slate and similar materials</td>
<td>1.0%</td>
</tr>
<tr>
<td>Clay lumps</td>
<td>0.25%</td>
</tr>
<tr>
<td>Soft fragments</td>
<td>3.0%</td>
</tr>
<tr>
<td>Other deleterious substances (Including friable, thin, elongated or laminated pieces)</td>
<td>5.0%</td>
</tr>
</tbody>
</table>

The sum of all deleterious materials exclusive of materials removed by decantation shall not exceed 5% by weight.
D-504.04 FINE AGGREGATE: The fine aggregate shall conform to the requirements of the latest revision of ASTM Designation C-33.

<table>
<thead>
<tr>
<th>AGGREGATE</th>
<th>3/8 in.</th>
<th>No.4</th>
<th>No.8</th>
<th>No.16</th>
<th>No. 30</th>
<th>No. 50</th>
<th>No.100</th>
<th>No.200</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRADE #1</td>
<td>0</td>
<td>0-5</td>
<td>0-20</td>
<td>15-50</td>
<td>35-75</td>
<td>65-90</td>
<td>90-100</td>
<td>97-100</td>
</tr>
</tbody>
</table>

The amount of deleterious substances in fine aggregate shall not exceed the following percentages by weight:

| Materials removed by decantation | 3.0% |
| Clay Lumps | 0.5% |
| Other deleterious substances | 2.5% |
| (Such as coal, shale, coated or soft flaky particles) |
| Material finer than No. 200 sieve | |
| (a) In concrete subject to surface abrasion | |
| (b) All other concrete | 3.0% |

D-504.05 WATER: Water shall be clean and free from deleterious amounts of acids, alkalies, and organic materials.

**EQUIPMENT**

D-504.06 GENERAL: All equipment will be inspected by the Engineer and only equipment approved by him may be used. Any equipment disapproved shall be removed from the job site within 24 hours after it has been inspected.

D-504.07 CEMENT STORAGE FACILITIES: All cement shall be stored in well ventilated, weatherproof buildings which will protect the cement from dampness. The floor supporting the cement shall clear the ground a sufficient distance to prevent the absorption of moisture by the cement. Provision for storage shall be ample, and the shipment of cement shall be segregated in such manner as to provide easy access for identification of each shipment.

The Engineer may permit small quantities of cement to be stored in the open for periods not exceeding 48 hours, if a raised platform and adequate waterproof coverings are provided.

D-504.08 AGGREGATE STORAGE FACILITIES: If the aggregates are stored on the ground, the sites for the stockpiles shall be grubbed clear of all weeds and grass, and leveled off. The bottom layer of aggregate shall not be disturbed nor used without cleaning.

When the contract requires the use of two or more sizes of aggregate, the different sizes shall be stored in a manner as to prevent intermixing.
Materials in all stockpiles shall be handled and placed in such manner that segregation of materials within the stockpile will be avoided.

**D-504.09 MEASURING EQUIPMENT:** Equipment for measuring concrete materials shall be such that the proportions can be accurately controlled and easily checked at any time during the work, preferably measurement by weight rather than by volume.

**D-504.10 MIXING EQUIPMENT:** The mixing shall be done in a batch mixer of approved type and size which will insure the uniform distribution of the material throughout the mass so that the mixture will be uniform in color and smooth in appearance. Whenever a concrete mixer is not suitable or adequate for the work, it shall be removed from the site upon written order from the Engineer. Pick-up and throw-over blades in the mixer drum which are worn down more than ten percent (10%) in depth shall be repaired or replaced.

**D-504.11 CLASSIFICATION AND MIX DESIGN:** It shall be the responsibility of the Contractor to furnish the mix design, using a Coarse Aggregate Factor acceptable to the Engineer, for the class(es) of concrete specified to conform with the requirements contained herein and in accordance with TxDOT Standards. The contractor shall perform, at his own expense, the work required to substantiate the design, except the testing of strength specimens, which will be done by the Department. Complete concrete design data shall be submitted to the Engineer for approval and shall be less than 1 year old signed and sealed by a licensed professional engineer in the State of Texas.

It shall also be the responsibility of the Contractor to determine and measure the batch quantity of each ingredient including all water, not only for batch designs, but for all concrete produced for the project, so that the mix conforms to these specifications and other requirements shown on the plans.

In lieu of the above mix design responsibility, the Contractor may accept a design furnished by the Engineer, however, this will not relieve him of the responsibility of providing concrete meeting the requirements of these specifications.

Trial batches will be made and tested using all the proposed ingredients prior to placing of concrete, and when the aggregate, and/or type, brand or source of cement, or admixture is changed. When the brand and/or source of cement only is changed, the Engineer may waive trial batches only if a prior record of satisfactory performance of the cement has been established.

Trial batches shall be made in the mixer to be used on the job. When Transit Mix concrete is to be used, the trial designs will be made in a transit mixer representative of the mixers to be used. Batch size shall not be less than fifty percent (50%) of its rated mixing capacity.

Mix designs from previous or concurrent jobs may be used without trial batches if it is shown that no substantial change in any of the proposed ingredients has been made. Mix design shall be current or less than one (1) year old.

The coarse aggregate factor shall not be more than 0.82, but when the voids in the coarse aggregate exceed 48 percent of the total dry loose volume, the coarse aggregate factor shall not exceed 0.85.
The coarse aggregate factor shall not be less than 0.68 unless authorized by the Engineer in writing.

Water reducing or retarding agents may be used with all classes of concrete at the option of the Contractor, and will be required for hot weather concreting for cased drilled shafts and for continuous slab placement.

When a retarding admixture is required for hot weather concreting, must meet the requirements of ASTM C 94 When used in continuous slab placement, the amount to be used will be established by several trial batches with varying retarder content and simulating the placing conditions to be encountered. When water reducing or retarding agents are used at the option of the Contractor, reduced dosage of the admixture will be permitted.

Entrained air materials shall comply with ASTM C 260 and will be required in accordance with Table 7 TxDOT item 421. Specimens will be tested in accordance with Tex-414-A or Tex-416-A.

**D-504.12 QUALITY OF CONCRETE:** The concrete shall be uniform, workable, and of a consistency acceptable to the Engineer. The cement content, maximum allowable water/cement ratio, the desired and maximum slump, the proper amount of entrained air and the strength requirements for all classes of concrete shall conform to the requirements of these specifications. It shall be the responsibility of the Contractor to provide concrete meeting these specifications.

During the progress of the work, the Engineer will cast test cylinders or beams, perform slump and entrained air tests, and will make temperature checks, as required, to insure compliance with the specifications.

A strength test shall be defined as the average of the breaking strength of two cylinders or two beams as the case may be. Specimens will be tested in accordance with Test Methods TEX-418-A or Tex-448-A.

If the required strength or consistency of the class of concrete being produced cannot be secured with the minimum cement specified or without exceeding the maximum water/cement ratio, the Contractor will be required to furnish different aggregates, use a water-reducing agent, an air-entraining agent, or increase the cement content in order to provide concrete meeting these specifications.

All test specimens, beams or cylinders, representing tests for removal of forms and/or false work shall be cured using the same methods, and under the same conditions as concrete represented.

"Design Strength" beams and cylinders shall be cured in accordance with TxDOT Bulletin C-11 and Supplement thereto.

The Contractor shall provide and maintain curing facilities as described in TxDOT Bulletin C-11 and Supplement thereto, for the purpose of curing test specimens. Provision shall be made to maintain the water in the curing tank at temperatures between 70°F and 90°F.
When control of concrete quality is by twenty-eight day compressive tests, job control will be by seven day compressive tests which are shown to provide the required twenty-eight day strength. Based on results from trial batches. Thereafter, if the required seven day strength is not secured with the quantity of cement specified in Table 5, changes in the batch design will be made as specified in this article.

**Table 5- Concrete Classes TxDOT Item 421**

<table>
<thead>
<tr>
<th>Class of Concrete</th>
<th>Design Strength, Min. 28-day f’c (psi)</th>
<th>Maximum W/C Ratio¹</th>
<th>Coarse Aggregate Grades²,³</th>
<th>General Usage⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3,000</td>
<td>0.60</td>
<td>1—4, 8</td>
<td>Inlets, manholes, curb, gutter, curb &amp; gutter. conc. Retards, sidewalks, driveways, backup walls, anchors</td>
</tr>
<tr>
<td>B</td>
<td>2,000</td>
<td>0.60</td>
<td>2—7</td>
<td>Riprap, small roadside signs and anchors</td>
</tr>
<tr>
<td>C</td>
<td>3,600</td>
<td>0.45</td>
<td>1—6</td>
<td>Drilled shafts, bridge substructure, bridge railing, culverts except top slab of direct traffic culverts, headwalls, wing walls, approach slabs, concrete traffic barrier (cast-in-place)</td>
</tr>
<tr>
<td>D</td>
<td>1,500</td>
<td>0.60</td>
<td>2—7</td>
<td>Riprap</td>
</tr>
<tr>
<td>E</td>
<td>3,000</td>
<td>0.50</td>
<td>2—5</td>
<td>Seal concrete</td>
</tr>
<tr>
<td>F⁵</td>
<td>Note 6</td>
<td>0.45</td>
<td>2—5</td>
<td>Railroad structures; occasionally for bridge piers, columns, or bents</td>
</tr>
<tr>
<td>H⁵</td>
<td>Note 6</td>
<td>0.45</td>
<td>3—6</td>
<td>Prestressed concrete beams, boxes, piling, and concrete traffic barrier (precast)</td>
</tr>
<tr>
<td>S⁵</td>
<td>4,000</td>
<td>0.45</td>
<td>2—5</td>
<td>Bridge slabs, top slabs of direct traffic culverts</td>
</tr>
<tr>
<td>P</td>
<td>See Item 360</td>
<td>0.45</td>
<td>2—3</td>
<td>Concrete pavement</td>
</tr>
<tr>
<td>DC⁵</td>
<td>5,500</td>
<td>0.40</td>
<td>6</td>
<td>Dense conc. overlay</td>
</tr>
<tr>
<td>CO⁵</td>
<td>4,600</td>
<td>0.40</td>
<td>6</td>
<td>Conc. overlay</td>
</tr>
<tr>
<td>Concrete</td>
<td>Page 6 of 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>--------------</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| LMC⁵     | 4,000        | 0.40  | 6—8  | Latex-modified concrete overlay |
| SS⁵      | Note 7       | 0.45  | 4—6  | Slurry displacement shafts, underwater drilled shafts |
| K⁵       | Note 6       | 0.45  | Note 6 | Note 6 |
| HES      | Note 6       | 0.45  | Note 6 | Note 6 |

1. Maximum water-cement or water-cementitious ratio by weight.
2. Unless otherwise permitted, do not use Grade 1 coarse aggregate except in massive foundations with 4-in. minimum clear spacing between reinforcing steel bars. Do not use Grade 1 aggregate in drilled shafts.
3. Unless otherwise approved, use Grade 8 aggregate in extruded curbs.
4. For information only.
5. Structural concrete classes.
6. As shown on the plans or specified.
7. Cementitious material content shall be minimum 658 lb/cy of concrete.

**D-504.13 CONSISTENCY:** The consistency of the concrete as placed should allow the completion of the finishing operation without the addition of water to the surface. When field conditions are such that additional moisture is needed for the final concrete surface finishing operation, the required water shall be applied to the surface by fog spray only and shall be held to a minimum. The concrete shall be workable, cohesive, possessing satisfactory finishing qualities, and of the stiffest consistency that can be placed and vibrated into a homogeneous mass. Excessive bleeding shall be avoided. Slump requirements will be as specified in TxDOT item 421 Table 8.

### Table 8
Slump Requirements

<table>
<thead>
<tr>
<th>CONCRETE DESIGNATION</th>
<th>RECOMMENDED DESIGN AND PLACEMENT SLUMP (in.)</th>
<th>MAXIMUM ACCEPTABLE PLACEMENT SLUMP (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilled Shafts</td>
<td>See item 416</td>
<td>See item 416</td>
</tr>
<tr>
<td>Thin walled section (9 in. or less)</td>
<td>4</td>
<td>6-1/2</td>
</tr>
<tr>
<td>Approach slabs, concrete overlays, caps, columns, piers, wall sections (over 9 in.)</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Bridge slabs</td>
<td>4</td>
<td>5-1/2</td>
</tr>
<tr>
<td>Prestressed Concrete Members¹</td>
<td>4</td>
<td>6-1/2</td>
</tr>
<tr>
<td>Concrete Traffic Barrier, concrete bridge railing</td>
<td>4</td>
<td>6-1/2</td>
</tr>
<tr>
<td>Dense concrete overlay</td>
<td>3/4</td>
<td>2</td>
</tr>
</tbody>
</table>

¹ For prestressed concrete members, the slump requirements may vary depending on the specific conditions and specifications.
### CONCRETE DESIGNATION

<table>
<thead>
<tr>
<th>CONCRETE DESIGNATION</th>
<th>RECOMMENDED DESIGN AND PLACEMENT SLUMP (in.)</th>
<th>MAXIMUM ACCEPTABLE PLACEMENT SLUMP (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latex-modified concrete for bridge deck overlays</td>
<td>3</td>
<td>7-1/2</td>
</tr>
<tr>
<td>Concrete Placed Under Water</td>
<td>6</td>
<td>8-1/2</td>
</tr>
<tr>
<td>Concrete pavement (slip-formed)</td>
<td>1-1/2</td>
<td>3</td>
</tr>
<tr>
<td>Concrete pavement (formed)</td>
<td>4</td>
<td>6-1/2</td>
</tr>
<tr>
<td>Riprap, Curb, Gutter, and other Miscellaneous Concrete</td>
<td>As approved</td>
<td>As approved</td>
</tr>
</tbody>
</table>

1. If a high-range water reducer (HRWR) is used, maximum acceptable slump will be 9 in.

**NOTE:** No concrete will be permitted with slump in excess of the maximums shown.

1. The mortar will cling to the coarse aggregate
2. The concrete is not sufficiently fluid to segregate when transported to the place of deposit
3. The concrete, when dropped directly from the discharge chute, will flatten out at the center of the pile but the edges of the pile will stand up and not flow
4. The mortar will show no free water when removed from the mixer
5. The concrete will settle into place when deposited in the forms, and when transported in metal chutes at an angle of 30 degrees horizontal, it will slide and not flow into place
6. The surface of the finished concrete will be free from "laitance", or a surface film of free water

Any concrete failing to meet the requirements although meeting the slump requirements will be considered unsatisfactory; and the mix shall be changed to correct such unsatisfactory conditions.

**D-504.14 MIXING:** The first batch of materials placed in the mixer for each placement shall contain an extra quantity of sand, cement, and water sufficient to coat the inside surface of the drum without diminishing the mortar content or the mix. Upon cessation of mixing for any considerable period of time, the mixer shall be thoroughly cleaned.

The entire contents of the drum shall be discharged before any materials are placed therein for the succeeding batch. The concrete shall be mixed in quantities required for immediate use, and any concrete which is not in place within one (1) hour after water is added to the batch will not be used. Re-tempering of concrete will not be permitted.

After all the ingredients are assembled in the drum the mixing shall continue for a minimum time of one and one-half minute for 14 cubic foot mixers and smaller, and for a minimum time of one minute for 21 cubic foot mixers and larger. During the mixing time the drum shall revolve at a speed of 14 to 20 revolutions per minute. The mixer shall be equipped with a speed regulator to hold the mixer to the required speed of revolution. The absolute volume of the concrete batch shall not exceed 120 percent of the NRMCA-rated capacity of the mixer.
D-504.15 READY MIX CONCRETE: Concrete forms from a central plant of mixed-in-transit mixer trucks may be used if it complies with these specifications. The Engineer shall have free access at all times to the batching and mixing plant for sampling of all materials and inspection of work performed at this project. Concrete shall be delivered in water-tight containers which will not permit segregation of the materials. When delivered, the concrete shall be uniform throughout the mass.

The delivery ticket shall include the date, time, strength, slump, and amount of batch delivered. If an extra charge of water is required at the job site because of too low a slump, the drum shall be turned a minimum of 30 revolutions after addition of such water. Mixer shall be completely emptied before recharging. Trucks shall not be loaded greater than NRMCA-rated capacity. The maximum time interval between the addition of the cement to the batch and the placing of the concrete in the forms shall conform to the requirements set up under TxDOT specifications, Item 421. Overwet mixers shall be rejected and shall not be corrected by the addition of either aggregate or cement to the particular batch in question.

D-504.16 ADVERSE WEATHER: In threatening weather which, in the opinion of the Engineer, may result in conditions which will adversely affect the quality of the concrete to be placed, the Engineer may order postponement of the work. Where work has been started and changes in weather conditions require protective measures to be used, the Contractor shall furnish adequate shelter to protect the concrete against damage from rainfall, wind, or damage due to freezing temperature. In case it is necessary to continue mixing operation during rainfall, the Contractor shall provide protective coverings for the material stockpiles as well as the concrete being placed. The covering for aggregate stockpiles will be required only to the extent as may be necessary to control the moisture conditions in the aggregate so that adequate control of the consistency of the concrete mix may be maintained.

