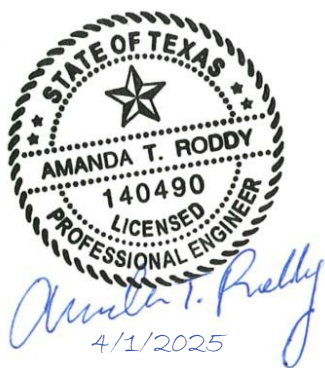


DRAFT CONTRACT  
DOCUMENTS  
ADDENDUMS ISSUED  
TO BE INCORPORATED  
AT TIME OF EXECUTION

**SPECIFICATIONS AND CONTRACT DOCUMENTS  
FOR CONSTRUCTION OF THE  
2024 ANNUAL STREET MAINTENANCE**



City of Keller  
1100 Bear Creek Parkway, Keller, TX 76248



April 2025



301 Commerce Street, Suite 2210, Fort Worth, TX 76102

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## SECTION 00 11 13 ADVERTISEMENT FOR BIDS

### 2024 Annual Street Maintenance

Sealed Bids will be received by City of Keller at the 1100 Bear Creek Parkway, Keller, Texas, 76248, until 2:00 PM, April 30, 2025, at which time and place said Bids will be opened and publicly read aloud for the following project: **2024 Annual Street Maintenance Project, Keller, Texas, Project #502408**

Bids will be received for the following Work:

1. Asphalt streets rehabilitation for a variety of street. Rehabilitation methods include full-depth reclamation with cement, lime stabilization, and mill and overlay.
2. Limited curb and gutter, driveway, barrier free ramp, and sidewalk replacement (remove and replace). As well as the installation of speed cushions, and pavement markings, and the removal of large trees. Limited culvert, water service, water meter, fire hydrant, and water valve and box replacement (remove and replace). Work to be completed as shown in Plans.

Advertisement for bids will be on ***April 13, 2025 & April 20, 2025.***

Contract Documents may be examined at the following locations:

1. City of Keller, 1100 Bear Creek Parkway, Keller, Texas, 76248
2. Wade Trim, Inc., 301 Commerce Street, Suite 2210, Fort Worth, TX 76102
3. Plans and spec are also available for viewing and downloading at no cost online at:  
<https://www.civcastusa.com/>
4. Copies of the Contract Documents can be obtained at the office(s) of Wade Trim, Inc., 301 Commerce Street, Suite 2210, Fort Worth, TX 76102, starting on April 14, 2025, upon making a payment of one hundred (\$100.00) Dollars if picked up or one hundred fifty (\$150.00) Dollars if mailed (checks or money orders only – payable to Wade Trim, no cash), none of which will be refunded.
  - A. Request for hard copies shall be made a least 48-hours in advance by contacting Amanda Roddy. [aroddy@wadetrim.com](mailto:aroddy@wadetrim.com) | 682.237.7718

You must download the Contract Documents from CIVCAST to Bid on the Project, to be included on the plan holders list, and to receive Addenda.

Each Proposal shall be accompanied by a certified check, money order, or bid bond, in the amount of at least **five (5)** percent of the amount bid, drawn payable to **City of Keller** as security for the proper execution of the Agreement. Bidders will enter into a contract for the project with the Owner within fifteen (15) days of Notice of Award of the contract.

**A non-mandatory pre-bid conference will be held at 2:00 PM, April 23, 2025**, at 1100 Bear Creek Parkway, Keller, Texas, Representatives of the Owner and the Engineer will be present to discuss the project. Bidders are encouraged to attend and participate in the meeting. The Engineer will transmit to all the Plan Holders a record sun as an Addenda as the Engineer considers necessary in response to questions arising at the conference.

The City of Keller reserves the right to accept or reject any or all bids and to waive any informality in any bids should it consider same to be in its best interest.

Bids may not be withdrawn for the period of 60 days after date of receiving bids.

All inquiries shall be directed to Amanda Roddy, 682.237.7718 or email: [aroddy@wadetrim.com](mailto:aroddy@wadetrim.com). Last day for questions to be received is Thursday, April 24, 2025, at 5:00 PM.

## SECTION 00 21 13 INSTRUCTIONS TO BIDDERS

### PART 1 GENERAL

#### 1.01 DEFINED TERMS

- A. Terms used in these Instructions to Bidders have the meanings assigned to them in the General Conditions.
- B. The term "Bidder" means one who submits a Bid directly to Owner as distinct from a subbidder who submits a Bid to a Bidder.
- C. The term "Successful Bidder" means the lowest, qualified, responsible Bidder to whom the Owner makes an award.
- D. The term "Owner" means City of Keller, 1100 Bear Creek Parkway, Keller, Texas, 76248, a Municipal Corporation and being a party of the first part of this Contract.
- E. The term "Engineer" means Wade Trim, Inc., 301 Commerce Street, Suite 2210, Fort Worth, TX 76102, or a duly authorized representative.

#### 1.02 BIDDERS QUALIFICATIONS

- A. No Bid will be considered from any Bidder unless known to be skilled and regularly engaged in work of a character similar to that covered by the Contract Documents. ***The Contractor must provide a completed and signed copy of the "Construction Contractor's Qualification Statement for Engineered Construction" document.*** In order to aid the Owner in determining the responsibility of any Bidder, the Bidder, within 48 hours after being requested in writing by the Owner to do so, shall furnish evidence, satisfactory to the Owner, of the Bidder's experience and familiarity with Work of the character specified, and Bidder's financial ability to properly prosecute the proposed Work to completion within the specified time. The evidence requested may include, but shall not be limited to, the following:
  - 1. Address and description of the Bidder's plant or permanent place of business.
  - 2. Bidder's performance records for all Work awarded to or started by Bidder within the past three years.
  - 3. An itemized list of the Bidder's equipment available for use on the proposed Contract.
  - 4. Bidder's financial statement, including statement of ownership of equipment necessary to be used in executing Work under Contract.
  - 5. Evidence that the Bidder is authorized to do business in the state in which the project is located, in case of a corporation organized under the laws of any other state; and,
  - 6. Such additional information as will satisfy the Owner that the Bidder is adequately prepared to fulfill the Contract.

#### 1.03 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

- A. It is the responsibility of each Bidder before submitting a Bid, to:
  - 1. Examine the Contract Documents thoroughly,
  - 2. Visit the site to familiarize himself with local conditions that may in any manner affect cost, progress or performance of the Work,
  - 3. Consider federal, state, and local Laws and Regulations that may affect cost, progress, performance, or furnishing of the Work; and
  - 4. Study and carefully correlate Bidder's knowledge and observations with the Contract Documents and such other related data; and

5. Promptly notify the Engineer in writing of conflicts, errors, ambiguities or discrepancies which Bidder has discovered in or between Contract Documents and such related documents.
6. ***Include signed documents for:***
  - a. ***Legal Status of Bidder Sec 00 43 45***
  - b. ***Contractor Compliance to Texas Sales Tax***
  - c. ***(CIQ) Conflict of Interest Questionnaire***
  - d. ***Vendor Compliance to State Law***
  - e. ***(CIS) Local Government Officer Conflicts Disclosure Statement***
  - f. ***Form TCG 2270***
  - g. ***Acknowledgement of Insurance Requirements***
  - h. ***Conflict Disclosure Statement***
  - i. ***Disadvantaged Business Enterprises (DBE Only)***
  - j. ***Contractor BMP Adherence Agreement***
  - k. ***Proposed Construction Schedule***
- B. Reference is made to the Supplementary Conditions for the identification of those reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which have been relied upon by the Engineer in preparing the Contract Documents.
  1. If such reports are not included as appendices to the Contract Documents, the Owner will make copies available to any Bidder requesting them. These reports are included for reference only and are not guaranteed as to accuracy or completeness, nor are they part of the Contract Documents.
  2. The Bidder may rely upon the general accuracy of the "technical data" contained in such reports but not upon other data, interpretations, opinions or information contained in such reports or otherwise relating to the subsurface conditions at the site, nor upon the completeness thereof for bidding or construction purposes.
  3. Before submitting their Bid each Bidder will, at Bidder's own expense, make such additional investigations and tests as the Bidder may deem necessary to determine Bidder's Bid for performance of the Work in accordance with the time, price and other terms and conditions of the Contract Documents.
- C. On request, the Owner will provide each Bidder access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of their Bid. Bidder shall fill all holes and clean up and restore the site to its former conditions upon completion of such investigations and tests.
- D. The lands upon which the Work is to be performed, rights-of-way for access thereto and other lands designated for use by the Contractor in performing the Work are identified in Section 01 11 00 - Summary of Work, or on the Plans.
- E. The locations of utilities as shown on the Plans are taken from sources believed to be reliable. Neither the Owner nor the Engineer will be responsible for any omissions of, or variations from, the indicated location of existing utilities which may be encountered in the Work.
  1. The submission of a Bid will constitute an incontrovertible representation by the Bidder that the Bidder has complied with every requirement of this Article 1.04, that without exception the Bid is based upon performing and furnishing the Work required by the Contract Documents and applying the specific means, methods, techniques, sequences or

procedures of construction (if any) that may be shown, indicated or required by the Contract Documents, that Bidder has given the Engineer written notice of all conflicts, errors, ambiguities and discrepancies that Bidder has discovered in Contract Documents and the resolution by the Engineer is acceptable to Bidder, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performing and furnishing the Work, and that the time stated in the Proposal is sufficient to complete the project.