No concrete shall be mixed without the approval of the Engineer when the air temperature is at or below 40 degrees Fahrenheit taken in the shade away from artificial heat and falling. If authorized by the Engineer, concrete may be mixed when the air temperature is 35 degrees Fahrenheit and rising. When permission is given for mixing when the temperature is below 40 degrees Fahrenheit, the Engineer will specify the special precautions which shall be taken.

In case the air temperature is at or above 85 degrees Fahrenheit, concrete may be mixed in accordance with the requirements set up in TxDOT, Specifications.

Hand mixing of concrete will be permitted only for small placements or in the case of an emergency and then only when authorized by the Engineer. The Engineer will also specify the proportioning and methods of mixing to be used.

D-504.17 TESTING AND INSPECTION OF MATERIALS:

(a) Concrete testing of mix designs shall be made by a commercial testing laboratory approved by the Engineer. One copy of the test reports shall go to the Engineer and one copy of same shall go to the Contractor.

(b) Selection of the testing laboratory by the Engineer shall be understood as in no way relieving the
Contractor's responsibility for the satisfactory performance of the work in full conformance with the requirements of the contract. Excluding written protest by the Contractor, in advance of processing or use of materials, services of the testing laboratory shall be understood as constituting full acceptance by an approval of the Contractor.

(c) Tests of concrete and materials shall be made under the direction of the Engineer who shall have access to all places where materials are stored, proportioned, or mixed.

(d) The Contractor shall submit to the Engineer the mixes he/she intends to use which have been proven by preliminary compression test prior to commencement of work. Proving tests shall consist of at least six 6" x 12" cylinders for each mix specified. Three cylinders shall be tested at 7 days and three at 28 days.

(e) During the progress of the work one set of 3 (4) each 6" x 12" cylinders for compression tests shall be cast for each 50 c.y. or day's pour. Cylinders shall be tested for compression at seven 7 days, 14 days, and at 28 days, and one cylinder will be reserved as "stand-by" or as per engineer’s recommendation.

Samples used for testing must be representative of the batch tested and should be taken from the middle third portion of the batch. Samples shall be mixed with a shovel to insure uniformity throughout the sample and immediately molded into test specimens.

If test cylinders fail to meet specified strength at 28 days by more than 5%, core tests of the structure may be ordered by the Engineer at the Contractor's expense. These tests shall be made by an approved laboratory.

(f) Slump tests: Slump tests shall be made on each sample taken for compression tests and shall comply with Table 8 “Slump Requirements”. Additional slump tests shall be as required by the Engineer.

**D-504.18 TEST METHODS:**

(a) ASTM Designation C-17 "Standard Method of Sampling Fresh Concrete."

(b) ASTM Designation C-143 "Standard Method of Slump Test for Consistency of Portland Cement Concrete".

(c) ASTM Designation C-31 "Standard Method of Making and Curing Compression and Flexure Test Specimens in the Field".

(d) ASTM Designation C-39 "Standard Method of Test for Compressive Strength of Molded Concrete Cylinders".

(e) ASTM Designation C-42 "Standard Methods of Securing, Preparing, and Testing Specimens from Hardened Concrete for Compressive and Flexural Strengths".
All tests shall conform to the requirements of the latest revisions of the applicable ASTM Designations.

**D-504.19 PLACING, CURING, AND FINISHING:** The placing of concrete including construction of forms and falsework, curing and finishing, shall be in accordance with Division D, Section 406, CONCRETE STRUCTURES.

**D-504.20 MEASUREMENT AND PAYMENT:** No separate measurement or payment will be made under this item, but all such work done shall be deemed a subsidiary obligation of the Contractor, having been taken into account and included in price bid for the complete job.
SECTION 506
CONCRETE CURB AND GUTTER

D-506.01 DESCRIPTION: This item shall consist of curb and gutter composed of Portland Cement concrete, constructed as herein specified on an approved subgrade or base course, in conformity with the lines and grades established by the Engineer and the details and sections shown on the plans.

MATERIALS

D-506.02 CONCRETE: Concrete shall be Class "A" and shall conform to the requirements of Division D, Section 504, titled "CONCRETE" in the specifications.

D-506.03 EXPANSION JOINT MATERIAL: Filler for expansion joints shall be preformed bituminous fiber type and shall conform to the requirements of Division D, Section 416, titled "EXPANSION JOINT Materials".

D-506.04 FORMS: Forms shall be of metal and of a section satisfactory to the Engineer, straight, free from warp and of a depth equal to the depth of the finished work. Forms shall be securely staked to line and grade and maintained in true position during the placing of concrete.

D-506.05 REINFORCING STEEL: Reinforcing steel shall conform to the requirements of Division D, Section 410, titled REINFORCING STEEL.

CONSTRUCTION METHODS

D-506.06 SUBGRADE OR BASE COURSE: The subgrade and base course shall be excavated and shaped to line, grade and cross-section, compacted as specified. The subgrade and base course shall be moist at the time concrete is placed. The specified subgrade and base materials and specifications for the roadway shall extend 1 foot beyond the back of curb.

D-506.07 PLACING CONCRETE: Placement of concrete shall comply with TxDOT Item 420. Where reinforcing is required, it shall be placed and supported upon suitable chairs or concrete spacer blocks before concrete is poured.

D-506.08 FINISHING AND JOINTING: The surface of the concrete shall be struck off to the required line and grade with an appropriately shaped screed and shall be floated smooth while the concrete is still soft. The surface shall be floated with a wood float until a slight excess of sand appears. The outer edges and joints shall be rounded with approved tools to the radii shown on the plans. When the concrete has taken sufficient set, the inside form shall be carefully removed, and the surface thus exposed shall be pointed up where necessary, then wetted and rubbed with a wooden block to remove all form marks and other irregularities, producing a finish similar in appearance to the finished upper surfaces. Mortar finishing will not be permitted. Where the location of expansion joints is not indicated, joints shall be placed at spacing of not more than forty (40) feet. Expansion joint material shall be of the thickness shown on the plans and shall conform to the required section of the curb. Expansion joint material shall be placed between the curb and any abutting structures, and around all obstructions protruding through the curb and gutter as shown on the plans.
Dummy groove contraction joints shall be placed at intervals of approximately ten (10) feet. Joints shall be made so that the joint is perpendicular to the line of the curb.

**D-506.09 CURING:** As per Division D, Section 418. Other methods of curing if approved by the Engineer may be used at the Contractor's option.

**D-506.10 BACKFILLING:** The curb shall be backfilled to the full height of the concrete, tamped, and sloped as directed.

**D-506.11 MEASUREMENT:** The footage of concrete curb and gutter to be paid for shall be the number of linear feet, measured along the back of the curb in place, completed, and accepted. The various types and classes of curb and gutter shall be measured separately.

**D-506.12 PAYMENT:** The footage of concrete curb and gutter, measured as provided in Division D, Section 506, Paragraph D-506.11 will be paid for at the contract unit price per linear foot for concrete curb and gutter of the various types and classes.
SPECIAL PROVISION TO SECTION 506
CONCRETE CURB AND GUTTER

Add the following to Sections D-506.11 Measurement:

Measurement for removal and replacement of existing concrete curb and gutter, when indicated as a pay item, is on a linear foot basis, measured along the back of curb in place, completed, and accepted.

Add the following to Sections D-506.12 Payment:

Payment for removal and replacement of existing concrete curb and gutter shall include all labor, materials, and equipment necessary for removal and disposal of existing material and provide new concrete curb and gutter.
SECTION 510
FLEXIBLE BASE COURSE

D-510.01 GENERAL: Flexible Base shall consist of a foundation course for surfacing, pavement, or other base courses; shall be composed of uncontaminated materials of uniform quality that meet the requirements of TxDOT Item 247, and shall be constructed as herein specified in conformity with the sections shown on the plans and to the lines and grades established by the Engineer.

MATERIALS

D-510.02 MATERIALS: The materials shall consist of argillaceous limestone, calcareous clay particles with or without stone, conglomerate, gravel, sand, or other granular materials. The materials shall be at least Type “B” Grade II, conforming to Item No. 247 of the Texas Department of Transportation Specifications 2004 or latest edition. The source of the material shall be approved by the Engineer prior to use. The plasticity index of caliche shall have a maximum of 12 and a minimum of 5. The Contractor shall stockpile the material to be used for this particular project. Sampling and testing shall conform to TxDOT or ASTM specifications. Triaxial test will be required only when specified by the engineer. Stones greater than 3” in any direction shall be removed from street during construction.

CONSTRUCTION METHODS

D-510.03 CONSTRUCTION METHODS: The flexible base materials shall be placed on the approved subgrade in courses not to exceed eight (8) inches compacted depth. It shall be the responsibility of the Contractor that the required amount of materials be delivered and uniformly spread and shaped. All materials shall be moved from the place where it is dumped by cutting in windrow. After the material has been cut into windrows, it shall be sprinkled, spread, shaped, and rolled in proper sequence to prevent segregation and as necessary for required compaction.

The surface upon completion shall be smooth and in conformity with typical sections and to the established lines and grades. Any deviation in excess of 1/4 inch in cross section and in length of 16 feet measured longitudinally shall be corrected. All irregularities, depressions, or weak spots which develop shall be corrected.

Flexible base shall be compacted to an apparent dry density of not less than 98 percent (98%) of the maximum dry density as determined in accordance with TxDOT Specifications Test Method TEX 113-E. Tests for density will be made within 24 hours after compaction operations are completed. If the material fails to meet the density specified, it shall be reworked as necessary to meet the density required. Just prior to the placing of any succeeding course of flexible base or surfacing on a previously completed course, the density and moisture of the top four (4) inches of the flexible base shall be checked and if tests show the density to be more than 2 percent (2%) below the specified minimum or the moisture content to be more than 3 percent (3%) above or below the optimum, the course shall be reworked as necessary to obtain the specified compaction and moisture content.

Should the base course due to any reason or cause lose the required stability, density, or finish before the surface is completed, it shall be recompacted, refinshed, and retested at the sole expense of the Contractor.
The limits of placement for F.B.C. will extend 1 foot beyond the back of curb (whenever curb is specified) in order to provide proper support for concrete curb (Detail No.).

**D-510.04 MEASUREMENT:** Flexible Base: The number of square yards of flexible base course to be paid for shall be measured as the square yards in place after compaction. Thickness shall be checked by means of depth tests or cores, but no extra yardage for thickness in excess of that shown on the plans will be paid.

**D-510.05 PAYMENT:** The yardage of flexible base measured as provided for in Paragraph above will be paid for at the contract unit price for "Flexible Base". All payment made under this section shall constitute full compensation for excavation for furnishing, loading, hauling, and placing materials; for mixing, blending, sprinkling, shaping and compacting; for reconditioning the underlying course and shoulders, and for furnishing all labor, tools, and equipment as specified herein.
SECTION 516
BITUMINOUS PRIME COAT

GENERAL

D-516.01 DESCRIPTION: This item shall consist of an application of asphaltic material on the completed base course in accordance with these specifications and as directed by the Engineer.

MATERIAL

D-516.02 CUT-BACK ASPHALT: The bituminous material shall conform to the following:

GRADE MC-30

<table>
<thead>
<tr>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinematic Vis. at 140 F, CST</td>
<td>30</td>
</tr>
<tr>
<td>Flash Point T.O.C. F</td>
<td>100</td>
</tr>
</tbody>
</table>

When distilled ASTM Method D-402, the distillate-off volume shall be as follows:

<table>
<thead>
<tr>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off at 437 F%</td>
<td>--</td>
</tr>
<tr>
<td>Off at 500 F%</td>
<td>40</td>
</tr>
<tr>
<td>Off at 600 F%</td>
<td>75</td>
</tr>
<tr>
<td>Residue from 680 F Distillation</td>
<td>50</td>
</tr>
</tbody>
</table>

The residue when poured from the flash without cooling immediately upon reaching the maximum temperature specified, shall have the following characteristics:

<table>
<thead>
<tr>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penetration at 77 F, 100gms.,5 sec</td>
<td>120</td>
</tr>
<tr>
<td>Ductility at 77 F, 5 cm/min., cms.</td>
<td>100</td>
</tr>
<tr>
<td>Solubility in CCI 4%</td>
<td>99.5</td>
</tr>
</tbody>
</table>

The material shall be free from water.

MC-30 shall be applied uniformly at the rate of 0.25 gallons per square yard. At Contractor's option, appropriate emulsified asphalt, water mixture may be used in lieu of MC-30. Number of applications, mixture rate, and depth of penetration shall be approved by Engineer prior to use of emulsified asphalt. Furnishing and placement of prime coat shall be subsidiary to pavement and flexible base construction.

CONSTRUCTION METHODS

D-516.03 APPLICATION OF ASPHALT: Asphalt shall be applied when the air temperature is
60°F and above, and it may be applied when the air temperature is 50°F and rising; the air temperature to be taken in the shade and away from artificial heat. No asphalt shall be placed when general weather conditions in the opinion of the Engineer are not suitable.

All storage tanks, piping, retorts, booster tanks, and distributors used in storing or handling asphalt shall be kept clean and in good operating condition at all times, and they shall be operated in such a manner that there will be no contamination of the asphalt with foreign material. Asphalt shall not be heated above 400°F at any time, and when applied, shall be at a temperature of not less than 70°F, and not more than 150°F. The Engineer will select the temperature of application, and the Contractor shall apply the asphalt at a temperature within 15°F of the temperature selected. All asphalt heated above 400°F will be rejected.

Before the application of asphalt, the surface of the base shall be cleaned of dirt, dust, or other deleterious matter by sweeping or other approved methods and, if required by the Engineer, lightly sprinkled with water.

Asphalt shall be applied on the clean surface by an approved type of self-propelled pressure distributor so operated as to distribute the asphalt in the quantity specified evenly and smoothly under a pressure necessary for proper distribution. The Contractor shall provide all necessary facilities for determining the temperature of the asphalt in all the heating equipment and in the distributor for determining the rate at which it is applied and for insuring uniformity at the junction of two distributor loads. Asphalt shall be applied for the full width of the surface treatment in one application unless the width exceeds twenty-two (22) feet. No traffic or hauling will be permitted over the freshly applied asphalt for five days.

**MEASUREMENT AND PAYMENT**

**D-516.04 QUANTITY-SQUARE YARDS:** The quantity of bituminous prime coat to be paid shall be measured in square yards of the area primed, applied at a rate of 0.25 gallons per square yard.

**D-516.05 GALLONS:** The number of gallons of bituminous prime coat measured as provided in Division D, Section 514, Paragraph D-514.04 will be paid for at the contract unit price per square yard for bituminous prime coat applied.

**D-516.06 GENERAL:** All payment made under these sections shall constitute full compensation for furnishing (freight included) heating, hauling, and distributing all bituminous material; for cleaning the surface to which it is applied; and for furnishing all labor, tools, and equipment.
SECTION 520
HOT MIX ASPHALTIC CONCRETE PAVEMENT-TYPE-D

D-520.01 DESCRIPTION: This item shall consist of a base course, a leveling up course, a surface course, or any combination of these courses as shown on the plans, each to be composed of a compacted mixture of mineral aggregate and asphaltic material. The mixture, when designed and tested in accordance with these specifications and methods outlined in Tex 204-F shall have the following:

<table>
<thead>
<tr>
<th>IN PLACE DENSITY, PERCENT</th>
<th>STABILITY, PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIN</td>
<td>MAX</td>
</tr>
<tr>
<td>95</td>
<td>99</td>
</tr>
</tbody>
</table>

Not less than 35 nor more than 60 unless otherwise shown on plans.

The pavement shall be constructed on the previously completed and approved subgrade, base, existing pavement, bituminous surface, or, in the case of a bridge, on the prepared floor slab, as herein specified and in accordance with the details shown on the plans.

D-520.02 MATERIALS: Materials used in Hot-Mix Asphaltic Concrete Pavement shall meet the requirements as set forth in TxDOT Item 340 “Dense Graded Hot-Mix Asphalt” Specifications, 2004 or latest edition.

Prior to laying any asphalt, Contractor shall submit a Hot-Mix Asphaltic Concrete mix design (less than one year old) signed and sealed by a professional engineer licensed in Texas for approval. He/She shall also submit written assurance that material stockpiles are sufficient to produce a mix consistent with the design for the duration of the project. If material source change occurs prior to completion, Contractor shall provide a revised mix design at no additional expense to Owner.

The Contractor shall provide for quality control at the plant to ensure that paving material delivered to the site conforms to requirements of these specifications and the mix design unless otherwise specified by Engineer.

D-520.03 CONSTRUCTION METHODS: Construction methods used in Hot- Mix Asphaltic Concrete Pavement shall meet the requirements as set forth in TxDOT Item 340 “Dense Graded Hot-Mix Asphalt” Specifications, 2004 or latest revision, with the following addition:

1. Place the mixture when the roadway surface temperature is 60°F or higher unless otherwise approved. Place mixture only when weather conditions and moisture conditions of the roadway surface are suitable in the opinion of the engineer.
2. Delivery temperature no to exceed 350°F
3. Minimum placement temperature shall not be less than 260°F and depending on the Hot Mix Binder grade.
4. Ensure pavement is fully compacted before allowing rollers to stand on the pavement.
5. Use only water or an approved release agent on rollers, tamps, and other compaction equipment. Keep diesel, gasoline, oil, grease, and other foreign matter off of the mixture.
6. Allow the compacted pavement to cool to 160°F or lower before opening to traffic.

**D-520.04 EQUIPMENT:** Mixing plants that will not continuously produce a mixture meeting all of the requirements of TxDOT Item 340.4 Specifications, 2004, shall not be allowed.

**D-520.05 TESTING:** The assigned Laboratory shall test a job site sample to compare with the approved Hot-Mix design and also test for in-place air void determination as per TxDot Item 340. Reports of Core test, made by the assigned laboratory, to assure the required compacted lift thickness shall be provided prior to acceptance.

**D-520.06 MEASUREMENT:** The asphaltic mixture shall be measured by square yards of various types and thickness as actually used in the completed and accepted work in accordance with the plans and specifications for the project. No separate measurement will be made for fluxing oil.

**D-520.07 PAYMENT:** The number of square yards of asphaltic mixture placed will be paid for at the contract unit price per square yard of various types and thickness. The unit price will be full compensation for surface preparation, hot mix material, placement, equipment, labor, tools and incidentals.
SECTION 540
VALLEY GUTTER

D-540.01 DESCRIPTION: This work shall consist of the construction of conventionally formed Portland Cement concrete valley gutter in accordance with these specifications and in reasonably close conformity with the pavement design report for the concrete thickness but not less than the minimum standards shown in Detail No. and the lines and grades shown on the plans or established by the Engineer.

D-540.02 GENERAL:

1. Valley gutters crossing local street intersection with collectors shall be minimum five (5) foot wide.

2. Valley gutters will not be allowed to cross Arterials and collectors.

3. Mid-Block valley gutters shall only be permitted at local streets when drainage conditions require this structure, and shall be minimum ten (10) foot wide.

4. Asphalt valley gutters will not be allowed on any street.

D-540.03 MATERIALS:

Concrete: Conform to material and proportion requirements for concrete Section 406.

Reinforcing Steel: Conform to material requirements in section 410 & 412.

Curing: Conform to requirements of Section 406 - Concrete Curing.

D-540.04 CONSTRUCTION:

1. All valley gutters shall be constructed monolithic with curb & Gutter at radii of return. No concrete shall be poured until forms, steel and grades are inspected and approved.

2. Contractor shall “blue-top” along flow line and the connection with gutter tangent elevation and valley gutter.

3. Place concrete in forms to specified depth. Bring mortar to surface. Curb depressions and adjacent flares for accessible ramps shall be constructed.

5. A water flow test shall be required to detect depressions during finishing of concrete.

6. Concrete testing will be performed under provision of Division C, General Provisions, Section 6 Control of Work and Materials. Compressive Strength Test Specimens will be tested in accordance with ASTM C 39. Minimum compressive strength shall be 3000 pounds per square inch at 28 days or as shown on the plans.

D-540.05 MEASUREMENT: Valley gutter will be measured by the unit for the length (tangent to tangent) and different widths specified.

D-540.05 PAYMENT: Will be paid by the unit price bid for concrete valley gutter for the width specified. This price is full compensation for surface preparation of base; materials; removal and disposal of excavated material; drilling and doweling into the existing concrete curb, the curb ramp depression, adjacent flares and pavement; repair of the adjacent street or pavement structure damaged by the operations; and equipment, labor, materials, tools and incidentals.
SECTION 542
PARKING METERS

PART 1     G E N E R A L

1.01     SECTION INCLUDES
A. Protection, removal, salvage, and coordination with the City regarding parking meters, parking sensors, and other associated items.

1.02     MEASUREMENT AND PAYMENT
A. Removal and salvage of existing parking meters shall be paid on a unit price basis per each parking meter to be removed and salvaged. Payment shall be full compensation including all incidental and subsidiary material and work to remove and salvage existing parking meters.
B. Protection of existing parking meters which are not to be removed or salvaged will not be measured for payment and shall be subsidiary to related work items.

PART 2     P R O D U C T S – N O T U S E D

PART 3     E X E C U T I O N

3.01     APPLICATION
A. Contractor to protect existing parking meters which are not to be removed throughout construction as indicated in the Drawings.
B. Contractor to coordinate with the City in advance of construction activities for City to remove and salvage parking sensors within the pavement in the vicinity of parking meters.
C. Contractor to remove and salvage parking meters as indicated in the Drawings.
D. Contractor to coordinate with the City in advance of re-paving the roadway for City to reinstall parking sensors as required.

END OF SECTION
SECTION 606
NPDES REQUIREMENTS

D-606.01 GENERAL: This section describes the required documentation to be prepared and signed by the Contractor before conducting construction operations, in accordance with the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) Permit, as stated in the Federal Register Vol. 57 No. 175, issued by the Environmental Protection Agency on September 2, 1992.

The Contractor shall be responsible for implementation, maintenance, and inspection of storm water pollution prevention control measures including, but not limited to, erosion and sediment controls, stormwater management plans, waste collection and disposal, off-site vehicle tracking, and other practices shown on the drawings or specified elsewhere in this or other specifications.

The Contractor shall review implementation of the Storm Water Pollution Prevention Plan (SWPPP) in a meeting with the City Engineer prior to start construction.

D-606.02 UNIT PRICES: Unless indicated in the Unit Price schedule as a pay item, no separate payment will be made for work performed under this section. Include cost of work performed under this section in pay items of which this work is a component.

D-606.03 REFERENCES:

ASTM D4632- Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

EXECUTION

D-606.04 NOTICE OF INTENT: The Contractor shall fill out, sign, and date the Contractor’s Notice of Intent (NOI). The signed copy of the Contractor’s NOI shall be returned to the City. The City will complete the Owner’s Notice of Intent and will submit both notices to the EPA. Submission of the NOI is required by both the City and the Contractor before construction operations start.

D-606.05 CERTIFICATION REQUIREMENTS: Submit name, address, and telephone number of persons or firms responsible for maintenance and inspection of erosion and sediment control measures and all Subcontractors.

D-606.06 RETENTION OF RECORDS:
(a) The Contractor shall keep a copy of the Storm Water Pollution Prevention plan at the construction site or at the Contractor’s office from the date it became effective to the date of project completion.

(b) At the project closeout, the Contractor shall submit to the City all NPDES forms and
certifications, as well as a copy of the SWPPP. Stormwater pollution prevention records and data will be retained by City for a period of three (3) years from the date of project completion.

**D-606.07 REQUIRED NOTICES:**

(a) The following notices shall be posted from the date that this SWPPP goes into effect until the date of final site stabilization:

1. Copies of the Notices of Intent submitted by the City and Contractor and a brief project description shall be posted at the construction site or at Contractor’s office in a prominent place for the public viewing.

2. Notice to drivers of equipment and vehicles, instruction them to stop, check, and clean tires of debris and mud before driving onto traffic lanes. Post such notices at every stabilized construction exit area.

3. In an easily visible location on site, post a notice of waste disposal procedures.

4. Notice of hazardous material handling and emergency procedures shall be posted with the NOI on site. Keep copies of Material Safety Data Sheets at a location on site that is know to all personnel.

5. Keep a copy of each signed certification at the construction site or at Contractor’s office.
SECTION 628
SEDIMENT CONTAINMENT DIKES

D-628.1 - Description

This item shall govern the provision and placement of temporary filtration dikes along or across such areas as indicated on the Drawings. This method shall be used during construction only and its purpose shall be to temporarily control erosion by intercepting and retaining sediment.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

D-628.2 - Submittals

The submittal requirements for this specification item shall include:

A. Locations and Types of containment dikes (hay Bales or Triangular Sediment Filter Dike).
B. Seeding
   1. Identification of the type, source, mixture, pure live seed (PLS) and rate of application of the seeding.
   2. Type of mulch.
   3. Type of tacking agent.
   4. Type and rate of application of fertilizer.

D-628.3 - Materials

A. Hay Bales

"Hay Bales" shall be free of Johnson Grass or other noxious weeds. The bales shall consist of either hay or straw in good condition and be securely tied with wire. Stakes for anchoring bales shall be #4 (10M) reinforcing bars, ½ inch (12.5 mm) steel pickets or 2 x 2 inch (50 x 50 mm) wooden stakes. Hay bales shall be limited to drainage areas less than 2,500 square feet (0.02 hectares).

B. Filter Dike

"Filter Dike" shall be prefabricated from 6x6-D2.9xD2.9 (150x150-MW19xMW19) WWF and 4.5 oz. (127 grams) non-woven polyester filter fabric securely fastened to WWF with galvanized shot rings or j-clips. A 12-inch (300-mm) skirt shall be a continuous extension of the filter fabric on the upstream face.

The filter fabric shall extend beyond the dike joints to provide a 3-inch (75-mm) overlap. Ends of dike not lapped with filter fabric shall be plugged with filter fabric.

D-628.4 - Construction Methods

The Contractor may select the material for the dikes, unless otherwise indicated, conforming to the details on the Drawings.

Bales shall be placed with ends tightly abutting the adjacent bales. Each bale shall be embedded in the soil a minimum of 4 inches (100 mm) and a maximum of 6 inches (150 mm). Bales shall be securely anchored in place by a minimum of 2 stakes per bale. The first stake in each bale shall be angled toward the previously placed bale to force the bales together. Stakes shall be embedded in the soil a minimum of
1 ½ feet (0.45 meters). Bales that are not able to be imbedded and are placed on impervious cover should
be placed level with the concrete and have all bales butted end to end with no voids or gaps between
them. Bales shall be bound by either wire or nylon string. Bales shall be replaced every 2 months or more
often during wet periods.

For filter dikes the filters shall be placed with ends tightly abutting the adjacent filter. Each filter and skirt
shall be securely anchored in place using 6 inch (150 mm) staples at a maximum spacing of 12 inches
(300 mm) on center. Anchoring on impervious areas shall be accomplished with sand/gravel bags placed
at 18 inches (450 mm) on center or with a nominal 1 inch by 4 inch (25 mm by 100 mm) board nailed at
18 inches (450 mm) on center.

Silt accumulation behind hay bales and triangular sediment filter dikes shall be removed at a maximum
depth of 6 inches (150 mm) or when, in the opinion of the Engineer or designated representative, the
structure ceases to function as intended.

All dikes shall be inspected by the Contractor at least monthly and after each rainfall. Dikes shall be
repaired or replaced when necessary or as directed by the Engineer or designated representative.

After completion of construction or when directed by the Engineer or designated representative the dike
shall be removed and the site re-graded to the final grades. Any depression shall be filled and any
accumulations of silt shall be spread or removed to a permitted disposal area.

D-628.5 - Measurement

Sediment containment dikes will not be measured for payment and shall be considered subsidiary to the
related work items.

D-628.6 - Payment

There will be no separate payment for sediment containment dikes. Payment for all materials, labor, and
equipment required to provide sediment containment dikes shall be considered subsidiary to related work
items.

END OF SECTION
SECTION 630
CURB INLET PROTECTION

D-630.1 - Description

This item shall govern the provision and placement of temporary curb inlet protection for existing and proposed curb inlets throughout the project area. This method shall be used during construction only and its purpose shall be to temporarily prevent sediment and other construction debris from entering the storm drain system.

D-630.2 - Submittals

The submittal requirements for this specification item shall include:

A. Types of curb inlet protection.

D-630.3 - Materials – NOT USED

D-630.4 - Construction Methods – NOT USED

D-630.5 - Measurement

Curb inlet protection shall be measured for payment per each curb inlet.

D-630.6 - Payment

Payment for curb inlet protection shall include all work, materials, and equipment to provide curb inlet protection.

END OF SECTION
SECTION 704
STREET SIGNS

D-704.01 GENERAL DESCRIPTION  This item shall govern for the furnishing, assembling, and installation of street signs. Street Name Signs see Figure 704 - 1 thru Figure 704 - 4.

D-704.02 MATERIALS  The sign supports shall use the Wedge Anchor Steel System and shall be tall enough to provide a minimum of 7 feet ground clearance (7.5 feet maximum) from bottom edge of the sign assembly. Length of the support will vary depending on the type and size of the signs installed on the pole as an assembly.

All traffic signs must comply with the latest edition of the Texas Manual of Uniform Traffic Control Devices. Unless otherwise specified by the Engineer, all signs shall be fabricated from 0.080 gauge aluminum. Sign face materials shall conform to ASTM D 4956-04, reflective beaded sheeting, TYPE II or better except for stop signs and school zone signs. All stop signs shall conform to ASTM D 4956-04, reflective prismatic sheeting, TYPE III or better. All school zone signs shall conform to ASTM D 4956-04, reflective prismatic sheeting, TYPE VII or better.

Street name signs shall have white lettering with a green background. Aluminum sign blades for street signs shall be 9 inch in height with a minimum length of 30 inches and maximum length of 48 inches. Lettering on post-mounted Street Name signs shall use a six (6) inch upper and lower case Clearview Highway font character set (6CV-2W). Street name lettering used for abbreviations, designations and block numbers shall use a three (3) inch upper and lower case Clearview Highway font character set (3CV-2W) Follow Figure – 704-4 for Mast Arm Street Name Sign Specification.

D-704.03 PROVISIONS:  Sidewalk clearance and sign standards shall comply with the latest revision of the TEXAS ACCESSIBILITY STANDARDS

D-704.04 FOUNDATIONS:  The concrete footing shall use the Wedge Anchor Steel System in conformance with the latest revision of the Texas Department of Transportation Standard Plans SMD (TWT) – 08 SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST. Signs shall be installed no less than 2 feet from the back of curb and the edge of sign. Maximum sidewalk clearance shall be maintained in identifying location of sign, but it shall not be installed more than 5 feet from back of curb to the edge of the sign. The location of the sign may be modified in special situations where the ROW is limited or obstructions are present based on engineering judgement. See Examples 1 thru 4 When the above requirement cannot be met due to location or width of sidewalk, a minimum of 30 inches sidewalk clearance shall be provided.

D-704.05 MEASUREMENT:  Street signs shall be measured by each assembly complete in place.

D-704.06 PAYMENT:  Street signs shall be paid by each assembly complete in place. The price bid shall be considered to include materials, labor, equipment and incidentals necessary to complete the work.
SECTION 706
REFLECTORIZED PAVEMENT MARKINGS

D-706.1. GENERAL DESCRIPTION: This item shall govern for furnishing and placing reflectorized pavement markings and raised reflectorized pavement markers of the types, colors, shapes, sizes, widths, and thickness shown on the plans. Unless otherwise approved by the Engineer, Type I or II pavement markings shall be used on all roadways within the City of Laredo that are under the City’s jurisdiction. Reflectorized pavement markings supplemented by raised reflectorized pavement markings (traffic buttons) shall be required on all streets with a road classification of major collector or greater.

D-706.2. MATERIALS: The pavement marking installation must abide to the latest edition of the Texas Manual of Uniform Control Devices and must comply with the latest TxDOT Traffic Engineer Standard Detail Sheets.

When Type I or Type II white pavement markings are to be applied on concrete, black pavement marking paint shall be applied under the white paint and shall exceed a minimum of 2 inches and a maximum of 4 inches in all directions from the edge of the white pavement marking to make it more visible. When using preformed pavement markings, it shall have the black edge as part of the preformed pavement marking.

Type I: Marking Materials. Type I markings are thermoplastic type materials that require heating to elevated temperatures for application. Type I marking materials shall conform to TxDOT Departmental Materials Specifications DMS-8220. Each container of Type I marking material shall be clearly marked to indicate the color, weight, type of material, manufacturer’s name and the lot/batch number.

Type I pavement markings shall be used for all crosswalks, stop bars and lane designation when required.

Type II: Marking Materials. Type II markings are paint-type materials that are applied at ambient or slightly elevated temperatures. Type II marking materials shall conform to TxDOT Departmental Materials Specifications DMS-8200, YPT-12 and/or WPT-12, and DMS-8200.

Blue Reflectors for Fire Hydrants. Blue raised reflective markers shall be used on all streets to identify location for all fire hydrants. One marker (Type II-B-B) shall be installed in the center of roadway immediately in front of the location of fire hydrant. The pavement marker shall have two (2) reflectorized faces 180° of each other. The body, other than the reflective faces, shall be blue. Reflectorized raised pavement markers shall abide by latest TxDOT Traffic Engineer Standard Plan Sheets.

D-706.3. EQUIPMENT REQUIREMENTS
The equipment used to place pavement markings shall be capable of accomplishing the required pavement markings. For projects that exceed 2000 linear feet the equipment used to place pavement markings shall:

1. Be maintained in satisfactory operating condition.

2. Be considered in satisfactory operating condition if it has an average placement rate of
5,000 linear feet per hour of acceptable four-inch solid or broken lines over any five (5) consecutive working days. Must comply with the latest edition of the Texas Manual of Uniform Traffic Control Revisions.

3. Meet or exceed the material handling at elevated temperatures requirements of the National Fire Underwriters and the Texas Railroad Commission.

4. Be capable of placing a minimum of 40,000 linear feet of four-inch solid or broken markings per working day.

5. Have production capabilities similar to four-inch marking equipment and shall be capable of placing linear markings up to eight (8) inches in width in a single pass when used for placing markings in widths other than four (4) inches.

6. Have production capabilities considered satisfactory by the Engineer when used to place markings other than solid or broken lines.