#### **1.04 PRE-BID CONFERENCE**

- A. An in-person, non-mandatory pre-bid conference will be held, and representatives of the Owner and the Engineer will be present to discuss the Project.
- B. Bidders are encouraged to attend and participate in the conference.
- C. Engineer will transmit to prospective Bidders a record of such Addenda as the Engineer considers necessary in response to questions arising at the meeting. Oral statements made during the meeting may not be relied upon and will not be binding or legally effective.

#### **1.05 INTERPRETATIONS AND ADDENDA**

- A. Should any prospective bidder find discrepancies in, or omissions from the Plans, Specifications or other parts of the Contract Documents, he may submit a written request to the Engineer for an interpretation thereof. The person submitting the request will be held responsible for its prompt delivery at least seven (7) days prior to the date for opening of Bids. Questions received less than seven (7) days prior to the date for opening of bids will not be answered. Any interpretation of inquiry will be made by Addendum duly issued to all prospective bidders.
- B. Any change in or addition to the Contract Documents deemed necessary by the Owner shall be made in the form of an Addendum issued to all prospective bidders who have taken out Contract Documents and all such Addenda shall become a part of the Contract Documents as though same were incorporated into same originally. Oral explanations and information do not constitute official notification and are not binding.

#### **1.06 BID SECURITY**

- A. Bid Security shall be made payable to the Owner, in an amount of **five (5)** percent of the Bidder's maximum Bid price and in a form as indicated in the Advertisement. Bid Bonds, if indicated as acceptable in the Advertisement, shall be issued on the form included in the Contract Documents by a Surety meeting the requirements of paragraph 5.01 of the General Conditions.
- B. The Bid Security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required Contract Security, whereupon it will be returned; if the successful Bidder fails to execute and deliver the Agreement and furnish the required Contract Security within 15 days of the Notice of Award, the Owner may annul the Notice of Award and the Bid Security of that Bidder will be forfeited.
- C. The Bid Security of any Bidder whom the Owner believes to have a reasonable chance of receiving the award may be retained by the Owner until the earliest of the seventh day after the "Effective Date of Agreement" (which term is defined in the General Conditions) or the expiration of the hold period on the Bids. Bid Security of other Bidders will be returned within 14 days of the Bid opening, unless indicated otherwise in the Advertisement.

#### **1.07 CONTRACT TIME**

- A. The number of days within which, or the date by which, the Work is to be Substantially Completed, if applicable, and also completed and ready for final payment (the Contract Time) are set forth in the Agreement.

#### **1.08 SUBSTITUTE AND “OR-EQUAL” ITEMS**

- A. The Contract, if awarded, will be on the basis of materials and equipment described in the Plans or specified in the Specifications without consideration of possible substitute or “or-equal” items.
- B. Whenever it is indicated in the Plans or specified in the Specifications that a substitute or an “or-equal” item of material or equipment may be furnished or used by the Contractor if acceptable to the Engineer, application for such acceptance will not be considered by the Engineer until after the Effective Date of Agreement.
- C. In addition, in no case shall the Engineer’s denial of the Contractor’s application give rise to any claim for additional cost, it being understood by the Contractor that acceptance of substitute or an “or equal” item of material is at the sole discretion of the Engineer.

#### **1.09 RECEIPT AND FORM OF BID**

- A. Bids shall be submitted at the time and place indicated in the Advertisement for Bids, and shall be accompanied by the Bid Security and other required documents.
  - 1. Bids shall be in an opaque sealed envelope, marked with the Project title and name and address of the Bidder and accompanied by the Bid Security and other required documents.
  - 2. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face thereof.
- B. Any Bid received after the scheduled time and place indicated in the Advertisement for Bids shall be returned unopened.
- C. The Owner invites bids on the Proposal and any other form(s) attached thereto.
- D. Bids will be received at the time and place indicated in the Advertisement and thereupon will be publicly opened and read. An abstract of the amounts of the base bids and any major alternates will be made available after the opening of Bids.
- E. The Owner may consider as informal any Bid on which there is an alternation of, or departure from the Proposal Form attached hereto.
- F. The complete set of Contract Documents must be used in preparing Bids; neither the Owner nor the Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents. In order to verify the completeness of the set of Contract Documents the Bidder used in preparing Bid, the Owner may require the Bidder to submit the set of Contract Documents used in the preparing of the Bid.
- G. The Bidder shall submit his/her Bid on the separate Proposal Form included in these Contract Documents. A separate excel spreadsheet may be provided to Bidder; neither the Owner nor the Engineer assume any responsibility for errors or incompleteness of the spreadsheet.
- H. The Proposal shall be legibly prepared, with ink or typed, on the form included in these Contract Documents. All blank spaces in the proposal forms must be correctly filled in where indicated for each and every item for which a quantity is given. Proposals will be compared on basis of lump sum items, if any, and on product of the quantities of items listed at the respective unit prices bid.
  - 1. Erasures or other changes in the Bids must be explained or noted over the signature of the Bidder.
- I. All names must be typed or printed below the signature.
- J. The quantities as shown in the Proposal are approximate only and will be used as a basis of comparison of Bids, and award of Contract(s).
  - 1. Payment will be made on basis of actual quantities of Work performed in accordance with the Contract Documents.

- K. The Unit Prices bid, shall include such amounts as the Bidder deems proper for overhead, profit, taxes, General Conditions and such other incidentals as noted in the Contract Documents.
- L. The Bidder shall acknowledge of receipt of all Addenda as provided for in the electronic bidding platform. Failure to acknowledge Addenda shall be cause for rejection of bid.
- M. The Legal Status of Bidder Form contained in the Contract Documents must be submitted with each Bid and must clearly state the legal position of a Bidder. In the case of a corporation, the home address, name and title of all officers must be given. In the case of a partnership, show names and home addresses of all partners. If an individual, so state. Any individual bid not signed by the individual must have attached, thereto, a power of attorney evidencing authority to sign.
- N. Other documents to be attached to the Proposal and made a condition thereof are identified in the Proposal.
- O. A tabulation of the amounts of the base bids and any alternates will be made available after the opening of Bids.
- P. To obtain Contract Documents, Bidders shall:
  - 1. Proceed to CIVCAST: <https://www.civcastusa.com/>
  - 2. Addenda will be issued through the CIVCAST electronic bidding site. Prospective Bidders must download the bid documents to become a plan holder and receive addenda notices. It is the sole responsibility of the Bidder to obtain and review all addenda.

#### **1.10 MODIFICATIONS AND WITHDRAWAL OF BIDS**

- A. Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.
- B. If, within 24 hours after Bids are opened, any Bidder files a duly signed written notice with the Owner and promptly thereafter demonstrates to the reasonable satisfaction of the Owner that there was a material and substantial mistake in the preparation of their Bid, that Bidder may withdraw their Bid and the Bid Security will be returned.
  - 1. Thereafter, at the sole option of the Owner, that Bidder will be disqualified from further Bidding on the Work to be provided under the Contract Documents.

#### **1.11 AWARD OF CONTRACT**

- A. Owner reserves the right to reject any and all Bids for any reason, to waive any and all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder, and the right to disregard all nonconforming, non-responsive, unbalanced, or conditional Bids.
- B. Discrepancies between words and figures will be resolved in favor of words. Discrepancies in the multiplication of units of work and unit prices, will be resolved in favor of unit price.
- C. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.
- D. In evaluating Bids, the Owner shall consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data if requested in the Bid forms. It is the Owner's intent to accept alternates (if any are accepted) in the order in which they are listed in the Bid form but the Owner may accept them in any order or combination.
- E. Subject to the approval of the Owner, the Contract will be awarded to the lowest responsive and responsible Bidder. Responsibility of Bidder will be determined on basis of past performance and Work of similar character, equipment and labor available to do the Work and financial status.

- F. The Contract shall be considered to have been awarded after the approval of the Owner has been duly obtained and a formal Notice of Award duly served on the successful Bidder by the Owner.
- G. If the Contract is to be awarded, the Owner will give the successful Bidder a Notice of Award within 60 days after the day of the Bid opening, unless such other time is specified in the Advertisement for Bids.
- H. The Contract shall not be binding upon the Owner until the Agreement has been duly executed by the Bidder and the duly authorized officials of the Owner.

#### **1.12 SIGNING OF AGREEMENT**

- A. Within fifteen (15) days after the Owner gives a Notice of Award to the successful Bidder, the Contractor shall sign and deliver the specified number of counterparts of the Agreement to the Owner with all other Contract Documents attached.
- B. Within ten (10) days thereafter, the Owner will deliver two (2) fully signed counterparts to the Contractor. Engineer will identify, date or correct those portions of the Contract Documents not fully signed, dated or executed by the Owner and the Contractor and such identification, dating or correction shall be binding on all parties.