7. Be capable of placing a centerline and no-passing barrier-line configuration consisting of one (1) broken line with two (2) solid lines at the same time to the alignment and spacing shown on the plans.

8. Be capable of placing broken and/or continuous white line from both sides.

9. Be capable of placing lines with clean edges and of uniform cross-section. All lines shall have a tolerance of plus or minus 1/8 inch per four (4) inch width.

10. Have an automatic cut-off device with manual operating capabilities to provide clean, reasonably square marking ends to the satisfaction of the Engineer, and to provide a method of applying broken line in an approximate stripe-to-gap ratio of 10 to 30.

11. Provide continuous mixing and agitation of the pavement marking material. The use of pans, aprons or similar appliances which the die overruns will not be permitted for longitudinal striping applications.

12. Apply glass beads by an automatic bead dispenser attached to the pavement marking equipment in such a manner that the beads are dispensed uniformly and almost instantly upon the marking as the marking is being applied to the road surface. The bead dispenser shall have an automatic cut-off control, synchronized with the cut-off of the pavement marking equipment.

When Type I markings are to be placed, the contractor shall have a hand-held thermometer on the project. The thermometer shall be capable of measuring the temperature of the pavement marking material to be placed.

**D- 706.4 CONSTRUCTION METHODS**

**General:** When required by the Engineer, the Contractor and the Engineer shall review the
sequence of work to be followed and the estimated progress schedule.

Markings may be placed on roadways either free of traffic or open to traffic. On roadways already open to traffic, the markings shall be placed under traffic conditions that exist with a minimum of interference to the operation of the facility. Traffic control shall be as shown on the plans or as approved by the Engineer in writing. All markings placed under open-traffic conditions shall be protected from traffic damage and disfigurement.

Guides to mark the lateral location of pavement markings shall be established as shown on the plans or as directed by the Engineer. The Contractor shall establish the pavement marking guides and the Engineer will verify the location of the guides.

Markings shall be placed in proper alignment with the guides. The deviation rate in alignment shall not exceed one (1) inch per 200 feet of roadway. The maximum deviation shall not exceed two (2) inches nor shall any deviation be abrupt.

Markings shall essentially have a uniform cross-section. The density and quality of markings shall be uniform throughout their thickness. The applied markings shall have no more than five (5) percent, by area, of holes or voids and shall be free of blisters.

Markings, in place on the roadway, shall be reflectorized both internally and externally. Glass beads shall be applied to the materials at a uniform rate sufficient to achieve uniform and distinctive retroreflective characteristics when observed in accordance with Test Method Tex-828-B Determining Functional Characteristics of Pavement Markings.

The Contractor’s personnel shall be sufficiently skilled in the work of installing pavement markings.

Markings placed that are not in alignment or sequence, as shown on the plans or as stated in this specification, shall be removed by the Contractor at the Contractor’s expense. Removal shall be in accordance with Item 667, “Eliminating Existing Pavement Markings and Markers,” except for measurement and payment. Guides placed on the roadway for alignment purposes shall not establish a permanent marking on the roadway.

Unless otherwise shown on the plans, pavement markings may be applied by any method that will yield markings meeting the requirements of these specifications.

**Surface Preparation:** New portland-cement-concrete surfaces shall be cleaned in accordance with Item 678, “Pavement Surface Preparation for Markings” to remove curing membrane, dirt, grease, loose and/or flaking existing construction markings and other forms of contamination.

Older portland-cement-concrete surfaces and asphaltic surfaces that exhibit loose and/or flaking existing markings shall be cleaned in accordance with Item 678, “Pavement Surface Preparation for Markings” to remove all loose and flaking markings.

Pavement to which material is to be applied shall be completely dry. Pavements shall be considered dry if, on a sunny day after observation for 15 minutes, no condensation occurs on the
underside of a one (1) foot square piece of clear plastic that has been placed on the pavement and weighted on the edges.

Eliminating Existing Pavement Markings and Markers: Existing Pavement markings and Markers shall be eliminated in accordance with Item 677, “Eliminating Existing Pavement Markings and Markers” from the latest version of the TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES.

**Application of Type I Markings:** New portland-cement-concrete surfaces shall be further prepared for Type I markings, after cleaning, by placing a Type II markings as a sealer in accordance with this Item. When placing Type I markings in new locations on asphaltic surfaces three (3) years old or older or any portland-cement-concrete surfaces, a Type II marking shall be used as a sealer. Unless otherwise shown on the plans, existing portland-cement-concrete and asphaltic surfaces to be re-striped will not require Type II markings as a sealer; existing markings may be used as a sealer in lieu of Type II markings. Type II markings shall be placed a minimum of two (2) and a maximum of 30 calendar days in advance of placing Type I markings. Type II markings that become dirty due to inclement weather or road conditions shall be cleaned by washing, brushing, compressed air or other means approved by the Engineer, prior to application of Type I markings. If washing is used, the surface of Type II markings shall become thoroughly dry before placing Type I markings. Color, location and configuration of Type II markings shall be the same as that of Type I markings.

Type I pavement marking material shall be applied within temperature limits recommended by the material manufacturer. Application of Type I pavement markings shall be done only on clean, dry pavement having a surface temperature above 50°F. Pavement temperature shall be measured in accordance with Test Method Tex-829-B Measuring Pavement Temperature.

When Type I pavement marking application is by spray, and operations cease for five (5) minutes or more, the spray head shall be flushed by spraying pavement marking material into a pan or similar container until the pavement marking material being sprayed is at the proper temperature for application.

Unless otherwise directed by the Engineer in writing, Type I pavement marking materials shall not be placed on roadways between during cold inclement weather subject to temperature and moisture limitations specified herein.

Unless otherwise shown on the plans, Type I marking minimum thickness shall be 0.060 inches (60 mil) for edgeline markings and 0.090 inches (90 mil) for stop-bars, legends, symbols, gore and center-line/no-passing barrier-line markings. The maximum thickness of all Type I markings shall be 0.180 inches (180 mil).

The thickness of Type I markings at the time of placement will be measured above the plane formed by the pavement surface. The Engineer will supply a device to measure the thickness of the applied markings. The markings shall be of uniform thickness of the applied markings. The markings shall be of uniform thickness throughout their lengths and widths.

**Application of Type II Markings:** The application of Type II marking materials shall be done
only on surfaces with a minimum surface temperature of 50°F.

The application rate for Type II marking material shall be: between 15 and 20 gallons per mile of solid four (4) inch line and between 30 and 40 gallons per mile for solid eight (8) inch line except that, for new surface treatment projects the application rate shall be between 25 and 30 gallons per mile of solid four (4) inch line and between 40 and 50 gallons per mile for solid eight (8) inch line. Pavement markings for new surface treatment projects shall be applied in two (2) applications each approximately one-half the application rate. The first application shall not contain glass beads. The interval between the first and second applications shall be a minimum of one (1) hour.

When, in the case of impending inclement weather, and the Engineer directs the Contractor to apply water-base traffic paint, the markings are damaged by subsequent rain, sleet, hail, etc., the Contractor will be paid for the initial placement and the replacement markings. However, if the Contractor places the markings at his option, the Contractor is responsible for all costs associated with the replacement markings.

When existing pavement marking are removed, temporary flexible roadway marker tabs will be required to supplement pavement markings and shall abide by Traffic Engineering Standards Plan Sheets (TxDOT). Temporary flexible reflective roadway marker tabs may also be used to mark or delineate roadway prior to applying pavement markings and shall conform to Departmental Materials Specifications DMS 8242 (TxDOT).

**D-706.5. PERFORMANCE PERIOD FOR TYPE I MARKINGS**

Type I pavement markings shall meet all requirements of this specification for a minimum of 15 calendar days after installation. Pavement markings that fail to meet all requirements of this specification shall be removed and replaced by the Contractor at the Contractor’s expense. The Contractor shall replace all pavement markings failing the requirements of this specification within 30 calendar days following notification by the Engineer of such failing. All replacement markings shall also meet all requirements of this specification for a minimum of 15 calendar days after installation.

**D-706.6. MEASUREMENT**

This item will be measured by the linear foot, by each of the various words, symbols or shapes, or by any other unit as shown on the plans.

Where double stripes are place, each stripe will be measured separately.

This is a plans quantity measurement Item and the quantity to be paid for will be that quantity shown in the proposal and on the “Estimate and Quantity” sheet of the contract plans except as may be modified by approval of Engineer. If no adjustment of quantities is required, additional measurement or calculations will not be required.

Type II pavement markings requiring two (2) applications on new surface treatments will be measured as one (1) marking.

Type II pavement marking materials, when used as a sealer for Type I markings will be measured
as Type II markings.

**D-706.7. 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 “Reflectorized Pavement Markings” of the various types, colors, shapes, sizes, widths, and thickness (Type I markings only) specified. This price shall be full compensation for furnishing all materials; for application of pavement and raised pavement markings and for all other labor, tools, equipment and incidentals necessary to complete the work, except as shown below.

Surface Preparation, when shown on the plans, will be paid for under Item 678 “Pavement Surface Preparation for Markings.”

Final work zone pavement markings (paint and beads), which will be, used as a sealer for Type I pavement markings will be paid for under this Item.

When replacement Type II markings are required due to damage to the original markings from rain, sleet, hail, etc., and the original markings were placed at the direction of the Engineer, the plan quantity requirements under “Measurement” do not apply to the original and replacement markings. The Contractor will be paid for the actual quantity of original and replacement markings at the unit price bid for that item.
Add the following to Sections D-706.6 Measurement:

Concrete curb painting and marking shall be paid for by the linear foot, by each of the various words, symbols or shapes, or by any other unit as shown on the plans.

Add the following to Sections D-706.7 Payment:

Payment for concrete curb painting of the various types and colors shall be full compensation for all materials, labor, and equipment necessary to complete the work.
SECTION 710
RELOCATION OR REMOVAL OF PERMANENT SIGNS

D-710.01 GENERAL DESCRIPTION:  This item shall govern for removing or relocating existing permanent signs shown on the plans.

All regulatory signs shall be displayed at all times when plans call for relocating of an existing permanent traffic sign during construction. Temporary signs supports shall be in strict accordance with the latest revision of Texas Department of Transportation standard BC(5) – 07 BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT STANDARD. Any relocated signs shall be new and in accordance with Section 704 STREET SIGNS.

D-710.02 MATERIALS:

A. All materials and construction methods shall conform to the details shown on the plans and the requirements of this Section.

B. Unless otherwise shown on the plans, the Contractor shall furnish all materials. All materials furnished by the Contractor shall be new.

D-710.03 CONSTRUCTION METHODS:

A. Removal: Unless otherwise shown on the plans, existing concrete foundations that are to be abandoned shall be removed to a minimum two (2) feet below finish grade. The remaining hole shall be backfilled with material equal in composition and density to the surrounding area, and by replacing any surfacing, such as asphalt pavement or concrete riprap, with like material to equivalent condition.

B. Relocation: Relocation shall include new foundations in accordance with Section 704 STREET SIGNS. The removed signs, poles, and wedge anchor system shall be returned to the Traffic Safety Department. The contractor will be responsible for disposing the removed concrete foundation and any remaining material. If the removed foundation does not include the wedge anchor system, the contractor will be responsible for properly disposing of the concrete foundation and the sign pole in concrete.

C. Handling and Storage: Existing signs and supports to be salvaged shall be handled and stored in such a manner that they are not damaged. Care shall be taken to prevent any damage to the various sign assembly components. Any portion of the sign assembly designated for relocation or salvage, including messages, damaged by the Contractor shall be replaced by the Contractor at the Contractor’s expense in accordance with the applicable specification.

D. Any sign components that are removed and are shown on the plans to be reused or salvaged shall become the property of the City and shall be stockpiled at a designated location. All other parts shall become the property of the Contractor and shall be removed from the right-of-way to a site approved by the engineer.
**D-710.04 MEASUREMENT:** This item will be measured as each permanent sign removed or relocated or by any other unit as shown on the plans, complete in place.

**D-710.05 PAYMENT:** The work performed and materials furnished in accordance with this Section and measured as provided under “Measurement” will be paid for at the unit price bid for “Relocation of Permanent Signs”. This price shall be full compensation for furnishing and installing new foundations as per latest standards, and/or new sign supports (when required), removing existing signs and related materials; for modifying existing sign supports; for salvaging; for hauling, excavating, backfilling and surface placement; and for all other materials, labor, tools, equipment and incidentals necessary to complete the work.
SECTION 712
TRAFFIC CONTROL AND REGULATION

D-712.01 GENERAL DESCRIPTION: Section includes requirements for signs, signals, control devices, flares, lights, and traffic signals, as well as construction parking control, designated haul routes and bridging of trenches and excavation. Temporary Traffic Control plans shall be in strict accordance with the latest revision of TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

D-712.02 INSPECTIONS:

   a) Yard Inspection: Before the Traffic control Plan (TCP) is implemented and devices or hardware are installed in the field the devices must be inspected to insure that they are accepted devices in acceptable condition. There must also be sufficient devices to meet the needs of the approved traffic control plan.

   b) Drive-Through Inspection: To decrease hazards to motorists and workers, traffic control shall be inspected and evaluated immediately after the traffic control plan is implemented. This kind of inspection shall be done in all lanes, in both directions or crossroads, during the day and the night, and from all entry or exist points within the zone. Any other routes such as detours that have work zone traffic on them shall be inspected also. Unacceptable devices or situations that are found on the jobsite shall be replaced or the situation corrected. Imminent danger situation require immediate correction.

D-712.03 MATERIALS: All materials shall comply with the latest version of the Texas State Manual on Uniform Traffic Control Devices

D-712.04 PUBLIC ROADS:

   (a) Abide by laws and regulations of governing authorities when using public roads. If the Contractor’s work requires that public roads be temporarily impeded or closed, approvals shall be obtained from governing authorities and permits paid for before starting any work.

   (b) Contractor shall maintain at all times a 10-foot-wide all-weather lane adjacent to work areas which shall be kept free of construction equipment and debris and shall be for the use of emergency vehicles, or as otherwise provided in traffic control plan.

   (c) Contractor shall not obstruct the normal flow of traffic from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. on designated major arterials or as directed by the City Engineer.

   (d) Contractor shall maintain local driveway access to residential and commercial properties adjacent to work areas at all times.

   (e) Surrounding streets used for entering or leaving the job area must be keep free of excavated
material, debris, and any foreign material resulting from construction operations.

**D-712.05 CONSTRUCTION PARKING CONTROL:**

(a) Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles and City’s Operations.

(b) Monitor parking of construction personnel’s vehicles in existing facilities. Maintain vehicular access to and through parking areas.

(c) Prevent parking on or adjacent to access roads or in non-designated areas.

**D-712.06 FLARES AND LIGHTS:**

(a) Provide flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

**D-712.07 HAUL ROUTES:**

(a) Utilize haul routes designed by authorities or shown on the drawings for construction traffic.

(b) Confine construction traffic to designated haul routes.

(c) Provide traffic control at critical areas of haul routes to regulate traffic minimize interference with public traffic.

**D-712.08 TRAFFIC SIGNS AND SIGNALS:**

(a) Install traffic control devices at approaches to the site and on site, at cross roads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

(b) Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor’s control and areas affected by Contractor’s operations.

1. Relocate traffic signs and signals as work progresses to maintain effective traffic control.

**D-712.09 BRIDGING TRENCHES AND EXCAVATIONS**

(a) Whenever necessary, bridge trenches and excavation to permit an unobstructed flow of traffic.

(b) Secure bridging against displacement by using adjustable cleats, angles, bolts or other devices whenever bridge is installed:

1. On a existing bus route;
2. When more than five percent of daily traffic is comprised of commercial or truck traffic;
3. When more than two separate plates are used for the bridge; or
4. When bridge is to be used for more than five consecutive days.

(c) Install bridging to operate with minimum noise.

(d) Adequately shore the trench or excavation to support bridge and traffic.

(e) Extend steel plates used for bridging a minimum one foot beyond edges of trench or excavation. Use temporary paving materials (premix) to featheredges of plates to minimize wheel impact on secured bridging.

(f) Use steel plates (refer to SECTION 808) of sufficient thickness to support H-20 loading, truck or lane that produces maximum stress.

D-712.10 REMOVAL

(a) Remove equipment and devices when no longer required.

(b) Repair damage caused by installation

(c) Remove post settings to a depth of 2 feet.

D-712.11 MEASUREMENT: Measurement is a lump sum basis for traffic control and regulation, including submittal of a traffic control plan if different from the plan shown on the Drawings, provision of traffic control devices and provision of equipment and personnel as necessary to protect the work and the public.

D-712.12 PAYMENT: The amount invoiced shall be paid by percent completed or as approved by the Engineer based on the schedule of values submitted for traffic control and regulation. Refer to Division C, General Provisions, Section 9 - Measurement and Payment for unit prices procedures.
SPECIAL PROVISION TO SECTION 712
TRAFFIC CONTROL AND REGULATION

Remove Sections D-712.11 Measurement and Section D-712.12 Payment and replace with the following:

D-712.11 MEASUREMENT AND PAYMENT: There will be no measurement and payment for traffic control and regulation. Preparation, submittal, and implementation of traffic control, including required labor, materials, and equipment, shall be considered subsidiary to the work as a whole.
SECTION 714
LIGHTING AND TRAFFIC SIGNALS

D-715.01 GENERAL DESCRIPTION: This item shall govern for the furnishing, assembling, and installation of street lighting, electrical services, traffic signals, and flashers and shall be in strict accordance with DIVISION VI, Lighting and Signing from the Texas Department of Transportation STANDARDS SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES.

D-702.02 MATERIALS: All materials, erection, and usage shall be in strict accordance with DIVISION VI, Lighting and Signing from the Texas Department of Transportation STANDARDS SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES.

D-704.04 MEASUREMENT: Measurement will depend on the item and shall be in strict accordance with DIVISION VI, Lighting and Signing from the Texas Department of Transportation STANDARDS SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES.

D-702.05 PAYMENT: The amount invoiced shall be paid as approved by the Engineer based on the schedule of values submitted. The price bid shall be considered to include materials, labor, equipment and incidentals necessary to complete the work.
SPECIAL PROVISION TO SECTION 714
LIGHTING AND TRAFFIC SIGNALS

Remove Sections D-704.04 Measurement and Section D-702.05 Payment and replace with the following:

D-714.04 MEASUREMENT: Measurement for electrical ground boxes shall be per each. Incidental work items related to providing electrical ground boxes, complete in place, such as concrete curb and gutter and sidewalks will not be measured for payment and shall be considered subsidiary to the bid items for electrical ground boxes.

Measurement for relocation of existing pedestrian signal poles shall be per each pedestrian signal pole to be relocated.

D-714.05 PAYMENT: The amount invoiced for electrical ground boxes shall be paid as approved by the Engineer, and shall include all labor, materials, and equipment required to provide electrical ground boxes, complete in place, including incidental items including concrete curb and gutter, sidewalks, and other related items as required.

Payment for relocation of existing pedestrian signal poles shall include all labor, equipment, and materials to remove and relocate existing pedestrian signal poles and shall include all incidental electrical wiring and related items necessary to complete the work.
SECTION 802
SHEETING AND BRACING

GENERAL

D-802.01 DESCRIPTION: Unstable soil encountered in trench or foundation excavation which tends to cave in or otherwise, shall be properly sheeted and braced as per OSHA requirements. Sufficient bracing material shall be left in place to guarantee safety to workmen and material where removal of such sheeting and bracing after it has served its purpose would be dangerous to workmen during backfilling or harmful to materials in place.

MATERIALS

D-802.02 MATERIALS: The sheeting material to be placed in contact with the dirt shall be either rough lumber with a minimum thickness of 2" appropriately designed steel sheet piling. Braces shall consist of lumber with a minimum thickness of 4" or metal screw jacks or other mechanical devices approved by the Engineer. All lumber shall be No. 3 common or better.

D-802.03 WHEN TO INSTALL SHEETING AND BRACING: Whenever, in the opinion of the Engineer or the Contractor, the soil at the edge of any excavation is sufficiently unstable as to endanger the safety of life, limb, or property, sheeting and bracing material shall be installed. Such material shall also be installed in all trenches whose sides are steeper than the natural angle of repose of the soil material if it were in loose uncompacted condition and the trenches are in excess of 8 feet deep, but only such portions of the total height of the trench shall be sheeted as appears necessary. Should a layer or pocket of material be encountered anywhere in the trench or other excavation which is of such type as to make possible the failure of adjacent soils, such layer or pocket shall be sheeted and braced in such a manner as to insure its permanency. Whenever a doubt exists as to the necessity of the installation of sheeting and bracing, it shall be installed.

CONSTRUCTION METHODS

D-802.04 GENERAL: Upon discovery of unstable material in any excavation, such sheeting and bracing as may be deemed adequate by the Engineer shall be installed. Stay bracing, piling boards, and box or vertical sheeting methods shall be used depending on the nature of the unstable material encountered. Metal sheeting and steel sheet piling may be used at the option of the Engineer.

D-802.05 MEASUREMENT: This item will be measured by the foot along the long axis of the trench.

D-802.06 PAYMENT: Contractor shall investigate the conditions as they exist in the field and include in the unit price bid per linear foot. This price is full compensation for the excavation and backfill required for excavation protection; furnishing, placing and removing shoring, sheeting, or bracing; dewatering or diversion of water; jacking and jack removal; and equipment, labor, materials, tools and incidentals.
SECTION 804
WORK PERFORMED ON NON-WORKING DAYS

D-804.01 WORKING DAY: A working day is Monday thru Friday, 8:00 a.m. to 5:00 p.m. excluding holidays.

D-804.02 WORK PERFORMED ON A NON-WORKING DAY: Any work which is to be performed on a non-working day must be inspected. The Engineer will decide which work will be requiring the presence of an inspector.

D-804.03 COST OF INSPECTION: The cost for having an inspector present shall be incurred by the Contractor performing the work. Such arrangements will be made in writing and submitted to the Engineer for his approval. Any testing requested by the contractor out of service hours or any overtime charged by the testing laboratory for delaying, shall be paid by the contractor.

D-804.04 STOP WORK: Any work stoppage by the contractor must be reported in writing to the engineer and owner 24 hours prior to work stoppage.
SECTION 808
STEEL PLATE, TRENCH PLATE: BRIDGING UTILITY PROVISIONS

GENERAL

D-808.01 DESCRIPTION: Temporary Steel Plate Bridging: When approved by the Engineer or Contracting Agency the Contractor may use steel plates to bridge excavated trenches in areas where the roadway surface is to be opened to traffic.

D-808.02 MATERIALS: The plates shall be of steel construction capable of supporting HS-20 loading.

Plates shall be fabricated from ASTM-36 Steel (Min). (see drawing 808-1 for plate tickness)
Plate Locks Trench Securing System

D-808.03 WHEN TO INSTALL STEEL PLATES: When backfilling operations of an excavation in the traveled way either transverse or longitudinal cannot be properly completed within a work day, steel plate bridging may be required to preserve unobstructed traffic flow. In such cases, the following conditions shall apply:

1. The plates must extend beyond the edge of the trench wall to adequately support the traffic loads on it. All steel trench plates shall extend beyond the edges of the trench wall a minimum of twelve (12”) inches. Drawing No. 808-1

2. Trenches and excavations shall be adequately shored and braced to withstand highway traffic loads.

3. Each plate must be fully supported around the perimeter to prevent wobbling or rocking with non asphaltic shims and installed to operate with minimum noise.

4. Plates shall be secured and ramped on all sides with a trench plate securing device, to ensure a smooth transition from the road surface to the top of the plate surface and back to the road surface.

5. If the trench steel plates are going to be in place more than 48 hrs, a “STEEL PLATE” sign with black lettering on an orange background will be used in advance of steel plate bridging. This sign is used along with any other required construction signing.

6. The contractor is responsible for maintenance of the steel plates, shoring, and trench plate securing systems, and ensuring that they meet minimum specifications. If city forces must correct emergency condition due to excavation and plate placement and or movement, Contractor will be charged for the cost of corrective measures required.
CONSTRUCTION METHODS

D-808.04 GENERAL: For trenches and excavations with spans greater than four feet (4’), a structural design shall be prepared by a civil engineer registered in the state of Texas and approved by the City. Steel plate bridging and shoring shall be installed using either Method (1) or (2):

Method 1: Roadways with posted speeds equal to or less than 30 mph

One pre-approved method of securing steel trench plates involves a perimeter restraint consisting of polypropylene (PP). This method involves placing a 6” wide strip of PP along the edges of the trench plate which are exposed to traffic. The adjacent edges of multiple trench plates do not require additional edge restraint along those edges.

The PP strips shall be tapered from a nominal 1” thickness to approximately 1/4’ to provide a ramped surface for vehicles to enter and exit the trench plate. The PP perimeter restraint shall be safety orange in color to provide high visibility and help alert drivers to the presence of trench plates.

The perimeter restraint shall be secured to the pavement with 4” long Simpson -Titan H.D 3/8” concrete anchors (or equal) with washers. Anchors shall be spaced at intervals of 36” or less. The ends of the perimeter restraint shall be anchored a minimum 4” and a maximum of 8” from each end.

The horizontal gaps between the sides of the perimeter restraint and the trench plate shall not exceed 1/2”. Vertical differences in elevation between the top of the perimeter restraint and the top of the trench plate shall not exceed 1/2”. Plates shall be shimmed with PP shims to prevent vertical movement of the trench plate of more than 1/4” at any location. Shims, as required, shall be secured below the perimeter restraint at the anchor locations used to secure the frame. Shim thicknesses shall be limited to a total of 3/4”. Gaps that require greater than 3/4” thick shims shall be corrected by reorienting trench plates to reduce the size of vertical gaps between the bottom of the trench plate and the street surface.

Holes in the PP perimeter restraint and shims shall be pre-drilled and oversized to allow for PP expansion and contraction. Holes in the perimeter restraints shall be counter sunk to minimize exposure of bolt heads to traffic.

Trench plates may be removed and replaced as necessary to complete utility work in the street without removal of the PP perimeter restraint. Upon completion of construction and permanent removal of trench plates and frames, the anchor screw holes shall be filled with liquid asphalt during the trench patching operation or with high strength grout or other material approved or directed by the engineer. Patch material shall be struck smooth with the street surface.

The PP securing system shall be substantially similar, or equal to, the Plate Lock Trench Plate Securing System which is pre-approved for use. The trench plate securing system shall be installed
per manufacture’s direction and continuously maintained around all outside edges of the trench plates until removal of the plates.

**Method 2:** Roadways with posted speeds greater than 30 mph

The pavement shall be cold-planed to a depth equal to the thickness of the plate and to a width and length equal to the dimensions of the plate(s) The approach and ending plates shall be attached to the roadway by a minimum of 2 dowels pre-drilled into the corners of the plate and drilled 3 inches into the pavement: subsequent plates shall be butted to each other.

**D-808.05 MEASUREMENT AND PAYMENT:** No Separate measurement or payment will be made for this item
SECTION 812
DEFINITIONS

Whenever 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 thereof:

Addenda-Written or graphic instruments issued by ENGINEER prior to the receipt of bids which clarify, correct, or change the Bidding Requirements or the Contract Documents.

Agreement-The written contract between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

Application for Payment-A request from CONTRACTOR for a progress or final payment on the form accepted by ENGINEER and which is accompanied by such supporting documentation as is required by the Contract Documents.

Asbestos-Any material that contains more than one percent (1%) asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

BID-The offer or proposal of the BIDDER submitted on the prescribed form setting forth the required information, including prices for the Work to be performed.

Bidder-An individual, partnership, limited liability company, corporation, or joint venture submitting a bid for a proposed Contract.

Bidding Documents-The advertisement or Invitation to Bid, Instructions to Bidders, the Bid form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

Bidding Requirements-The information requested by and conditions for bidding set forth in the advertisement or Invitation to Bid, Instructions to Bidders, and the Bid form.

Bonds-Performance and Payment bonds and other instruments of security.

Change Order-A document prepared by ENGINEER, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion, or revision in the Work, or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

Contract Documents-The Agreement, Addenda (which pertain to the Contract Documents), Contractor’s Bid (including documentation accompanying the BID and any post-bid documentation accompanying the BID and any post-bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these GENERAL CONDITIONS, the Supplementary Conditions, the Specifications, and the PLANS, as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders, and
ENGINEERS’s written interpretations and clarifications, issued pursuant to Paragraph 3.3, on or after the Effective Date of the Agreement. Shop Drawing submittals approved pursuant to Paragraphs 6.17.4 and 6.17.5 and the reports and drawings referred to in Paragraphs 4.2.1 and 4.2.2 are not Contract Documents.

**Contract Price**-The amount agreed to by OWNER and CONTRACTOR for completion of the Work, in accordance with the Contract Documents, as stated in Article 4 of the Agreement (subject to the provisions of Paragraph 11.3.1 in the case of Unit Price Work), and as adjusted by any Change Orders.

**Contract Times**-The numbers of days or the dates stated in the Agreement: (i) to achieve Substantial Completion, and (ii) to complete the Work so that it is ready for final payment as evidenced by ENGINEER’s written recommendation of final payment in accordance with Paragraph 14.9.1.

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

**Defective**-An adjective which, when modifying the word Work, refers to Work that is unsatisfactory, faulty, or deficient, in that it does not conform to, or has not been performed in accordance with, the Contract Documents, or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with Paragraph 14.5.1 or 14.6).

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

**ENGINEER**-The licensed person, firm, or corporation authorized by the City or the owner to act on their behalf.

**ENGINEER’s Subconsultant**-A licensed person, firm, or corporation having a contract with ENGINEER to furnish services as ENGINEER’s independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

**Field Order**-A written order issued by ENGINEER which orders minor changes in the Work in accordance with Paragraph 9.5 but which does not involve a change in the Contract Price or the Contract Times.

**General Requirements**-Sections of Division A, B, and C of the Specifications.

**Hazardous Waste**-The term Hazardous Waste shall mean (i) any hazardous materials, hazardous wastes, hazardous substances, and toxic substances as those or similar terms are defined under any Environmental Laws; (ii) any Asbestos or any material which contains any hydrated mineral silicate, including chrysotile, amosite, crocidolite, tremolite, anthophylite, and/or actinolite, whether friable or non-friable; (iii) any PCBs or PCB-containing materials, or fluids; (iv) radon;
(v) any other hazardous, radioactive, toxic, or noxious substance, material, pollutant, or solid, liquid, or gaseous waste; (vi) any pollutant or contaminant (including petroleum, petroleum hydrocarbon, petroleum products, crude oil, and any factions thereof; any oil or gas exploration or production waste, and natural gas, synthetic gas, and any mixtures thereof) that in its condition, concentration, or area of release could have a significant effect on human health, the environment, or natural resources; (vii) any substance that, whether by its nature or its use, is subject to regulation under any Environmental Law or, with respect to which any Environmental Law or Governmental Authority, requires environmental investigation, monitoring, or remediation; (viii) any Radioactive Material; and (ix) any underground storage tanks, as defined in 42 U.S.C. Section 699(1)(A)(I) (including those defined by Section 9001[1] of the 1984 Hazardous and Solid Waste Amendments to the Resource Conservation Act, 42 U.S.C. Section 6901 et seq.; the Texas Water Code Annotated Section 26.344; and Title 30 of the Texas Administrative Code Sections 334.3 and 334.4), whether empty, filled, or partially filled with any substance.

Laws and Regulations; Laws or Regulations-Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction over the Work, the Project, and/or the CONTRACTOR’s performance of the Work.

Liens-Liens, charges, security interests, or encumbrances upon real property or personal property.

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

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 Agreement.

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

OR EQUAL CLAUSE- Whenever a material or article required is specified or shown on the plans by using the name of the proprietary product, or of a particular manufacturer or vendor, any material or article which will perform adequately the duties imposed by the general design will be considered equal and satisfactory, provided the material or article so proposed is of equal substance and function, and only after written approval by the City Engineer.

OWNER-The public body or authority, corporation, association, firm, or person which is a party to the Agreement and for whom the Work is to be provided.

Partial Utilization-Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work in accordance with Paragraph 14.6.

PCBs-Polychlorinated biphenyls.
Definitions

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

PLANS—The PLANS which show the scope, extent, and character of the Work to be furnished and performed by CONTRACTOR and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents. Shop drawings are not Drawings as so defined.

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

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

Resident Project Representative—The authorized representative of the OWNER who may be assigned to the site or any part thereof.

Right of Way—A general term denoting land or property devoted to transportation purposes.

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

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

Specifications—Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

Subcontractor—An individual, firm, or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site. Excluding a material supplier, truck owner-operator, wholly owned subsidiary, specialty-type businesses such as security companies and rental companies.

Subsidiary—Materials, labor, or other elements that because of their nature or quantity have not been identified as a separate item and are included within the items on which they necessarily depend.

Substantial Completion—The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by ENGINEER’s definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended or, if no such certificate is issued, when the Work is complete and ready for final payment as evidenced by ENGINEER’s written recommendation of final payment in accordance with Paragraph 14.9. The terms “substantially complete” and “substantially completed” as applied to
all or part of the Work refer to 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 vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated into the Work by CONTRACTOR or any Subcontractor.

**Traffic Lane**- The strip of roadway intended to accommodate the forward movement of a single line of vehicles.

**Underground Facilities**-All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities which have been installed underground.

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

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

**Work Change Directive**-A written directive to CONTRACTOR, issued on or after the Effective date of the Agreement and signed by OWNER and prepared by ENGINEER, 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 Paragraph 4.2 or 4.3, or to emergencies under Paragraph 6.15. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change directed or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times as provided in Paragraph 10.1.2.

**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 nonengineering or nontechnical, rather than strictly construction-related aspects of the Contract Documents.
SECTION 820
CONTROL OF GROUND WATER AND SURFACE WATER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Dewatering, depressurizing, draining, and maintaining trenches, shaft excavations, structural excavations, and foundation beds in a stable condition, and controlling ground water conditions for tunnel excavations.

B. Protecting work against surface runoff and rising flood waters.

C. Disposing of removed water.

1.02 METHOD OF PAYMENT

A. No separate payment will be made for control of ground water and surface water. Include the cost to control ground water and surface water in unit price for work requiring such controls.