#### **1.13 WAGE RATES**

- A. Contractor must, to the approval of the Owner, pay no less than the general prevailing rates for the Project location as determined in accordance with statutory requirements. The minimum rates for various labor classifications as established by the Owner are included in the Contract Documents.

#### **1.14 BONDS**

- A. Performance, Payment, and Maintenance Bonds are required for this project and shall be provided in accordance with the General Conditions.

#### **1.15 SALES TAXES**

- A. The Owner qualifies as an exempt agency as defined by the statutes of the State of Texas. The Owner's purchasing department will issue exemption certificates. Comply with all statutes and rulings of the State Comptroller.

### **PART 2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 00 42 43  
PROPOSAL**

City of Keller  
1100 Bear Creek Parkway  
Keller, TX 76244

Re: 2024 Annual Street Maintenance Project

Gentlemen:

The undersigned Bidder proposes and agrees, if this Proposal is accepted, to enter into an Agreement with the City of Keller in the form included in the Contract Documents to complete all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.

In submitting this Proposal, Bidder represents, as more fully set forth in the Agreement, that;

a) Bidder has examined copies of all Contract Documents, (consisting of Plans dated April 2025 and Project Manual dated April 2025) which he understands and accepts as sufficient for the purpose, including any and all Addenda officially issued, the receipt of which is hereby acknowledged.

| ADDENDUM<br>NO. | DATE OF<br>RELEASE | SIGNATURE |
|-----------------|--------------------|-----------|
| _____           | _____              | _____     |
| _____           | _____              | _____     |
| _____           | _____              | _____     |
| _____           | _____              | _____     |
| _____           | _____              | _____     |

b) Bidder has examined the surface and subsurface conditions where the Work is to be performed, the legal requirements and local conditions affecting cost, progress, furnishing or performance of the Work and has made such independent investigations as Bidder deems necessary.

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

The Bidder agrees to complete the Work, in accordance with the Contract Documents, for the following Contract Price:

**2024 Annual Street Maintenance Project****Base Streets:**

| <u>ITEM NO.</u>                                 | <u>DESCRIPTION</u>                               | <u>UNITS</u> | <u>QUANTITY</u> | <u>UNIT PRICE</u> | <u>AMOUNT</u> |
|-------------------------------------------------|--------------------------------------------------|--------------|-----------------|-------------------|---------------|
| <b>BASE STREETS GENERAL ITEMS</b>               |                                                  |              |                 |                   |               |
| G1                                              | MOBILIZATION                                     | LS           | 1               | @                 | \$            |
| G2                                              | RIGHT-OF-WAY PREPARATION                         | LS           | 1               | @                 | \$            |
| G3                                              | TRAFFIC CONTROL                                  | LS           | 1               | @                 | \$            |
| G4                                              | SW3P IMPLEMENTATION & MAINTENACE                 | LS           | 1               | @                 | \$            |
| G5                                              | AUDIO & VIDEO ROUTE SURVEY                       | LS           | 1               | @                 | \$            |
| <b>MISCELLANEOUS IMPROVEMENT ITEMS</b>          |                                                  |              |                 |                   |               |
| M1                                              | SODDING                                          | SY           | 2,000.0         | @                 | \$            |
| M2                                              | FURNISHING & PLACING TOPSOIL (6" MIN)            | SY           | 2,000.0         | @                 | \$            |
| M3                                              | MISCELLANEOUS IMPROVEMENTS ALLOWANCE             | LS           | 1               | @ \$50,000        | \$ 50,000     |
| M4                                              | MISCELLANEOUS IRRIGATION & LANDSCAPING ALLOWANCE | LS           | 1               | @ \$20,000        | \$ 20,000     |
| M5                                              | PRIVATE SERVICE RECONNECTION                     | EA           | 15              | @                 | \$            |
| <b>CASTLEMAN COURT</b>                          |                                                  |              |                 |                   |               |
| <b>CASTLEMAN COURT REMOVAL ITEMS</b>            |                                                  |              |                 |                   |               |
| R1                                              | REMOVE EXISTING ASPHALT & BASE/SUBGRADE (4"-6")  | SY           | 8,400.0         | @                 | \$            |
| <b>CASTLEMAN COURT PAVING IMPROVEMENT ITEMS</b> |                                                  |              |                 |                   |               |
| P1                                              | ASPHALT PAVEMENT (2" TYPE "D" HMAC)              | SY           | 7,000.0         | @                 | \$            |
| P2                                              | ASPHALT PAVEMENT (3" TYPE "D" HMAC)              | SY           | 0.0             |                   |               |
| P3                                              | ASPHALT PAVEMENT (2" TYPE "B" HMAC)              | SY           | 7,000.0         | @                 | \$            |
| P4                                              | ASPHALT PAVEMENT (4" TYPE "B" HMAC)              | SY           | 0.0             |                   |               |
| P5                                              | LIME STABILIZED SUBGRADE (8")                    | SY           | 8,400.0         | @                 | \$            |
| P6                                              | LIME STABILIZED SUBGRADE (10")                   | SY           | 0.0             |                   |               |
| P7                                              | FULL-DEPTH RECLAMATION WITH CEMENT (8")          | SY           | 0.0             |                   |               |
| P8                                              | ADDITIONAL SUBGRADE MATERIAL (2" MIN)            | TON          | 0.0             |                   |               |
| P9                                              | LIME FOR SUBGRADE STABILIZATION (42 LB/SY)       | TON          | 176.4           | @                 | \$            |
| P10                                             | LIME FOR SUBGRADE STABILIZATION (53 LB/SY)       | TON          | 0.0             |                   |               |
| P11                                             | CEMENT FOR SUBGRADE STABILIZATION (30 LB/SY)     | TON          | 0.0             |                   |               |

| <u>ITEM NO.</u>                               | <u>DESCRIPTION</u>                                                             | <u>UNITS</u> | <u>QUANTITY</u> | <u>UNIT PRICE</u> | <u>AMOUNT</u> |
|-----------------------------------------------|--------------------------------------------------------------------------------|--------------|-----------------|-------------------|---------------|
| P12                                           | ROOT BARRIER AS NEEDED (FURNISH & INSTALL)                                     | LF           | 105.0           | @                 | \$            |
| P13                                           | RETROREFLECTED PAVEMENT MARKINGS (TY II) (Y)(6") (SOLID)                       | LF           | 0.0             |                   |               |
| P14                                           | RETROREFLECTED PAVEMENT MARKINGS (TY II) (W)(24") (SOLID)                      | LF           | 12.0            | @                 | \$            |
| P15                                           | SPEED CUSHION                                                                  | EA           | 0               |                   |               |
| <b>CASTLEMAN COURT WATER IMPROVEMENTS</b>     |                                                                                |              |                 |                   |               |
| W1                                            | SINGLE WATER SERVICE (SHORT) REPLACEMENT                                       | EA           | 1               | @                 | \$            |
| W2                                            | SINGLE WATER SERVICE (LONG) REPLACEMENT                                        | EA           | 1               | @                 | \$            |
| W3                                            | DOUBLE WATER SERVICE (SHORT) REPLACEMENT                                       | EA           | 6               | @                 | \$            |
| W4                                            | DOUBLE WATER SERVICE (LONG) REPLACEMENT                                        | EA           | 4               | @                 | \$            |
| W5                                            | REMOVE EXISTING 6" WATER LINE                                                  | LF           | 26.0            | @                 | \$            |
| W6                                            | REMOVE FIRE HYDRANT ASSEMBLY                                                   | EA           | 4               | @                 | \$            |
| W7                                            | REMOVE 6" VALVE & BOX                                                          | EA           | 5               | @                 | \$            |
| W8                                            | 6" PVC, C900, DR-18 WATER LINE PIPE (OPEN CUT)                                 | LF           | 26.0            | @                 | \$            |
| W9                                            | FIRE HYDRANT ASSEMBLY                                                          | EA           | 4               | @                 | \$            |
| W10                                           | 6" GATE VALVE & BOX                                                            | EA           | 6               | @                 | \$            |
| W11                                           | 6" CUT-IN SLEEVE                                                               | EA           | 6               | @                 | \$            |
| W12                                           | CONNECT PROPOSED 6" FIRE HYDRANT LEAD TO EXISTING 6" WATER LINE (TEE OR CROSS) | EA           | 2               | @                 | \$            |
| W13                                           | TRENCH SAFETY & EXCAVATION PROTECTION                                          | LF           | 50.0            | @                 | \$            |
| <b>CHANDLER ROAD</b>                          |                                                                                |              |                 |                   |               |
| <b>CHANDLER ROAD REMOVAL ITEMS</b>            |                                                                                |              |                 |                   |               |
| R1                                            | REMOVE EXISTING ASPHALT & BASE/SUBGRADE (4"-6")                                | SY           | 7,950.0         | @                 | \$            |
| <b>CHANDLER ROAD PAVING IMPROVEMENT ITEMS</b> |                                                                                |              |                 |                   |               |
| P1                                            | ASPHALT PAVEMENT (2" TYPE "D" HMAC)                                            | SY           | 6,000.0         | @                 | \$            |
| P2                                            | ASPHALT PAVEMENT (3" TYPE "D" HMAC)                                            | SY           | 65.0            | @                 | \$            |
| P3                                            | ASPHALT PAVEMENT (2" TYPE "B" HMAC)                                            | SY           | 0.0             |                   |               |
| P4                                            | ASPHALT PAVEMENT (4" TYPE "B" HMAC)                                            | SY           | 6,000.0         | @                 | \$            |
| P5                                            | LIME STABILIZED SUBGRADE (8")                                                  | SY           | 0.0             |                   |               |
| P6                                            | LIME STABILIZED SUBGRADE (10")                                                 | SY           | 7,950.0         | @                 | \$            |
| P7                                            | FULL-DEPTH RECLAMATION WITH CEMENT (8")                                        | SY           | 0.0             |                   |               |