1.03 REFERENCES

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.


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 keeping 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 850 - Trench Safety Systems, 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, eductor and ejector-type 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 design phase studies and left for Contractors monitoring and use.

1.06 SUBMITTALS

A. Submit a Ground Water and Surface Water Control Plan for review by the City prior to start of any field work. The Plan shall be signed by a Professional Engineer registered in the State of Texas. 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 proposed ground water control systems indicating arrangement, location, depth and capacities of 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 application and other necessary means.
9. Surface water control and drainage installations.
10. Proposed methods and locations for disposing of removed water.

B. Submit the following records upon completed initial installation:

1. Installation and development reports for well points, eductors, 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.

C. 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. Refer to Paragraph 3.2, Requirements for Eductor, Well Points, or Deep Wells.
2. Maintenance records for ground water control installations, piezometers, and monitoring wells.
D. Submit the following records at end of work. Decommissioning (abandonment) reports for monitoring wells and piezometers installed by other during the design phase and left for Contractor’s monitoring and use.

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. Refer to Section 606 – NPDES Requirements.

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 potentially contaminated sites.

PART 2 PRODUCTS

2.01 EQUIPMENT AND MATERIALS

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 of the City.

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 GROUND WATER CONTROL

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 waterbearing layers. The results shall be presented in the Ground Water and Surface Water Control Plan.
B. Provide labor, material, equipment, techniques and methods to lower, control and handle ground water in a manner compatible with construction methods and site conditions. Monitor effectiveness of the installed system and its effect on adjacent property.

C. Install, operate, and maintain ground water control systems in accordance with the Ground Water and Surface Water Control Plan. Notify the City in writing of any changes made to accommodate field conditions and changes to the Work. Provide revised drawings and calculations with such notification.

D. Provide for continuous system operation, including nights, weekends, and holidays. Arrange for appropriate backup if electrical power is primary energy source for dewatering system.

E. Monitor operations to verify that the system lowers ground water piezometric levels at a rate required to maintain a dry excavation resulting in a stable subgrade for prosecution of subsequent operations.

F. 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.

G. 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 the design phase investigations and left for Contractor's use, upon completion of testing, in accordance with Section 230 – Gravity Sanitary Sewers
   3. Remove monitoring wells when directed by the City.
   4. Grout abandoned well and piezometer holes. Fill piping that is not removed with cement-bentonite grout or cement-sand grout.

H. 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 hour after placement.

I. 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.

J. 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.

K. Remove system upon completion of construction or when dewatering and control of surface or ground water is no longer required.
L. Compact backfill to not less than 95 percent of the maximum dry density in accordance with ASTM D 698.

3.02 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 predrained 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 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 predrained 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. Submit a revised plan.

3.03 EXCAVATION DRAINAGE

A. 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.

3.04 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 City.
3.05 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 City determines that more frequent monitoring and recording are required. Comply with City’s direction for increased monitoring and recording and take measures as necessary to ensure effective dewatering for intended purpose.

3.06 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.

END OF SECTION
SECTION 830
CONCRETE RESURFACING

PART 1 – GENERAL

1.01 SUMMARY
A. Provide one component, cement based, mortar for repair and resurfacing of existing concrete surfaces.

1.02 SUBMITTALS
A. Product Data: Submit manufacturer’s product data and installation for each material and product used. Include manufacturer’s Material Safety Data Sheets.

1.03 REFERENCES
A. ASTM C 109: Compressive Strength of Hydraulic Mortars

1.04 QUALITY ASSURANCE
A. Manufacturer’s Qualifications: The manufacturer shall be a company with at least ten years experience in the manufacturer and marketing cementitious dry packaged repair materials.
B. Installer’s Qualifications: The contractor shall be qualified to perform the work specified by reason of experience.

1.05 DELIVERY, STORAGE AND HANDLING
A. Deliver products in original packaging, labeled with product identification, manufacturer, batch number and shelf life.
B. Store products in a dry area. Protect from direct sunlight.
C. Handle products in accordance with manufacturer’s printed recommendations.

1.06 MEASUREMENT AND PAYMENT
A. Measurement: Concrete resurfacing of sidewalks shall be measured per square yard.
B. Payment for concrete resurfacing of sidewalks shall include all labor, material, and equipment to provide concrete resurfacing of sidewalks.

PART 2 – PRODUCTS

2.01 MATERIALS
A. Hydraulic cement based one component concrete resurfacing material. Comply with the following:
1. Manufacturer: Concrete Resurfacer as manufactured by the QUIKRETE®, Sure Broom as manufactured by SURECRETE, or equal.
2. Performance and Physical Properties:
   a. Compressive Strength, ASTM C 109 (Air Cured): minimum 4500 psi @ 28 days

Division D – Technical Provisions
PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.

B. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas landscaping from contact due to mixing and handling of materials.

3.02 SURFACE PREPARATION:

Comply with manufacturer’s printed instructions and the following:

1. Existing concrete must be rigorously cleaned to ensure proper adhesion of concrete resurfacing. Pressure wash thoroughly with a 3,500 – psi pressure washer.

2. Level spalled areas, pits or cracks pre manufacturers requirements

3. Section off the work into areas no larger than about 100 sq. ft. Control joints and expansion joints must be maintained. Use weather stripping or duct tape to prevent concrete resurfacing material from flowing into joints.

3.03 MIXING:

Comply with manufacturer’s printed instructions and the following:

3.04 APPLICATION:

Comply with manufacturer’s printed instructions and the following:

1. Saturate the surface with water then remove any standing water.

2. Pour resurfacing material on to the prepared surface and spread with a long-handled squeegee.

3. For a slip resistant professional finish, follow within five minutes with a broom making full strokes across the full distance of the current work area without stopping. If desired a concrete edger can be used around the edges within 20 minutes of pouring.

4. Do not apply if temperatures are below 50°F (10°C) or are expected to go below 40° within a 24 hour period.

3.05 CURING

1. Under normal conditions no special curing is required. Keep temperature above 50°F (10°C) for 48 hours after finishing.

2. Protect from rain for at least 6 hours, longer in cool or damp weather. Do not cover unless immediate rain protection is necessary.

3.06 CLEANING

A. Remove excess material before material cures.

END OF SECTION
Revised Geotechnical Engineering Report

Flores Avenue Drainage and Utility Improvements – Ph. II

Flores Avenue
Laredo, Texas

November 10, 2017
Terracon Project No. 89175006

Prepared for:
Lockwood, Andrew, & Newnam, Inc.
Austin, Texas

Prepared by:
Terracon Consultants, Inc.
Laredo, Texas
November 10, 2017

Lockwood, Andrew, & Newnam, Inc.
8911 N. Capital of Texas Hwy, Building 2, Suite 2300
Austin, Texas 78759

Attn: Mr. Travis Michel, P.E.
P: [512] 338 4212
E: TMMichel@ian-inc.com

Re: Revised Geotechnical Engineering Report
Flores Avenue Drainage & Utility Improvement – Ph. II
Flores Avenue
Laredo, Texas
Terracon Project No.: 89175006

Dear Mr. Michel:

Terracon Consultants, Inc. (Terracon) is pleased to submit this Revised Geotechnical Engineering Report for the proposed Flores Avenue Drainage & Utility Improvements – Ph. II in Laredo, Texas. This report addresses review comments from our originally submitted report on October 25, 2017.

We appreciate the opportunity to work with you on this project and look forward to providing Materials Testing services in the future. Please contact us if you have any questions or if we can be of further assistance.

Sincerely,
Terracon Consultants, Inc.
(Firm Registration: TX F-3272)

[Signatures]

Luis Castillo Jr., P.E.
Senior Staff Engineer

Gregory P. Stieben, P.E., D.GE
Senior Consultant

Copies To: Addressee: (1) Electronic
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**APPENDIX A – FIELD EXPLORATION**
- Exhibit A-1 Site Location Plan
- Exhibit A-2.1 and A-2.2 Bore Location Plan
- Exhibit A-3 Field Exploration Description
- Exhibit A-4 and A-7 Boring Logs

**APPENDIX B – LABORATORY TESTING**
- Exhibit B-1 Laboratory Testing

**APPENDIX C – SUPPORTING DOCUMENTS**
- Exhibit C-1 General Notes
- Exhibit C-2 Unified Soil Classification System
EXECUTIVE SUMMARY

A geotechnical investigation has been performed for the proposed Drainage and Utility improvements along Flores Avenue in Laredo, Texas. A total of 4 borings were drilled to typical depths of approximately 20 feet below existing grade within the improvements, except for B-3 which was terminated upon auger refusal at a depth of 1.5 feet (colored concrete was encountered, probable utility line).

Based on the information obtained from our subsurface exploration, the site can be developed for the proposed project. The following geotechnical considerations were identified:

- The subsurface soils at this site generally consist of Lean Clay with Sand (CL) and Sandy Silty Clay (CL-ML)

- Groundwater was not encountered either during or upon completion of the drilling operations.

- Flexible and rigid pavement (stamped concrete) systems may be considered for this project.

- Close observation of the construction operations discussed herein will be critical in achieving the design subgrade support. Therefore, we recommend that Terracon be retained to observe this portion of work.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled GENERAL COMMENTS should be read for an understanding of the report limitations.
1.0 INTRODUCTION

Terracon is pleased to submit this Geotechnical Engineering Report for the proposed Drainage and Utility improvements along Flores Avenue in Laredo, Texas. This project was authorized by Mr. Travis Michel, P.E. with Lockwood, Andrews, & Newnam, Inc. through signature of Subconsulting Agreement on July 18, 2017. The project scope was performed in general accordance with Terracon Proposal No. P89175006R dated February 6, 2017.

The purposes of this report were to describe the subsurface conditions observed at the boring locations drilled for this study, analyze and evaluate the test data, and provide recommendations with respect to:

- Subsurface soil conditions
- Groundwater conditions
- Underground utility design recommendations
- Pavement reconstruction recommendations
- Selection and placement of bedding and backfill materials
- Earthwork recommendations

2.0 PROJECT INFORMATION

2.1 Project Description

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<th>ITEM</th>
<th>DESCRIPTION</th>
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<tr>
<td>Proposed Improvements</td>
<td>The proposed improvements will include approximately 1,000 feet of street reconstruction and utility improvements.</td>
</tr>
<tr>
<td>Construction Type</td>
<td>The proposed pavement sections will consist of flexible or stamped concrete pavement system; sanitary sewer and water lines will be PVC material. RCP storm sewer lines and manholes will be concrete or fiberglass material.</td>
</tr>
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</table>
### Traffic Loads

Based on the information provided to us by Lockwood, Andrews, Newnam, the roadway will be classified as a Local Collector as defined in the City of Laredo Ordinance (1,000,000 ESALS).

### Grading

Cuts and fill are estimated to be minor for this project site. (assumed)

### 2.2 Site Location and Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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<tr>
<td>Location</td>
<td>The proposed street and utility improvements will be located along Flores Avenue between Hidalgo and Victoria Street in Laredo, Texas.</td>
</tr>
<tr>
<td></td>
<td>Latitude: 27.507844°N / Longitude: -99.506543°W</td>
</tr>
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<td>Current Ground Cover</td>
<td>Asphalt Pavement</td>
</tr>
<tr>
<td>Existing Topography</td>
<td>Information not provided at this time.</td>
</tr>
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</table>

### 3.0 SUBSURFACE CONDITIONS

#### 3.1 Geology

The Geologic Atlas of Texas (1976) published by the Bureau of Economic Geology of the University of Texas at Austin has mapped the Laredo Formation (El) in the Eocene of Tertiary Geological age at or near this site. As mapped in the project area, the Laredo Formation (El) includes sandstone and clay; thick sandstone members in upper and lower part, very fine to fine grained, in part glauconitic, micaceous, ferruginous, crossbedded, dominantly red and brown; clay in middle, weathers orange-yellow; dark gray limestone concretions common, some fossiliferous; marine mega fossils abundant; thickness about 620 feet.

#### 3.2 Typical Profile

We were provided with a schematic drawing of the proposed planned development. The boring locations were identified and staked by Terracon prior to drilling operations. Based on the results of the borings, subsurface conditions on the project site can be generalized as follows:
Conditions encountered at each boring location are indicated on the individual boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual. Details for each of the borings can be found on the boring logs in Appendix A of this report.

### 3.3 Groundwater

The boreholes were drilled to their full depths using dry drilling techniques to aid in the observation of groundwater. Groundwater was not observed in the borings while drilling, or for the short duration that the borings were allowed to remain open. However, this does not necessarily mean these borings terminated above groundwater.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. Clayey Sand materials encountered at the site may easily transmit water especially during periods of rainfall. The contractor should check the groundwater conditions prior to foundation excavation activities.

### 3.4 Sulfate Considerations

Sulfate tests were performed on selected sample collected from the borings to check for possible adverse reactions with lime or cement treatment. Testing was not performed on all borings nor at all depths. Sulfate content concentrations for a boring along with its approximate depth and nearest boring number is as follows:

<table>
<thead>
<tr>
<th>Approximate Depth of Stratum, feet</th>
<th>Material Encountered</th>
<th>Consistency/Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 0.4</td>
<td>Flexible Pavement</td>
<td>---</td>
</tr>
<tr>
<td>0.4 to 20</td>
<td>LEAN CLAY and LEAN CLAY WITH SAND ¹; brown</td>
<td>Soft to Hard</td>
</tr>
<tr>
<td>4.5 to 20</td>
<td>SANDY SILTY CLAY ¹; brown</td>
<td>Medium Stiff</td>
</tr>
</tbody>
</table>

¹ The LEAN CLAY (CL), LEAN CLAY WITH SAND (CL), and SANDY SILTY CLAY (CL-ML) materials could undergo low to moderate volumetric changes (shrink/swell) should they experience changes in their in-place moisture content. Due to their granular nature, they can readily transmit water especially during periods of rainfall. Borings B-3 was terminated upon auger refusal at a depth of 1.5 feet (colored concrete was encountered, probable utility line).
The test results indicate sulfate values in the range of 224 to 1,070 ppm and are considered low for soil treatment on this site. If cement or lime treatment are considered, additional sulfate tests are recommended at subgrade elevation prior to treatment to verify class exposure.

Using the criteria from ACI 201.2R, the test results classify as Class 1 exposure and the concrete mix should be designed for moderate sulfate level. Based on these references and our experience, the following concrete may be used at this site:

- Maximum water/cement ratio of 0.50

Cementitious Material:

- ASTM C150, Type II;
  - Maximum expansion when tested using ASTM C1012/C1012M ≤ 0.10% at 6 months.

### 4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

The following recommendations are based upon the data obtained from our field and laboratory programs, project information provided to us and on our experience with similar subsurface and site conditions.

#### 4.1 Earthwork

The following presents recommendations for site preparation on the project. Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill and other geotechnical conditions during the construction of the project.

#### 4.1.1 Site Preparation

Construction operations may encounter difficulties due to the wet or soft surface soils becoming a general hindrance to equipment due to rutting and pumping of the soil surface, especially during and soon after periods of wet weather.

Prior to placing any fill, all loose material and any otherwise unsuitable materials should be removed from the construction area. Wet or dry material should either be removed or moisture conditioned and re-compacted. After stripping and grubbing, the subgrade should be proof-rolled where possible to aid in locating loose or soft areas. Proof-rolling can be performed with a
15-ton roller or fully loaded dump truck. Soft, dry and low-density soil should be removed or compacted in place prior to placing fill.

### 4.1.2 Demolition Consideration

We understand that some of the existing pavement sections at this site will be demolished prior to trench excavation. As a result, abandoned underground utilities or void spaces may be present along the trench excavation alignment. Utilities and associated backfill and granular bedding material can provide avenues for groundwater to enter to the new trench excavation. We recommend that all abandoned utility lines, if any, be completely removed from the proposed waterline alignment. Abandoned pipes which remain underground should be grouted.

Any structures removed during demolition will likely create large subsurface voids. It is very important that all subsurface voids formed from the removal of the foundation system be backfilled completely with moisture conditioned, compacted, engineered backfill as described in the “Earthwork” section of this report. It is our experience that improperly backfilled excavations can cause significant settlement under and around the proposed trench excavation.

As an alternative to compacted soil backfill, a flowable fill material may be considered. Flowable fill, or slurry, when properly designed provides a competent subgrade and can still be readily excavated if the utilities require repair or maintenance. In addition, flowable fill does not need to be placed in lifts, compacted, or tested.