| <u>ITEM NO.</u>                            | <u>DESCRIPTION</u>                                        | <u>UNITS</u> | <u>QUANTITY</u> | <u>UNIT PRICE</u> | <u>AMOUNT</u> |
|--------------------------------------------|-----------------------------------------------------------|--------------|-----------------|-------------------|---------------|
| P8                                         | ADDITIONAL SUBGRADE MATERIAL (2" MIN)                     | TON          | 0.0             |                   |               |
| P9                                         | LIME FOR SUBGRADE STABILIZATION (42 LB/SY)                | TON          | 0.0             |                   |               |
| P10                                        | LIME FOR SUBGRADE STABILIZATION (53 LB/SY)                | TON          | 210.7           | @                 | \$            |
| P11                                        | CEMENT FOR SUBGRADE STABILIZATION (30 LB/SY)              | TON          | 0.0             |                   |               |
| P12                                        | ROOT BARRIER AS NEEDED (FURNISH & INSTALL)                | LF           | 2,384.0         |                   |               |
| P13                                        | RETROREFLECTED PAVEMENT MARKINGS (TY II) (Y)(6") (SOLID)  | LF           | 4,806.0         | @                 | \$            |
| P14                                        | RETROREFLECTED PAVEMENT MARKINGS (TY II) (W)(24") (SOLID) | LF           | 0.0             |                   |               |
| P15                                        | SPEED CUSHION                                             | EA           | 0               |                   |               |
| N. TREEHOUSE LANE                          |                                                           |              |                 |                   |               |
| N. TREEHOUSE LANE REMOVAL ITEMS            |                                                           |              |                 |                   |               |
| R1                                         | REMOVE EXISTING ASPHALT & BASE/SUBGRADE (4"-6")           | SY           | 7,660.0         | @                 | \$            |
| N. TREEHOUSE LANE PAVING IMPROVEMENT ITEMS |                                                           |              |                 |                   |               |
| P1                                         | ASPHALT PAVEMENT (2" TYPE "D" HMAC)                       | SY           | 6,210.0         | @                 | \$            |
| P2                                         | ASPHALT PAVEMENT (3" TYPE "D" HMAC)                       | SY           | 0.0             |                   |               |
| P3                                         | ASPHALT PAVEMENT (2" TYPE "B" HMAC)                       | SY           | 6,210.0         |                   |               |
| P4                                         | ASPHALT PAVEMENT (4" TYPE "B" HMAC)                       | SY           | 0.0             |                   |               |
| P5                                         | LIME STABILIZED SUBGRADE (8")                             | SY           | 0.0             |                   |               |
| P6                                         | LIME STABILIZED SUBGRADE (10")                            | SY           | 0.0             |                   |               |
| P7                                         | FULL-DEPTH RECLAMATION WITH CEMENT (8")                   | SY           | 7,660.0         | @                 | \$            |
| P8                                         | ADDITIONAL SUBGRADE MATERIAL (2" MIN)                     | TON          | 530.0           | @                 | \$            |
| P9                                         | LIME FOR SUBGRADE STABILIZATION (42 LB/SY)                | TON          | 0.0             |                   |               |
| P10                                        | LIME FOR SUBGRADE STABILIZATION (53 LB/SY)                | TON          | 0.0             |                   |               |
| P11                                        | CEMENT FOR SUBGRADE STABILIZATION (30 LB/SY)              | TON          | 114.9           | @                 | \$            |
| P12                                        | ROOT BARRIER AS NEEDED (FURNISH & INSTALL)                | LF           | 0.0             |                   |               |
| P13                                        | RETROREFLECTED PAVEMENT MARKINGS (TY II) (Y)(6") (SOLID)  | LF           | 0.0             |                   |               |
| P14                                        | RETROREFLECTED PAVEMENT MARKINGS (TY II) (W)(24") (SOLID) | LF           | 12.0            | @                 | \$            |
| P15                                        | SPEED CUSHION                                             | EA           | 0               |                   |               |

| <u>ITEM NO.</u>                                     | <u>DESCRIPTION</u>                                                     | <u>UNITS</u> | <u>QUANTITY</u> | <u>UNIT PRICE</u> | <u>AMOUNT</u> |
|-----------------------------------------------------|------------------------------------------------------------------------|--------------|-----------------|-------------------|---------------|
| <b>N. TREEHOUSE LANE DRAINAGE IMPROVEMENT ITEMS</b> |                                                                        |              |                 |                   |               |
| D1                                                  | REMOVE EXISTING CMP (24 IN)                                            | LF           | 0.0             |                   |               |
| D2                                                  | REMOVE EXISTING CMP (30 IN)                                            | LF           | 100.0           | @                 | \$            |
| D3                                                  | REMOVE MISCELLANEOUS CONCRETE (HEADWALL)                               | SY           | 4               | @                 | \$            |
| D4                                                  | REMOVE MISCELLANEOUS CONCRETE (6" THICK CONCRETE APRON)                | SY           | 0.0             |                   |               |
| D5                                                  | CLEAN EXISTING RCP                                                     | LF           | 0.0             |                   |               |
| D6                                                  | RCP (CLASS III)(24 IN)                                                 | LF           | 0.0             |                   |               |
| D7                                                  | RCP (CLASS III)(30 IN)                                                 | LF           | 100.0           | @                 | \$            |
| D8                                                  | CAST-IN-PLACE SAFETY END TREATMENT (SINGLE CULVERT)                    | EA           | 4               | @                 | \$            |
| D9                                                  | CAST-IN-PLACE SAFETY END TREATMENT (DOUBLE CULVERT)                    | EA           | 0               |                   |               |
| D10                                                 | STORM DRAIN VAULT (5'X5')                                              | EA           | 0               |                   |               |
| D11                                                 | TRENCH SAFETY & EXCAVATION PROTECTION                                  | LF           | 140.0           | @                 | \$            |
| <b>N. TREEHOUSE LANE WATER IMPROVEMENT ITEMS</b>    |                                                                        |              |                 |                   |               |
| W1                                                  | SINGLE WATER SERVICE (SHORT) REPLACEMENT                               | EA           | 11              | @                 | \$            |
| W2                                                  | SINGLE WATER SERVICE (LONG) REPLACEMENT                                | EA           | 13              | @                 | \$            |
| W3                                                  | DOUBLE WATER SERVICE (SHORT) REPLACEMENT                               | EA           | 0               |                   |               |
| W4                                                  | DOUBLE WATER SERVICE (LONG) REPLACEMENT                                | EA           | 0               |                   |               |
| W5                                                  | REMOVE EXISTING 6" WATER LINE                                          | LF           | 15.0            | @                 | \$            |
| W6                                                  | REMOVE FIRE HYDRANT ASSEMBLY                                           | EA           | 3               | @                 | \$            |
| W7                                                  | REMOVE 6" VALVE & BOX                                                  | EA           | 5               | @                 | \$            |
| W8                                                  | 6" PVC, C900, DR-18 WATER LINE PIPE (OPEN CUT)                         | LF           | 15.0            | @                 | \$            |
| W9                                                  | FIRE HYDRANT ASSEMBLY                                                  | EA           | 3               | @                 | \$            |
| W10                                                 | 6" GATE VALVE & BOX                                                    | EA           | 6               | @                 | \$            |
| W11                                                 | 6" CUT-IN SLEEVE                                                       | EA           | 6               | @                 | \$            |
| W12                                                 | CONNECT PROPOSED 6" FIRE LINE TO EXISTING 6" WATER LINE (TEE OR CROSS) | EA           | 1               | @                 | \$            |
| W13                                                 | TRENCH SAFETY & EXCAVATION PROTECTION                                  | LF           | 25.0            | @                 | \$            |
| <b>S. TREEHOUSE LANE</b>                            |                                                                        |              |                 |                   |               |
| <b>S. TREEHOUSE LANE REMOVAL ITEMS</b>              |                                                                        |              |                 |                   |               |
| R1                                                  | REMOVE EXISTING ASPHALT & BASE/SUBGRADE (4"-6")                        | SY           | 7,550.0         | @                 | \$            |