### 4.1.3 Materials Requirements

Select fill should meet the following criteria:

<table>
<thead>
<tr>
<th>Fill Type</th>
<th>USCS Classification</th>
<th>Acceptable Location for Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granular select fill</td>
<td>Varies</td>
<td>Can be used in pavement areas.</td>
</tr>
<tr>
<td>Select fill</td>
<td>CL and/or SC (7≤PI≤20)</td>
<td>Can be used to construct all grade adjustments within the proposed utility improvements and pavement areas.</td>
</tr>
<tr>
<td>On-site soils</td>
<td>CL</td>
<td>The on-site soils meeting the applicable City of Laredo Utility Trench Backfill Condition criteria may be used for site restoration. The on-site soils and backfill materials should be relatively free and clean of deleterious material or materials exceeding 3 inches in maximum dimension.</td>
</tr>
<tr>
<td>Flowable Fill</td>
<td>---</td>
<td>City of Laredo Utility Trench Backfill Condition “D”.</td>
</tr>
<tr>
<td>Cement-Stabilized Backfill</td>
<td>---</td>
<td>City of Laredo Utility Trench Backfill Condition “D”.</td>
</tr>
</tbody>
</table>

1 Prior to any backfilling operations, samples of the proposed borrow and on-site materials should be obtained for laboratory moisture-density testing. The tests will provide a basis for evaluation of backfill compaction by in-place density testing. A qualified soil technician should perform sufficient in-place density tests during the backfilling operations to evaluate that proper levels of compaction, including dry unit weight and moisture content, are being attained.
2 Granular select fill should consist of 2014 TxDOT Item 247, Type A or B, Grade 1-2 crushed limestone or gravel base material. Granular select fill can also consist of crushed concrete meeting the criteria specified in the 2014 TxDOT Item 247, Type D, Grade 1, or 2; or pit-run material (caliche) having a Plasticity Index (PI) between 5 and 12.

3 Flowable fill should have a 28 day strength between 80 and 150 psi and meet the requirements for 2014 TxDOT Item 401. Although usually more costly, flowable fill does not require placement in lifts or mechanical compaction.

4 Cement-Stabilized Backfill should consist of a non-plastic sand or caliche as aggregate with a minimum of 2 sacks of Type I Portland cement per cubic yard based on the dry weight of the aggregate. No mixing will be allowed on the street surface.

4.1.4 Compaction Requirements

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fill Lift Thickness</td>
<td>All backfill should be placed in uniform; loose lifts of about 8 inches, with compacted thickness not exceeding 6 inches or as dictated by the City of Laredo Standard Technical Specifications Manual.</td>
</tr>
<tr>
<td>Compaction of On-site, Select Fill and Backfill Materials</td>
<td>95% of the material’s maximum dry density (TEX 114E) as recommended by the applicable City of Laredo Utility Trench Backfill Condition.</td>
</tr>
<tr>
<td>Compaction of Granular Materials</td>
<td>98% of the material’s maximum dry density (TEX 113E).</td>
</tr>
<tr>
<td>Moisture Content of On-site, Select Fill, and Granular Materials</td>
<td>Unless indicated otherwise, the materials should be moisture conditioned between -2 and +2 percentage points of the optimum moisture content.</td>
</tr>
</tbody>
</table>

4.2 Underground Utility Recommendations and Construction Considerations

The recommendations and criteria presented in the following subsections can be used to aid in the design and analysis of buried pipes and utilities at this site.

4.2.1 Trench Bearing Pressures
The subsurface soils have sufficient bearing capacity to support buried pipes. The actual depths were not provided to us at the time of this report submittal. A net allowable bearing pressure of 2,000 pounds per square foot (psf) may be used to support the buried pipes. This bearing pressure includes a factor of safety of 3. The bearing pressure also assumes that the bearing surface will be relatively free and clean of any soft or moist material and loose debris.

4.2.2 Modulus of Soil Reaction
A modulus of soil reaction for the in-situ soil, \( E_s \) or \( E_n \), of at least 600 psi may be used in the design of the flexible pipe. Additionally, the modulus of soil reaction, \( E_b \) or sometimes referred to as \( E' \), of the backfill material supporting the sides of the pipe is also used in the design of the flexible piping. This value is a function of several variables that include:
n Soil type that comprises the backfill material supporting the pipe sides;

n Degree of compaction of the backfill material supporting the pipe sides; and

n Lift thickness of the backfill material supporting the pipe sides.

Values for \( E_b \) vary, depending on the pipe backfill and bedding materials. Fine-grained soils consisting of primarily clay and silt should not be used for bedding materials and backfill around the pipe. More specific information regarding this design parameter is included in ASTM D2321 entitled “Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications”. The following table presents typical modulus of soil reaction values, \( E_b \), for various backfill materials at different compaction ranges.

<table>
<thead>
<tr>
<th>Type of Material</th>
<th>Dumped (no compaction)</th>
<th>Slight &lt;85%</th>
<th>Moderate 85% to 95%</th>
<th>High &gt;95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Grained Soil (LL&lt;50): CL, ML</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Fine Grained Soil (LL&lt;50) with &gt;25% Coarse-Grained Material: CL, ML</td>
<td>NR</td>
<td>NR</td>
<td>1000</td>
<td>2000</td>
</tr>
<tr>
<td>or Coarse-Grained Soil with fines: GM, GC, SM, SC</td>
<td></td>
<td></td>
<td>1000</td>
<td>2000</td>
</tr>
<tr>
<td>Coarse-Grained Soil with &lt;12% fines: GW, GP, SW, SP</td>
<td>NR</td>
<td>1000</td>
<td>2000</td>
<td>3000</td>
</tr>
<tr>
<td>Crushed Rock</td>
<td>1000</td>
<td>3000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 These values do not include a factor of safety. A factor of safety may be needed for design purposes. These values are for use in predicting the initial deflections only. If a high degree of compaction is not achieved in the backfill adjacent to the sides of the pipe, an approximate deflection lag factor should be applied for long-term deflection estimates. It should be noted that LL refers to the Liquid Limit, and NR means that the use of these materials is Not Recommended by ASTM D2321 for the backfill envelope.

4.2.3 Excavations
Various excavations are planned for site improvements. The actual excavation depths were not provided to us at the time of this report submittal. However, shoring, bracing, sloping, benching or a combination of each will be required during excavation or trenching of the surrounding soils during construction operations. Excavations and trenches should follow Occupational Safety and Health Administration (OSHA) Safety and Health Standards (29 CFR Part 1926 Revised, 1989), state and federal standards and guidelines. All excavation and safety health issues are the responsibility of the contractor.

4.2.4 Trench Backfill
Appropriate trench backfill is generally determined by several factors including the bearing capacity of the soil supporting the pipe, requirements of the pipe manufacturer regarding
support of the pipe, and the proposed improvements at the ground surface along the trench. Pipe manufacturers generally require a specified bedding and granular material around the pipe.

Typically, the bedding and embedment material around buried utilities is designed to support and protect the piping. The material above this material (which we call backfill) also helps to protect the piping and to support any overlying structure, roadway, or other improvement. Inadequate compaction of this material can lead to excessive settlement of the backfill, stress in the pipe, and premature distress to any overlying improvement. Therefore, we recommend that the embedment and backfill material be properly placed, moisture conditioned, and compacted in accordance with the City of Laredo Standard Technical Specifications Manual. Backfill beneath roadways should attempt to match the soil type exposed in the excavation sidewalls. As a compaction guideline, we recommend that all trench backfill be placed in loose lifts of about 8 inches, moisture conditioned within 2 percentage points of the optimum moisture content, and compacted to at least 95 percent of the maximum dry density as evaluated by ASTM D698.

Flowable fill can be used as an alternative to soil backfill, particularly beneath roadways. Flowable fill typically consists of a mixture of sand, portland cement, fly ash, and water and is readily available from ready-mixed concrete suppliers. This very low strength cementitious fill is placed in a slurry form and readily takes the shape of the excavation. Properly designed and placed, it can be trenched through by a backhoe for future repairs or modifications as required.

Embedment backfill along the sides to the top of the pipe and possibly 12 to 24 inches above the pipe should consist of materials that are acceptable to the project civil engineer or materials meeting those requirements established by the City of Laredo Standard Technical Specifications Manual. To avoid potential damage to the pipe, the embedment material should not contain materials exceeding 3 inches in maximum dimension. On-site soils should be suitable as backfill above the embedment material provided that the soils do not contain deleterious material or particles exceeding 3 inches in maximum dimension and in conformance with the City of Laredo Standard Technical Specifications Manual.

Construction equipment with wheel or gross loads exceeding the pipe’s design strength should not be driven over or close to the pipeline. Additional cover placed on top of the pipe or an alternate route should be provided for machinery producing excessive loads.

4.3 Pavements

Most utility improvement projects are constructed within open trenches in existing paved roadways that require pavement reconstruction along the trench alignment, but it is our understanding that there will be a whole pavement reconstruction after utilities are installed. Both asphalt and stamped concrete pavements will be considered. Pavement subgrade preparations are included in this section to limit changes in soil moisture conditions to help mitigate the effects of soil movement; however, even if these recommendations are followed
some pavement distress could still occur. Discussion for both types of pavement types will be addressed in the following sections.

4.3.1 Subgrade Preparation
On most project sites, the site grading is accomplished relatively early in the construction phase. Fills are placed and compacted in a uniform manner. However, as construction proceeds, excavations are made into these areas, rainfall and surface water saturates some areas, heavy traffic from trucks and other vehicles disturbs the subgrade and many surface irregularities are filled in with loose soil to improve trafficability temporarily. As a result, the pavement subgrade, initially prepared early in the project, should be carefully evaluated as the time for pavement construction approaches.

We recommend the moisture content and unit weight of the top 6 inches of the subgrade be evaluated and the pavement subgrades be proofrolled within two days to commencement of actual paving operations. Areas not in compliance with the required ranges of moisture or density should be moisture conditioned and recompacted.

Particular attention should be paid to high traffic areas that were rutted and disturbed earlier and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by removing and replacing the materials with properly compacted fills.

If a significant precipitation event occurs after the evaluation or if the surface becomes disturbed, the subgrade should be reviewed by qualified personnel immediately prior to paving. The subgrade should be in its finished form at the time of the final review.

4.3.2 Design Considerations
Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design of pavements:

- The subgrade and the pavement surface should have a minimum ¼ inch per foot cross slope to promote proper surface drainage;
- Install pavement drainage surrounding areas anticipated for frequent wetting;
- Install joint sealant and seal cracks immediately;
- Seal all landscaped areas in, or adjacent to pavements to reduce moisture migration to subgrade soils;
- Place compacted, low permeability backfill against the exterior side of curb and gutter; and,
- Place curb, gutter and/or sidewalk directly on low permeability subgrade soils rather than on unbound granular base course materials.

According to the City of Laredo pavement standards, pavement subgrade having a Plasticity Index (PI) value of 20 and greater should be treated with lime or cement to reduce its plasticity. Based on the borings drilled at this site, the pavement subgrade has a PI of less than 20
therefore, no lime treatment should be necessary to reduce the PI. However, the subgrade may be cement treated to enhance its load carrying capacity.

We understand that the roadway extension will be classified as **Local Collector** according to the City of Laredo Ordinance. If this is not applicable, we need to revise our design recommendations.

As specified in the City of Laredo Ordinance, the traffic data and assumptions that are used for a proposed Local Collector pavement section are as follow:

<table>
<thead>
<tr>
<th>Local Street / AASHTO 1993 Design Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-Kip ESAL</td>
</tr>
<tr>
<td>Reliability, %</td>
</tr>
<tr>
<td>Initial Serviceability Index, ( p_0 )</td>
</tr>
<tr>
<td>Terminal Serviceability Index, ( p_t )</td>
</tr>
<tr>
<td>Standard Deviation, ( S_0 )</td>
</tr>
<tr>
<td>Design Life, years (assumed)</td>
</tr>
<tr>
<td>Average CBR (assumed)</td>
</tr>
</tbody>
</table>

### 4.3.3 Estimates of Minimum Pavement Thickness

Based on the traffic load and encountered soil conditions, we recommend the following typical pavement section be considered for this project. Listed below are pavement component thickness which may be used as a guide for pavement systems at the site for the traffic classifications stated herein. These systems were derived based on general characterization of the subgrade. Specific testing (such as CBR’s, resilient modulus tests, etc.) was not performed for this project to evaluate the support characteristics of the subgrade.

<table>
<thead>
<tr>
<th>Minimum Recommended Flexible Pavement Section Thickness, inches</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Component</strong></td>
</tr>
<tr>
<td>Hot Mix Asphaltic Concrete</td>
</tr>
<tr>
<td>Granular Base Course (^1)</td>
</tr>
<tr>
<td>Cement Treated Subgrade (^2)</td>
</tr>
<tr>
<td>Moisture Conditioned Subgrade</td>
</tr>
</tbody>
</table>

\(^1\) Asphalitic base material may be used in place of granular base course material. Every 2.5 inches of granular base course material may be replaced with 1 inch of asphalitic base material.

\(^2\) The cement treated subgrade consists of 6 inches soil-cement treated subgrade, moisture conditioned and compacted layer. A geogrid may be used instead of 6 inches of cement treated subgrade. If used, the geogrid should be Tensar TriAx TX-5 or TX140 material and should be placed on top of the moisture conditioned and compacted subgrade.
4.3.4 Pavement Section Materials
Presented below are selection and preparation guidelines for various materials that may be used to construct the pavement sections. Submittals should be made for each pavement material. The submittals should be reviewed by the geotechnical engineer and appropriate members of the design team and should provide test information necessary to verify full compliance with the recommended or specified material properties.

**Hot Mix Asphaltic Concrete Surface Course and Base Course:** The asphaltic concrete surface should be plant mixed, hot laid Type C or D (Surface Course) meeting the specifications requirements in 2014 TxDOT Standard Specifications Item 341 and Item SS 3224 (2011) and specific job mix formula. The mix should be compacted between 91 and 95 percent of the maximum theoretical density as measured by TEX-227-F. The grade of the asphalt cement should be PG 70-22. However, this requirement may be waived at the engineer’s discretion if the asphalt supplier warrants that the asphalt cement can meet all applicable safety, environmental and constructability requirements. Aggregates known to be prone to stripping should not be used in the hot mix.

Pavement specimens, which should be either cores or sections of asphaltic pavement, should be tested according to Test Method TEX-207-F. The nuclear-density gauge or other methods which correlate satisfactorily with results obtained from project pavement specimens may be used when approved by the Engineer. Unless otherwise shown on plans, the Contractor should be responsible for obtaining the required pavement specimens at their expense and in a manner and at locations selected by the engineer.

**Reinforced Concrete:** The materials and properties of reinforced concrete pavement shall meet applicable requirements in the ACI Manual of Concrete Practice. The Portland cement concrete mix should have a minimum 28-day compressive strength of 4,000 psi.

**Granular Base Course:** Base material should be composed of crushed limestone meeting the requirements of 2014 TxDOT Standard Specifications Item 247,
Type A, Grade 1 or 2. The base material should be compacted to at least 98 percent of the TEX 113E maximum dry density at moisture content between -2 and +3 percentage points of the optimum moisture content.

As an alternate to the Type A base, a gravel base material composed of crushed or uncrushed gravel, such as caliche, meeting the requirements of 2014 TxDOT Item 247, Type B or C, Grade 1 through 3 may be used.

The gravel base material should be compacted to at least 98 percent of the maximum dry density as determined by the modified moisture-density relationship (TEX 113E) at moisture contents between -2 and +3 percentage points of optimum moisture content.

If it is necessary to use additives to the material to meet these criteria, the amount of additive should be limited so as not to create a rigid base layer that has a tendency to dry, shrink, and crack.

Pavement Reuse: A pulverized, uniform mixture of the existing pavements may also be used beneath the concrete pavement. The material should have particles no larger than 2 inches, and be moisture conditioned to between -2 and +3 percentage points of optimum. The material should be placed in loose lifts of no more than 8 inches in thickness, and be compacted to at least 98 percent of the maximum density determined in accordance with TEX 113E.

Prime Coat: The prime coat should consist of sealing the base with prime oil such as an MC-30 or an emulsion. The prime coat should be applied at a rate of about 0.2 to 0.5 gallons per square yard with materials which meet 2014 TxDOT Standard Specifications Item 300. The prime coat will help to minimize penetration of rainfall and other moisture which penetrates the base. However, due to weathering and traffic, treatment will probably be necessary on a periodic basis to protect the base. In addition, isolated areas of the base which have developed pot holes or other distress may need to be removed and replaced prior to application of a prime coat for maintenance. The prime coat without additional surface treatment may not be very effective when using non-treated base material.

Moisture Conditioned Subgrade: The subgrade should be scarified to a depth of 6 inches and moisture conditioned between -2 and +3 percentage points of the optimum moisture content. The subgrade should then be compacted to at least 95 percent of the maximum dry density determined in accordance with ASTM D698.

Cement Treated Subgrade: The subgrade may be treated with cement in accordance with 2014 TxDOT Item 275 in order to improve its strength and
improve its load carrying capacity. If used the quantity of cement required should be determined after the site is stripped and the subgrade soils are exposed. We anticipate that approximately 4 percent cement will be required, which is about 20 pound per square yard for the design thickness of 6 inches. However, the actual percentage should be determined by laboratory tests on samples of the clayey subgrade prior to construction. Cement treated subgrade includes moisture conditioned and compacted subgrade as recommended in this report.

**Reinforcing Steel** - Reinforcing steel should consist of No. 3 bars at 12 inches on-center-each-way, Grade 60; or No. 4 reinforcing steel bars at 18 inches on-center-each-way, Grade 60. Top of reinforcing steel should be no more than 4 inches from the top of pavement and have at least 1-inch of cover below the bottom of the saw cuts.

**Control Joint Spacing** – ACI recommendations indicate that control joints should be spaced at about 30 times the thickness of the pavement. Furthermore, ACI recommends a maximum control joint spacing of 15 feet for 6-inch or thicker pavements. Sawcut control joints should be cut within 6 to 12 hours of concrete placement.