| <u>ITEM NO.</u>                                     | <u>DESCRIPTION</u>                                        | <u>UNITS</u> | <u>QUANTITY</u> | <u>UNIT PRICE</u> | <u>AMOUNT</u> |
|-----------------------------------------------------|-----------------------------------------------------------|--------------|-----------------|-------------------|---------------|
| <b>S. TREEHOUSE LANE PAVING IMPROVEMENT ITEMS</b>   |                                                           |              |                 |                   |               |
| P1                                                  | ASPHALT PAVEMENT (2" TYPE "D" HMAC)                       | SY           | 6,100.0         | @                 | \$            |
| P2                                                  | ASPHALT PAVEMENT (3" TYPE "D" HMAC)                       | SY           | 0.0             |                   |               |
| P3                                                  | ASPHALT PAVEMENT (2" TYPE "B" HMAC)                       | SY           | 6,100.0         | @                 | \$            |
| P4                                                  | ASPHALT PAVEMENT (4" TYPE "B" HMAC)                       | SY           | 0.0             |                   |               |
| P5                                                  | LIME STABILIZED SUBGRADE (8")                             | SY           | 0.0             |                   |               |
| P6                                                  | LIME STABILIZED SUBGRADE (10")                            | SY           | 0.0             |                   |               |
| P7                                                  | FULL-DEPTH RECLAMATION WITH CEMENT (8")                   | SY           | 7,550.0         | @                 | \$            |
| P8                                                  | ADDITIONAL SUBGRADE MATERIAL (2" MIN)                     | TON          | 530.0           | @                 | \$            |
| P9                                                  | LIME FOR SUBGRADE STABILIZATION (42 LB/SY)                | TON          | 0.0             |                   |               |
| P10                                                 | LIME FOR SUBGRADE STABILIZATION (53 LB/SY)                | TON          | 0.0             |                   |               |
| P11                                                 | CEMENT FOR SUBGRADE STABILIZATION (30 LB/SY)              | TON          | 113.3           | @                 | \$            |
| P12                                                 | ROOT BARRIER AS NEEDED (FURNISH & INSTALL)                | LF           | 0.0             |                   |               |
| P13                                                 | RETROREFLECTED PAVEMENT MARKINGS (TY II) (Y)(6") (SOLID)  | LF           | 0.0             |                   |               |
| P14                                                 | RETROREFLECTED PAVEMENT MARKINGS (TY II) (W)(24") (SOLID) | LF           | 12.0            | @                 | \$            |
| P15                                                 | SPEED CUSHION                                             | EA           | 0               |                   |               |
| <b>S. TREEHOUSE LANE DRAINAGE IMPROVEMENT ITEMS</b> |                                                           |              |                 |                   |               |
| D1                                                  | REMOVE EXISTING CMP (24 IN)                               | LF           | 0.0             |                   |               |
| D2                                                  | REMOVE EXISTING CMP (30 IN)                               | LF           | 120.0           | @                 | \$            |
| D3                                                  | REMOVE MISCELLANEOUS CONCRETE (HEADWALL)                  | SY           | 3               | @                 | \$            |
| D4                                                  | REMOVE MISCELLANEOUS CONCRETE (6" THICK CONCRETE APRON)   | SY           | 0.0             |                   |               |
| D5                                                  | CLEAN EXISTING RCP                                        | LF           | 0.0             |                   |               |
| D6                                                  | RCP (CLASS III)(24 IN)                                    | LF           | 0.0             |                   |               |
| D7                                                  | RCP (CLASS III)(30 IN)                                    | LF           | 120.0           | @                 | \$            |
| D8                                                  | CAST-IN-PLACE SAFETY END TREATMENT (SINGLE CULVERT)       | EA           | 0               |                   |               |
| D9                                                  | CAST-IN-PLACE SAFETY END TREATMENT (DOUBLE CULVERT)       | EA           | 2               | @                 | \$            |
| D10                                                 | STORM DRAIN VAULT (5'X5')                                 | EA           | 0               |                   |               |
| D11                                                 | TRENCH SAFETY & EXCAVATION PROTECTION                     | LF           | 140.0           | @                 | \$            |
| <b>S. TREEHOUSE LANE WATER IMPROVEMENT ITEMS</b>    |                                                           |              |                 |                   |               |
| W1                                                  | SINGLE WATER SERVICE (SHORT) REPLACEMENT                  | EA           | 11              | @                 | \$            |

| <u>ITEM NO.</u> | <u>DESCRIPTION</u>                                                     | <u>UNITS</u> | <u>QUANTITY</u> | <u>UNIT PRICE</u> | <u>AMOUNT</u> |
|-----------------|------------------------------------------------------------------------|--------------|-----------------|-------------------|---------------|
| W2              | SINGLE WATER SERVICE (LONG) REPLACEMENT                                | EA           | 14              | @                 | \$            |
| W3              | DOUBLE WATER SERVICE (SHORT) REPLACEMENT                               | EA           | 0               |                   |               |
| W4              | DOUBLE WATER SERVICE (LONG) REPLACEMENT                                | EA           | 0               |                   |               |
| W5              | REMOVE EXISTING 6" WATER LINE                                          | LF           | 50.0            | @                 | \$            |
| W6              | REMOVE FIRE HYDRANT ASSEMBLY                                           | EA           | 3               | @                 | \$            |
| W7              | REMOVE 6" VALVE & BOX                                                  | EA           | 5               | @                 | \$            |
| W8              | 6" PVC, C900, DR-18 WATER LINE PIPE (OPEN CUT)                         | LF           | 50.0            | @                 | \$            |
| W9              | FIRE HYDRANT ASSEMBLY                                                  | EA           | 3               | @                 | \$            |
| W10             | 6" GATE VALVE & BOX                                                    | EA           | 6               | @                 | \$            |
| W11             | 6" CUT-IN SLEEVE                                                       | EA           | 6               | @                 | \$            |
| W12             | CONNECT PROPOSED 6" FIRE LINE TO EXISTING 6" WATER LINE (TEE OR CROSS) | EA           | 3               | @                 | \$            |
| W13             | TRENCH SAFETY & EXCAVATION PROTECTION                                  | LF           | 80.0            | @                 | \$            |

GENERAL ITEMS TOTAL COST \$ \_\_\_\_\_

MISCELLANEOUS ITEMS TOTAL COST \$ \_\_\_\_\_

CASTLEMAN COURT TOTAL COST \$ \_\_\_\_\_

CHANDLER ROAD TOTAL COST \$ \_\_\_\_\_

N. TREEHOUSE LANE TOTAL COST \$ \_\_\_\_\_

S. TREEHOUSE LANE TOTAL COST \$ \_\_\_\_\_

TOTAL FOR BASE STREETS \$ \_\_\_\_\_

TOTAL TIME FOR BASE STREETS (CALENDAR DAYS) \_\_\_\_\_

### Unit Prices for Alternate Work Items

If after bidding and if there is funding available; the Alternate Bid Items shown below may or may not be added to the project at the OWNER'S discretion.

**Alternative Streets:**

| <u>ITEM NO.</u>                               | <u>DESCRIPTION</u>                                        | <u>UNITS</u> | <u>QUANTITY</u> | <u>UNIT PRICE</u> | <u>AMOUNT</u> |
|-----------------------------------------------|-----------------------------------------------------------|--------------|-----------------|-------------------|---------------|
| <b>BELINDA DRIVE</b>                          |                                                           |              |                 |                   |               |
| <b>BELINDA DRIVE GENERAL ITEMS</b>            |                                                           |              |                 |                   |               |
| G1                                            | MOBILIZATION                                              | LS           | 1               | @                 | \$            |
| G2                                            | RIGHT-OF-WAY PREPARATION                                  | LS           | 1               | @                 | \$            |
| G3                                            | TRAFFIC CONTROL                                           | LS           | 1               | @                 | \$            |
| G4                                            | SW3P IMPLEMENTATION & MAINTENACE                          | LS           | 1               | @                 | \$            |
| G5                                            | AUDIO & VIDEO ROUTE SURVEY                                | LS           | 1               | @                 | \$            |
| <b>BELINDA DRIVE REMOVAL ITEMS</b>            |                                                           |              |                 |                   |               |
| R1                                            | REMOVE EXISTING ASPHALT & BASE/SUBGRADE (4"-6")           | SY           | 5,800.0         | @                 | \$            |
| <b>BELINDA DRIVE PAVING IMPROVEMENT ITEMS</b> |                                                           |              |                 |                   |               |
| P1                                            | ASPHALT PAVEMENT (2" TYPE "D" HMAC)                       | SY           | 4,700.0         | @                 | \$            |
| P2                                            | ASPHALT PAVEMENT (3" TYPE "D" HMAC)                       | SY           | 0.0             |                   |               |
| P3                                            | ASPHALT PAVEMENT (2" TYPE "B" HMAC)                       | SY           | 4,700.0         | @                 | \$            |
| P4                                            | ASPHALT PAVEMENT (4" TYPE "B" HMAC)                       | SY           | 0.0             |                   |               |
| P5                                            | LIME STABILIZED SUBGRADE (8")                             | SY           | 5,800.0         | @                 | \$            |
| P6                                            | LIME STABILIZED SUBGRADE (10")                            | SY           | 0.0             |                   |               |
| P7                                            | FULL-DEPTH RECLAMATION WITH CEMENT (8")                   | SY           | 0.0             |                   |               |
| P8                                            | ADDITIONAL SUBGRADE MATERIAL (2" MIN)                     | TON          | 0.0             |                   |               |
| P9                                            | LIME FOR SUBGRADE STABILIZATION (42 LB/SY)                | TON          | 121.8           | @                 | \$            |
| P10                                           | LIME FOR SUBGRADE STABILIZATION (53 LB/SY)                | TON          | 0.0             |                   |               |
| P11                                           | CEMENT FOR SUBGRADE STABILIZATION (30 LB/SY)              | TON          | 0.0             |                   |               |
| P12                                           | ROOT BARRIER AS NEEDED (FURNISH & INSTALL)                | LF           | 0.0             |                   |               |
| P13                                           | RETROREFLECTED PAVEMENT MARKINGS (TY II) (Y)(6") (SOLID)  | LF           | 0.0             |                   |               |
| P14                                           | RETROREFLECTED PAVEMENT MARKINGS (TY II) (W)(24") (SOLID) | LF           | 0.0             |                   |               |
| P15                                           | SPEED CUSHION                                             | EA           | 9               | @                 | \$            |

| <u>ITEM NO.</u>                                               | <u>DESCRIPTION</u>                                                     | <u>UNITS</u> | <u>QUANTITY</u> | <u>UNIT PRICE</u> | <u>AMOUNT</u> |
|---------------------------------------------------------------|------------------------------------------------------------------------|--------------|-----------------|-------------------|---------------|
| <b>BELINDA DRIVE DRAINAGE IMPROVEMENT ITEMS</b>               |                                                                        |              |                 |                   |               |
| D1                                                            | REMOVE EXISTING CMP (24 IN)                                            | LF           | 32.0            | @                 | \$            |
| D2                                                            | REMOVE EXISTING CMP (30 IN)                                            | LF           | 0.0             |                   |               |
| D3                                                            | REMOVE MISCELLANEOUS CONCRETE (HEADWALL)                               | EA           | 0               |                   |               |
| D4                                                            | REMOVE MISCELLANEOUS CONCRETE (6" THICK CONCRETE APRON)                | SY           | 4.0             | @                 | \$            |
| D5                                                            | CLEAN EXISTING RCP                                                     | LF           | 0.0             |                   |               |
| D6                                                            | RCP (CLASS III)(24 IN)                                                 | LF           | 40.0            | @                 | \$            |
| D7                                                            | RCP (CLASS III)(30 IN)                                                 | LF           | 0.0             |                   |               |
| D8                                                            | CAST-IN-PLACE SAFETY END TREATMENT (SINGLE CULVERT)                    | EA           | 1               | @                 | \$            |
| D9                                                            | CAST-IN-PLACE SAFETY END TREATMENT (DOUBLE CULVERT)                    | EA           | 0               |                   |               |
| D10                                                           | STORM DRAIN VAULT (5'X5')                                              | EA           | 1               | @                 | \$            |
| D11                                                           | TRENCH SAFETY & EXCAVATION PROTECTION                                  | LF           | 60.0            | @                 | \$            |
| <b>BELINDA DRIVE WATER IMPROVEMENT ITEMS</b>                  |                                                                        |              |                 |                   |               |
| W1                                                            | SINGLE WATER SERVICE (SHORT) REPLACEMENT                               | EA           | 7               | @                 | \$            |
| W2                                                            | SINGLE WATER SERVICE (LONG) REPLACEMENT                                | EA           | 8               | @                 | \$            |
| W3                                                            | DOUBLE WATER SERVICE (SHORT) REPLACEMENT                               | EA           | 0               |                   |               |
| W4                                                            | DOUBLE WATER SERVICE (LONG) REPLACEMENT                                | EA           | 0               |                   |               |
| W5                                                            | REMOVE EXISTING 6" WATER LINE                                          | LF           | 36.0            | @                 | \$            |
| W6                                                            | REMOVE FIRE HYDRANT ASSEMBLY                                           | EA           | 3               | @                 | \$            |
| W7                                                            | REMOVE 6" VALVE & BOX                                                  | EA           | 7               | @                 | \$            |
| W8                                                            | 6" PVC, C900, DR-18 WATER LINE PIPE (OPEN CUT)                         | LF           | 36.0            | @                 | \$            |
| W9                                                            | FIRE HYDRANT ASSEMBLY                                                  | EA           | 3               | @                 | \$            |
| W10                                                           | 6" GATE VALVE & BOX                                                    | EA           | 7               | @                 | \$            |
| W11                                                           | 6" CUT-IN SLEEVE                                                       | EA           | 7               | @                 | \$            |
| W12                                                           | CONNECT PROPOSED 6" FIRE LINE TO EXISTING 6" WATER LINE (TEE OR CROSS) | EA           | 3               | @                 | \$            |
| W13                                                           | TRENCH SAFETY & EXCAVATION PROTECTION                                  | LF           | 70.0            | @                 | \$            |
| <b>VALLE VISTA COURT &amp; VALLE VISTA LANE</b>               |                                                                        |              |                 |                   |               |
| <b>VALLE VISTA COURT &amp; VALLE VISTA LANE GENERAL ITEMS</b> |                                                                        |              |                 |                   |               |
| G1                                                            | MOBILIZATION                                                           | LS           | 1               | @                 | \$            |
| G2                                                            | RIGHT-OF-WAY PREPARATION                                               | LS           | 1               | @                 | \$            |

| <u>ITEM NO.</u>                                     | <u>DESCRIPTION</u>                                        | <u>UNITS</u> | <u>QUANTITY</u> | <u>UNIT PRICE</u> | <u>AMOUNT</u> |
|-----------------------------------------------------|-----------------------------------------------------------|--------------|-----------------|-------------------|---------------|
| G3                                                  | TRAFFIC CONTROL                                           | LS           | 1               | @                 | \$            |
| G4                                                  | SW3P IMPLEMENTATION & MAINTENACE                          | LS           | 1               | @                 | \$            |
| G5                                                  | AUDIO & VIDEO ROUTE SURVEY                                | LS           | 1               | @                 | \$            |
| <b>VALLE VISTA COURT</b>                            |                                                           |              |                 |                   |               |
| <b>VALLE VISTA COURT REMOVAL ITEMS</b>              |                                                           |              |                 |                   |               |
| R1                                                  | REMOVE EXISTING ASPHALT & BASE/SUBGRADE (4"-6")           | SY           | 3,400.0         | @                 | \$            |
| <b>VALLE VISTA COURT PAVING IMPROVEMENT ITEMS</b>   |                                                           |              |                 |                   |               |
| P1                                                  | ASPHALT PAVEMENT (2" TYPE "D" HMAC)                       | SY           | 2,800.0         | @                 | \$            |
| P2                                                  | ASPHALT PAVEMENT (3" TYPE "D" HMAC)                       | SY           | 0.0             |                   |               |
| P3                                                  | ASPHALT PAVEMENT (2" TYPE "B" HMAC)                       | SY           | 2,800.0         | @                 | \$            |
| P4                                                  | ASPHALT PAVEMENT (4" TYPE "B" HMAC)                       | SY           | 0.0             |                   |               |
| P5                                                  | LIME STABILIZED SUBGRADE (8")                             | SY           | 3,400.0         | @                 | \$            |
| P6                                                  | LIME STABILIZED SUBGRADE (10")                            | SY           | 0.0             |                   |               |
| P7                                                  | FULL-DEPTH RECLAMATION WITH CEMENT (8")                   | SY           | 0.0             |                   |               |
| P8                                                  | ADDITIONAL SUBGRADE MATERIAL (2" MIN)                     | TON          | 0.0             |                   |               |
| P9                                                  | LIME FOR SUBGRADE STABILIZATION (42 LB/SY)                | TON          | 71.4            | @                 | \$            |
| P10                                                 | LIME FOR SUBGRADE STABILIZATION (53 LB/SY)                | TON          | 0.0             |                   |               |
| P11                                                 | CEMENT FOR SUBGRADE STABILIZATION (30 LB/SY)              | TON          | 0.0             |                   |               |
| P12                                                 | ROOT BARRIER AS NEEDED (FURNISH & INSTALL)                | LF           | 0.0             |                   |               |
| P13                                                 | RETROREFLECTED PAVEMENT MARKINGS (TY II) (Y)(6") (SOLID)  | LF           | 0.0             |                   |               |
| P14                                                 | RETROREFLECTED PAVEMENT MARKINGS (TY II) (W)(24") (SOLID) | LF           | 0.0             |                   |               |
| P15                                                 | SPEED CUSHION                                             | EA           | 0               |                   |               |
| <b>VALLE VISTA COURT DRAINAGE IMPROVEMENT ITEMS</b> |                                                           |              |                 |                   |               |
| D1                                                  | REMOVE EXISTING CMP (24 IN)                               | LF           | 0.0             |                   |               |
| D2                                                  | REMOVE EXISTING CMP (30 IN)                               | LF           | 0.0             |                   |               |
| D3                                                  | REMOVE MISCELLANEOUS CONCRETE (HEADWALL)                  | EA           | 0               |                   |               |
| D4                                                  | REMOVE MISCELLANEOUS CONCRETE (6" THICK CONCRETE APRON)   | SY           | 0.0             |                   |               |
| D5                                                  | CLEAN EXISTING RCP                                        | LF           | 100.0           | @                 | \$            |
| D6                                                  | RCP (CLASS III)(24 IN)                                    | LF           | 0.0             |                   |               |
| D7                                                  | RCP (CLASS III)(30 IN)                                    | LF           | 0.0             |                   |               |