**Expansion Joint Spacing** – ACI recommendations indicate that regularly spaced expansion joints may be deleted from concrete pavements. Therefore, the installation of expansion joints is optional and should be evaluated by the design team.

All construction joints have dowels. Dowel information varies with pavement thickness as presented as follows:

<table>
<thead>
<tr>
<th>Pavement Thickness, inches</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dowels diameter, inches</td>
<td>7/8</td>
</tr>
<tr>
<td>Dowel Spacing on Center, inches</td>
<td>12</td>
</tr>
<tr>
<td>Dowel Length, inches</td>
<td>14</td>
</tr>
<tr>
<td>Dowel Embedment, inches</td>
<td>6</td>
</tr>
</tbody>
</table>

Related civil design factors such as subgrade drainage, shoulder support, cross-sectional configurations, surface elevations and environmental factors which will significantly affect the service life must be included in the preparation of the construction drawings and specifications. Normal periodic maintenance will be required.

Preventative maintenance should be planned and provided for the pavements at this site. Preventative maintenance activities are intended to slow the rate of pavement deterioration, and consist of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing). Prior to implementing any maintenance, additional
engineering observations are recommended to determine the type and extent of preventative maintenance.

4.3.5 Construction Considerations
The performance of the pavement system for the proposed project will be highly dependent upon the quality of construction. Thus, we recommend that earthwork and concrete placement be monitored full time by an experienced Terracon soil technician under the direction of our Geotechnical Engineer.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur away from our boring, across the site, or due to the modifying effects of weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, and bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.
APPENDIX A

FIELD EXPLORATION
LEGEND:
\[\text{APPROXIMATE BORE LOCATION}\]

- B-3
- B-4

Project Mngr: LC
File No.: 89175006
Date: 10.24.2017
Scale: NTS
File No.: 89175006
Date: 10.24.2017
Checked By: MTG
Approved By: MTG

BORE LOCATION PLAN
Flores Avenue Drainage and Utility Improvements - Ph. II
Flores Avenue
Laredo, Texas

EXHIBIT A-2.2
FIELD EXPLORATION DESCRIPTION

Terracon personnel used the site plan provided by the client to establish the bore locations in the field. A copy of the Bore Location Plan indicating the approximate boring locations is included in Appendix A Exhibit A-2. The location of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

A truck-mounted, rotary drill rig equipped with continuous flight augers was used to advance the boreholes. Soil samples were obtained by the split-barrel sampling procedure. In the split-barrel sampling procedure, a standard 2-inch O.D. split-barrel sampling spoon is driven into the ground with a 140-pound hammer falling a height of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the standard penetration resistance (N-value). These values are indicated on the boring logs at the depth of occurrence. The samples were sealed and transported to our laboratory for testing and classification.

Our field representative prepared the field logs as part of the drilling operations. The field logs included visual classifications of the materials encountered during drilling and our field representative interpretation of the subsurface conditions between samples. The boring logs included with this report represent the engineer’s interpretation of the field logs and include modifications based on visual observations and testing of the samples in the laboratory.

The scope of services for our geotechnical engineering services does not include addressing any environmental issues pertinent to the site.
FLEXIBLE PAVEMENT, 4” Asphaltic Concrete and 6” Caliche Base

LEAN CLAY WITH SAND (CL), brown, soft to medium stiff

- Silt with Sand (ML) seam at 13.5 feet

Boring Terminated at 20 Feet
**BORING LOG NO. B-2**

**PROJECT:** Flores Avenue Drainage and Utility Improvements - Ph II  
**SITE:** Flores Avenue  
Laredo, TX

**CLIENT:** Lockwood, Andrews & Newnam, Inc.  
Austin, TX

**LOCATION**  
See Exhibit A-2  
Latitude: 27.505986° Longitude: -99.50657°

**GRAPHIC LOG**  
**DEPTH**

<table>
<thead>
<tr>
<th>DEPTH (FT)</th>
<th>WATER LEVEL OBSERVATIONS</th>
<th>FIELD TEST RESULTS</th>
<th>STRENGTH TEST</th>
<th>ATTERBERG LIMITS</th>
</tr>
</thead>
</table>
| 4.5        | FLEXIBLE PAVEMENT, 4" Asphaltic Concrete and 6" Caliche Base  
LEAN CLAY (CL), brown, stiff to hard, with lime up to 1.5 feet  
SANDY SILTY CLAY (CL-ML), brown, medium stiff |
| 20.0       | Boring Terminated at 20 Feet |

**Notes:**
- Advancement Method: Dry augered from 0 to 20 feet
- Abandonment Method: Backfilled with soil cuttings and the pavement was patched with cold asphalt mix upon completion.
- Hammer Type: Automatic

**WATER LEVEL OBSERVATIONS**  
No groundwater was observed

**COMPRESSIVE STRENGTH (tsf)**  
**PERCENT FINES**

<table>
<thead>
<tr>
<th>SAMPLE TYPE</th>
<th>WATER CONTENT (%)</th>
<th>DRY UNIT WEIGHT (pcf)</th>
<th>LL-PL-PI</th>
</tr>
</thead>
<tbody>
<tr>
<td>13-10-5</td>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N=15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-5-4</td>
<td>13</td>
<td>27-18-9</td>
<td></td>
</tr>
<tr>
<td>N=9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-5-2</td>
<td>9</td>
<td>24-18-6</td>
<td></td>
</tr>
<tr>
<td>N=7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-2-3</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N=5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-3-3</td>
<td>13</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>N=6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-3-4</td>
<td>15</td>
<td>21-16-5</td>
<td></td>
</tr>
<tr>
<td>N=7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PROJECT:** Flores Avenue Drainage and Utility Improvements - Ph II  
**SITE:** Laredo, TX

**PROJECT NO.:** 89175006  
**Drill Rig:** CME 45  
**Driller:** Ramco Drillers  
**Boring Started:** 10-05-2017  
**Boring Completed:** 10-05-2017  
**Exhibit:** A-5
**BORING LOG NO. B-3**

**PROJECT:** Flores Avenue Drainage and Utility Improvements - Ph II  
**SITE:** Flores Avenue  
Laredo, TX

**CLIENT:** Lockwood, Andrews & Newnam, Inc.  
Austin, TX

### LOCATION
See Exhibit A-2  
Latitude: 27.506494° Longitude: -99.506574°

### GRAPHIC LOG
- **DEPTH (Ft.):** 1.5  
  **FLEXIBLE PAVEMENT:** 4" Asphaltic Concrete and 6" Caliche Base  
  **LEAN CLAY WITH SAND (CL):** brown, hard, colored concrete was encountered at 1.5 feet, probable utility line  
  **Auger Refusal at 1.5 Feet**

<table>
<thead>
<tr>
<th>DEPTH (Ft.)</th>
<th>FIELD TEST RESULTS</th>
<th>STRONGEST TEST</th>
<th>PERCENT FINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>N=ref/4&quot;</td>
<td>15</td>
<td>28-19-9</td>
</tr>
</tbody>
</table>

### WATER LEVEL OBSERVATIONS
- **DEPTH:** 1.5  
  **LOCATION:**  
  **Latitude:** 27.506494°  
  **Longitude:** -99.506574°  
  **OBSERVATIONS:**  
  **No groundwater was observed**

### Notes:
- **Project No.: 89175006**  
- **Drill Rig: CME 45**  
- **Boring Started:** 10-05-2017  
- **Boring Completed:** 10-05-2017  
- **Exhibit:** A-6  
- **Advancement Method:** Dry augered from 0 to 1.5 feet  
- **Abandonment Method:** Backfilled with soil cuttings and the pavement was patched with cold asphalt mix upon completion.
LABORATORY TESTING

Samples retrieved during the field exploration were taken to the laboratory for further observation by the project geotechnical engineer and were classified in accordance with the Unified Soil Classification System (USCS) described in this Appendix. At that time, the field descriptions were confirmed or modified as necessary and an applicable laboratory testing program was formulated to determine engineering properties of the subsurface materials.

Laboratory tests were conducted on selected soil samples and the test results are presented in this appendix. The laboratory test results were used for the geotechnical engineering analyses, and the development of foundation and earthwork recommendations. Laboratory tests were performed in general accordance with the applicable ASTM, local or other accepted standards.

Selected soil samples obtained from the site were tested for the following engineering properties:

- In-situ Water Content
- Atterberg Limits
- Amount of Material In-Soil Finer than the No. 200 Mesh (75-µm) Sieve
- Sulfate concentration (colorimetric method)

Sample Disposal

All samples were returned to our laboratory. The samples not tested in the laboratory will be stored for a period of 30 days subsequent to submittal of this report and will be discarded after this period, unless other arrangements are made prior to the disposal period.
FLEXIBLE PAVEMENT, 4" Asphaltic Concrete and 6" Caliche Base

LEAN CLAY WITH SAND (CL), brown, medium stiff to very stiff

<table>
<thead>
<tr>
<th>DEPTH (Ft.)</th>
<th>WATER LEVEL OBSERVATIONS</th>
<th>FIELD TEST RESULTS</th>
<th>STRENGTH TEST</th>
<th>ATTERBERG LIMITS</th>
<th>PERCENT FINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-5</td>
<td></td>
<td>5-5-5 N=10</td>
<td>11</td>
<td>30-17-13</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>5-3-5 N=8</td>
<td>14</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>4-5-4 N=9</td>
<td>12</td>
<td>28-18-10</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>5-5-5 N=10</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>6-5-6 N=11</td>
<td>7</td>
<td>76</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>7-6-6 N=12</td>
<td>8</td>
<td>29-16-13</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>7-8-9 N=17</td>
<td>6</td>
<td>62</td>
<td></td>
</tr>
</tbody>
</table>

Boring Terminated at 20 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dry augered from 0 to 20 feet

Abandonment Method:
Backfilled with soil cuttings and the pavement was patched with cold asphalt mix upon completion.

Notes:
See Exhibit A-3 for description of field procedures
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

PROJECT: Flores Avenue Drainage and Utility Improvements - Ph II
SITE: Flores Avenue
Laredo, TX

CLIENT: Lockwood, Andrews & Newnam, Inc.
Austin, TX

PROJECT: Flores Avenue Drainage and Utility Improvements - Ph II
SITE: Flores Avenue
Laredo, TX

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Austin, TX

WATER LEVEL OBSERVATIONS
No groundwater was observed
APPENDIX C

SUPPORTING DOCUMENTS
### Descriptive Soil Classification

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

### Location and Elevation Notes

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

### General Notes

- Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

### Descriptive Soil Classification Table

<table>
<thead>
<tr>
<th>Strength Terms (Density)</th>
<th>Standard Penetration or N-Value Blows/Ft.</th>
<th>Ring Sampler Blows/Ft.</th>
<th>Descriptive Term (Consistency)</th>
<th>Unconfined Compressive Strength, Qu, tsf</th>
<th>Standard Penetration or N-Value Blows/Ft.</th>
<th>Ring Sampler Blows/Ft.</th>
<th>Descriptive Term (Consistency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Loose</td>
<td>0 - 3</td>
<td>0 - 6</td>
<td>Very Soft</td>
<td>less than 0.25</td>
<td>0 - 1</td>
<td>&lt; 3</td>
<td>&lt; 30</td>
</tr>
<tr>
<td>Loose</td>
<td>4 - 9</td>
<td>7 - 18</td>
<td>Soft</td>
<td>0.25 to 0.50</td>
<td>2 - 4</td>
<td>3 - 4</td>
<td>30 - 49</td>
</tr>
<tr>
<td>Medium Dense</td>
<td>10 - 29</td>
<td>19 - 58</td>
<td>Medium-Stiff</td>
<td>0.50 to 1.00</td>
<td>4 - 8</td>
<td>5 - 9</td>
<td>50 - 89</td>
</tr>
<tr>
<td>Dense</td>
<td>30 - 50</td>
<td>59 - 98</td>
<td>Stiff</td>
<td>1.00 to 2.00</td>
<td>8 - 15</td>
<td>10 - 18</td>
<td>90 - 119</td>
</tr>
<tr>
<td>Very Dense</td>
<td>&gt; 50</td>
<td>&gt; 99</td>
<td>Very Stiff</td>
<td>2.00 to 4.00</td>
<td>15 - 30</td>
<td>19 - 42</td>
<td>&gt; 119</td>
</tr>
<tr>
<td>Hard</td>
<td></td>
<td>&gt; 4.00</td>
<td></td>
<td></td>
<td></td>
<td>&gt; 30</td>
<td>&gt; 42</td>
</tr>
</tbody>
</table>

### Relative Proportions of Sand and Gravel

<table>
<thead>
<tr>
<th>Descriptive Term(s) of other constituents</th>
<th>Percent of Dry Weight</th>
<th>Major Component of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace</td>
<td>&lt; 15</td>
<td>Boulders</td>
</tr>
<tr>
<td>With</td>
<td>15 - 29</td>
<td>Cobble</td>
</tr>
<tr>
<td>Modifier</td>
<td>&gt; 30</td>
<td>Gravel</td>
</tr>
</tbody>
</table>

### Grain Size Terminology

<table>
<thead>
<tr>
<th>Particle Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over 12 in. (300 mm)</td>
</tr>
<tr>
<td>12 in. to 3 in. (300mm to 75mm)</td>
</tr>
<tr>
<td>3 in. to #4 sieve (75mm to 4.75 mm)</td>
</tr>
<tr>
<td>#4 to #200 sieve (4.75mm to 0.075mm)</td>
</tr>
<tr>
<td>Passing #200 sieve (0.075mm)</td>
</tr>
</tbody>
</table>

### Plasticity Description

<table>
<thead>
<tr>
<th>Plasticity Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>1 - 10</td>
</tr>
<tr>
<td>11 - 30</td>
</tr>
<tr>
<td>&gt; 30</td>
</tr>
</tbody>
</table>
## Unified Soil Classification System

### Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests

<table>
<thead>
<tr>
<th>Soil Classification</th>
<th>Group Symbol</th>
<th>Group Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean Gravels:</td>
<td>Cu ≥ 4 and 1 ≤ Cc ≤ 3</td>
<td>GW</td>
</tr>
<tr>
<td>Gravels with Fines:</td>
<td>Cu &lt; 4 and/or 1 &gt; Cc &gt; 3</td>
<td>GP</td>
</tr>
<tr>
<td>Gravels:</td>
<td>Fines classify as ML or MH</td>
<td>GM</td>
</tr>
<tr>
<td>Clean Sands:</td>
<td>Cu ≥ 6 and 1 ≤ Cc ≤ 3</td>
<td>SW</td>
</tr>
<tr>
<td>Sand with Fines:</td>
<td>Cu &lt; 6 and/or 1 &gt; Cc &gt; 3</td>
<td>SP</td>
</tr>
<tr>
<td>Sand:</td>
<td>Fines classify as ML or MH</td>
<td>SM</td>
</tr>
<tr>
<td>Fine Grains:</td>
<td>Fines classify as CL or CH</td>
<td>GC</td>
</tr>
</tbody>
</table>

### Coarse Grained Soils: More than 50% retained on No. 200 sieve

- **Coarse Grained Soils:** More than 50% of coarse fraction retained on No. 4 sieve
- **Gravels:** More than 50% retained on No. 200 sieve
- **Clean Gravels:** Less than 5% fines
- **Gravels with Fines:** More than 12% fines
- **Sands:** 50% or more of coarse fraction passes No. 4 sieve
- **Clean Sands:** Less than 5% fines
- **Sands with Fines:** More than 12% fines

### Fine-Grained Soils: 50% or more passes the No. 200 sieve

- **Silts and Clays:** Liquid limit less than 50
- **Inorganic:** PI > 7 and plots on or above “A” line
- **Organic:** Liquid limit - oven dried < 0.75
- **Inorganic:** PI plots on or above “A” line
- **Organic:** Liquid limit - not dried < 0.75

### Highly Organic Soils:
- Primarily organic matter, dark in color, and organic odor
- **PT** | Peat

---

### Equations

#### For classification of fine-grained soils and fine-grained fraction of coarse-grained soils

Equation of "A" line

Horizontal at PI=4 to LL=25.5.

Then PI=0.73 (LL=20)

Equation of "U" line

Vertical at LL=16 to PI=7.

Then PI=0.9 (LL=8)

---

### Math Formulas

\[ E \text{ Cu } = \frac{D_{60}}{D_{10}} \quad \text{Cc } = \frac{(D_{30})^2}{D_{10} \times D_{60}} \]

---

### Notes

- **A** Based on the material passing the 3-inch (75-mm) sieve
- **B** If field sample contained cobbles or boulders, or both, add “with cobbles or boulders, or both” to group name
- **C** Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay
- **D** Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay
- **E** If fines are organic, add “with organic fines” to group name
- **F** If soil contains ≥ 15% sand, add “with sand” to group name
- **G** If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM
- **H** If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay
- **I** If soil contains 15 to 29% plus No. 200 predominantly sand, add “sandy” to group name
- **J** If soil contains 30 to 39% plus No. 200 predominantly gravel, add “gravelly” to group name
- **K** If PI plots on or above “A” line
- **L** If PI plots below “A” line
- **M** If PI plots on or above “A” line
- **N** If PI plots below “A” line

---

Exhibit C-2