| <u>ITEM NO.</u>                                  | <u>DESCRIPTION</u>                                                     | <u>UNITS</u> | <u>QUANTITY</u> | <u>UNIT PRICE</u> | <u>AMOUNT</u> |
|--------------------------------------------------|------------------------------------------------------------------------|--------------|-----------------|-------------------|---------------|
| D8                                               | CAST-IN-PLACE SAFETY END TREATMENT (SINGLE CULVERT)                    | EA           | 0               |                   |               |
| D9                                               | CAST-IN-PLACE SAFETY END TREATMENT (DOUBLE CULVERT)                    | EA           | 2               | @                 | \$            |
| D10                                              | STORM DRAIN VAULT (5'X5')                                              | EA           | 0               |                   |               |
| D11                                              | TRENCH SAFETY & EXCAVATION PROTECTION                                  | LF           | 0.0             |                   |               |
| <b>VALLE VISTA COURT WATER IMPROVEMENT ITEMS</b> |                                                                        |              |                 |                   |               |
| W1                                               | SINGLE WATER SERVICE (SHORT) REPLACEMENT                               | EA           | 1               | @                 | \$            |
| W2                                               | SINGLE WATER SERVICE (LONG) REPLACEMENT                                | EA           | 0               |                   |               |
| W3                                               | DOUBLE WATER SERVICE (SHORT) REPLACEMENT                               | EA           | 3               | @                 | \$            |
| W4                                               | DOUBLE WATER SERVICE (LONG) REPLACEMENT                                | EA           | 3               | @                 | \$            |
| W5                                               | REMOVE EXISTING 6" WATER LINE                                          | LF           | 20.0            | @                 | \$            |
| W6                                               | REMOVE FIRE HYDRANT ASSEMBLY                                           | EA           | 1               | @                 | \$            |
| W7                                               | REMOVE 6" VALVE & BOX                                                  | EA           | 1               | @                 | \$            |
| W8                                               | 6" PVC, C900, DR-18 WATER LINE PIPE (OPEN CUT)                         | LF           | 20.0            | @                 | \$            |
| W9                                               | FIRE HYDRANT ASSEMBLY                                                  | EA           | 1               | @                 | \$            |
| W10                                              | 6" GATE VALVE & BOX                                                    | EA           | 1               | @                 | \$            |
| W11                                              | 6" CUT-IN SLEEVE                                                       | EA           | 1               | @                 | \$            |
| W12                                              | CONNECT PROPOSED 6" FIRE LINE TO EXISTING 6" WATER LINE (TEE OR CROSS) | EA           | 1               | @                 | \$            |
| W13                                              | TRENCH SAFETY & EXCAVATION PROTECTION                                  | LF           | 30.0            | @                 | \$            |
| <b>VALLE VISTA LANE</b>                          |                                                                        |              |                 |                   |               |
| <b>VALLE VISTA LANE REMOVAL ITEMS</b>            |                                                                        |              |                 |                   |               |
| R1                                               | REMOVE EXISTING ASPHALT & BASE/SUBGRADE (4"-6")                        | SY           | 4,400.0         | @                 | \$            |
| <b>VALLE VISTA LANE PAVING IMPROVEMENT ITEMS</b> |                                                                        |              |                 |                   |               |
| P1                                               | ASPHALT PAVEMENT (2" TYPE "D" HMAC)                                    | SY           | 3,600.0         | @                 | \$            |
| P2                                               | ASPHALT PAVEMENT (3" TYPE "D" HMAC)                                    | SY           | 0.0             |                   |               |
| P3                                               | ASPHALT PAVEMENT (2" TYPE "B" HMAC)                                    | SY           | 3,600.0         | @                 | \$            |
| P4                                               | ASPHALT PAVEMENT (4" TYPE "B" HMAC)                                    | SY           | 0.0             |                   |               |
| P5                                               | LIME STABILIZED SUBGRADE (8")                                          | SY           | 4,400.0         | @                 | \$            |
| P6                                               | LIME STABILIZED SUBGRADE (10")                                         | SY           | 0.0             |                   |               |
| P7                                               | FULL-DEPTH RECLAMATION WITH CEMENT (8")                                | SY           | 0.0             |                   |               |

| <u>ITEM NO.</u>                          | <u>DESCRIPTION</u>                                                     | <u>UNITS</u> | <u>QUANTITY</u> | <u>UNIT PRICE</u> | <u>AMOUNT</u> |
|------------------------------------------|------------------------------------------------------------------------|--------------|-----------------|-------------------|---------------|
| P8                                       | ADDITIONAL SUBGRADE MATERIAL (2" MIN)                                  | TON          | 0.0             |                   |               |
| P9                                       | LIME FOR SUBGRADE STABILIZATION (42 LB/SY)                             | TON          | 92.4            | @                 | \$            |
| P10                                      | LIME FOR SUBGRADE STABILIZATION (53 LB/SY)                             | TON          | 0.0             |                   |               |
| P11                                      | CEMENT FOR SUBGRADE STABILIZATION (30 LB/SY)                           | TON          | 0.0             |                   |               |
| P12                                      | ROOT BARRIER AS NEEDED (FURNISH & INSTALL)                             | LF           | 0.0             |                   |               |
| P13                                      | RETROREFLECTED PAVEMENT MARKINGS (TY II) (Y)(6") (SOLID)               | LF           | 0.0             |                   |               |
| P14                                      | RETROREFLECTED PAVEMENT MARKINGS (TY II) (W)(24") (SOLID)              | LF           | 12.0            | @                 | \$            |
| P15                                      | SPEED CUSHION                                                          | EA           | 0               |                   |               |
| VALLE VISTA LANE WATER IMPROVEMENT ITEMS |                                                                        |              |                 |                   |               |
| W1                                       | SINGLE WATER SERVICE (SHORT) REPLACEMENT                               | EA           | 0               |                   |               |
| W2                                       | SINGLE WATER SERVICE (LONG) REPLACEMENT                                | EA           | 0               |                   |               |
| W3                                       | DOUBLE WATER SERVICE (SHORT) REPLACEMENT                               | EA           | 4               | @                 | \$            |
| W4                                       | DOUBLE WATER SERVICE (LONG) REPLACEMENT                                | EA           | 3               | @                 | \$            |
| W5                                       | REMOVE EXISTING 6" WATER LINE                                          | LF           | 20.0            | @                 | \$            |
| W6                                       | REMOVE FIRE HYDRANT ASSEMBLY                                           | EA           | 1               | @                 | \$            |
| W7                                       | REMOVE 6" VALVE & BOX                                                  | EA           | 2               | @                 | \$            |
| W8                                       | 6" PVC, C900, DR-18 WATER LINE PIPE (OPEN CUT)                         | LF           | 20.0            | @                 | \$            |
| W9                                       | FIRE HYDRANT ASSEMBLY                                                  | EA           | 1               | @                 | \$            |
| W10                                      | 6" GATE VALVE & BOX                                                    | EA           | 2               | @                 | \$            |
| W11                                      | 6" CUT-IN SLEEVE                                                       | EA           | 2               | @                 | \$            |
| W12                                      | CONNECT PROPOSED 6" FIRE LINE TO EXISTING 6" WATER LINE (TEE OR CROSS) | EA           | 1               | @                 | \$            |
| W13                                      | TRENCH SAFETY & EXCAVATION PROTECTION                                  | LF           | 30.0            | @                 | \$            |

**BELINDA DRIVE TOTAL COST**

\$ \_\_\_\_\_

**TOTAL TIME FOR BELINDA DRIVE (CALENDAR DAYS)**

\_\_\_\_\_

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**VALLE VISTA COURT & VALLE VISTA LANE TOTAL COST****\$ \_\_\_\_\_**

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**TOTAL TIME FOR VALLE VISTA COURT & VALLE VISTA LANE  
(CALENDAR DAYS)**

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**\_\_\_\_\_**

If after bidding and if there is funding available; the Alternate Bid Items shown may or may not be added to the project at the OWNER'S discretion.

The undersigned, as Bidder, hereby certifies that he or a qualified designated person in his employ has examined the Contract Documents provided by the Owner for bidding purposes. Further, the undersigned certifies that he or his qualified employee has reviewed the Bidder's proposed construction methods and finds them compatible with the conditions and from the information provided for Bidding.

The undersigned, as Bidder, shall complete the Work under any job circumstances or field conditions present and/or ascertainable prior to bidding. In addition, he shall also complete the Work under whatever conditions he may create by his own sequence of construction, traffic control plan and implementation, erosion control plan and implementation, construction methods, or other conditions he may create, at no additional cost to the Owner.

The undersigned, as Bidder, declares that he has familiarized himself with the location of the proposed Work and the conditions under which it must be constructed. Also, that he has carefully examined the Plans, the Specifications, and the Contract Documents, which he understands and accepts as sufficient for the purpose and agrees that he will Contract with the Owner to furnish all labor, material, tools, and equipment necessary to do all Work specified and prescribed for the completion of the Project.

The undersigned agrees, if awarded Contract, to sign the Agreement and submit satisfactory bonds and certificates of insurance coverage and other evidence of insurance required by the Contract Documents within 15 days after the date of Owner's Notice of Award.

The undersigned agrees that time is of the essence and, if awarded Contract, that the Base Streets will be Substantially Completed within \_\_\_\_\_ calendar days after the date when the Contract Time commences to run and completed within \_\_\_\_\_ calendar days after the date when the Contract Time commences to run. Additional calendar days will be added if Alternative Streets are construction.

Liquidated damages, as specified in the General Conditions, Supplementary Conditions and Agreement, shall also apply to the above Substantial Completion date.

All engineering and inspection costs incurred after the above final completion date shall be paid by the Contractor to the Owner as specified in the Conditions of the Contract and Agreement.

Proposals may not be withdrawn for a period of 60 days after bid opening.

**The following documents are attached to and made a condition of this Proposal Submittal:**

a) Required Bid security in the form checked below:

\_\_\_\_ Certified Check  
\_\_\_\_ Cashier's Check  
\_\_\_\_ Money Order  
\_\_\_\_ Bid Bond

- b) Legal Status of Bidder Sec 00 43 45
- c) Contractor Compliance to Texas Sales Tax
- d) (CIQ) Conflict of Interest Questionnaire
- e) Vendor Compliance to State Law
- f) (CIS) Local Government Officer Conflicts Disclosure Statement
- g) Form TCG 2270
- h) Acknowledgement of Insurance Requirements
- i) Conflict Disclosure Statement
- j) Disadvantaged Business Enterprises (DBE Only)
- k) Contractor BMP Adherence Agreement
- l) **Proposed Construction Schedule**

Bidder's Name \_\_\_\_\_

By \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Phone No. \_\_\_\_\_

Fax. No. \_\_\_\_\_

email \_\_\_\_\_

## CONTRACTOR COMPLIANCE TO TEXAS SALES TAX CODE

Comply with all requirements of the Texas Sales Tax Code. The Contractor hereby certifies that the Contract Amount is divided as follows:

Material incorporated into the Project

(resold to the Owner as defined in Tax Code)

\$ \_\_\_\_\_

All other charges and costs

\$ \_\_\_\_\_

Total \*

\$ \_\_\_\_\_

\* The total must equal the total amount of the Contract.

CONTRACTOR:

\_\_\_\_\_  
Company (please print)

BY: \_\_\_\_\_  
(signature of authorized person)

\_\_\_\_\_  
Address

Title: \_\_\_\_\_

\_\_\_\_\_  
City State Zip

THIS FORM SHALL BE EXECUTED AT TIME OF EXECUTION OF CONTRACT AND MADE A PART OF THE CONTRACT.

Note:

1. The Total Amount of Bid for Materials and Services must equal the sum of the Total Amount Bid for Materials and the Total Amount Bid for Services as well as the sum of all individual bid items.
2. Materials are those items which are tax exempt and are physically incorporated into the facilities constructed for the Owner. Materials include, but are not limited to, purchased items such as pipe, embedment, concrete, manholes, asphalt, road base, machinery, and equipment, etc.
3. Services are those items which are not tax exempt and are used by the Contractor but are not physically incorporated into the Owner's facilities and/or items that are consumed by construction. Services include, but are not limited to, supplies, tools, concrete forms, scaffolding, temporary buildings, the rental of equipment, skill, and labor, etc.

# THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA



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## CONSTRUCTION CONTRACTOR'S QUALIFICATION STATEMENT FOR ENGINEERED CONSTRUCTION

This qualification statement was developed by AGC of America in cooperation with the Engineers Joint Contract Documents Committee (EJCDC) which recommend its use as a suggested generic prequalification statement or a contract-specific qualification statement. In the latter case, the owner or engineer may wish to make appropriate supplemental inquiries.

The Engineers Joint Contract Documents Committee consists of representatives of the following organizations:

National Society of Professional Engineers  
American Consulting Engineers Council  
American Society of Civil Engineers  
Construction Specifications Institute

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**The contents of this statement are CONFIDENTIAL.**

### Submitted by:

Name of Organization \_\_\_\_\_

Name of Individual \_\_\_\_\_

Title \_\_\_\_\_

Address \_\_\_\_\_

Telephone \_\_\_\_\_

**Submitted to:**

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Telephone \_\_\_\_\_

Project Name and Description (if applicable)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Contractor's General Business Information**

Check If:

☐ Corporation   ☐ Partnership   ☐ Joint Venture   ☐ Sole Proprietorship

**If Corporation:**

a.      Date and State of Incorporation

\_\_\_\_\_

\_\_\_\_\_

b.      List of Executive Officers

Name

Title

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**If Partnership:**

a. Date and State of Organization

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b. Names of Current General Partners

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c. Type of Partnership

☐ General ☐ Publicly Traded

☐ Limited ☐ Other (describe): \_\_\_\_\_

**If Joint Venture:**

a. Date and State of Organization

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b. Name, Address and Form of Organization of Joint Venture Partners: (Indicate managing partner by an asterisk \*)

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**If Sole Proprietorship:**

a. Date and State of Organization \_\_\_\_\_

b. Name and Address of Owner or Owners

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1. On Schedule A, attached, list major engineered construction projects completed by this organization in the past five (5) years. (If joint venture list each participant's projects separately).

2. On Schedule B, attached, list current projects under construction by this organization. (If joint venture, list each participant's projects separately).

3. Name of surety company and name, address, and phone number of agent.

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4. Is your organization a member of a controlled group of corporations as defined in I.R.C. Sec. 1563? ☐ Yes ☐ No

If yes, show names and addresses of affiliated companies.

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5. Furnish on Schedule C, attached, details of the construction experience of the principal individuals of your organization directly involved in construction operations.

6. Has your organization ever failed to complete any construction contract awarded to it? ☐ Yes ☐ No

If yes, describe circumstances on attachment.

7. Has any Corporate officer, partner, joint venture participant or proprietor ever failed to complete a construction contract awarded to him or her in their own name or when acting as a principal of another organization? ☐ Yes ☐ No

If yes, describe circumstances on attachment.

8. In the last five years, has your organization ever failed to substantially complete a project in a timely manner? ☐ Yes ☐ No

If yes, describe circumstances on attachment.

9. Indicate general types of work performed with your own work force.

10. If required, can your organization provide a bid bond for this project? ☐ Yes ☐ No

11. What is your approximate total bonding capacity?

- ☐ \$500,000 to \$2,000,000
- ☐ \$2,000,000 to \$5,000,000
- ☐ \$5,000,000 to \$10,000,000
- ☐ \$10,000,000 or more

12. Describe the permanent safety program you maintain within your organization. Use attachment if necessary.

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13. Furnish the following information with respect to an accredited banking institution familiar with your organization.

Name of Bank \_\_\_\_\_

Address \_\_\_\_\_

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Account Manager \_\_\_\_\_

Telephone \_\_\_\_\_

I hereby certify that the information submitted herewith, including any attachment is true to the best of my knowledge and belief.

By: \_\_\_\_\_

Title: \_\_\_\_\_

Dated: \_\_\_\_\_

**SCHEDULE A**

| <b>Name, Location and<br/>Description of Project</b> | <b>Owner</b> | <b>Design<br/>Engineer</b> | <b>Date<br/>Completed</b> | <b>Reference/Contract<br/>Include Address and Phone</b> |
|------------------------------------------------------|--------------|----------------------------|---------------------------|---------------------------------------------------------|
|                                                      |              |                            |                           |                                                         |

**SCHEDULE B**

| <b>Name, Location<br/>and Description<br/>of Project</b> | <b>Owner</b> | <b>Design<br/>Engineer</b> | <b>Date<br/>Completed</b> | <b>Contract<br/>Price</b> | <b>Amount<br/>Completed</b> | <b>Date of<br/>Scheduled<br/>Completion</b> | <b>Reference/Contract<br/>Include Address and<br/>Phone</b> |
|----------------------------------------------------------|--------------|----------------------------|---------------------------|---------------------------|-----------------------------|---------------------------------------------|-------------------------------------------------------------|
|                                                          |              |                            |                           |                           |                             |                                             |                                                             |

**SCHEDULE C - PERSONNEL**

| Name | Position | Date started in this organization | Date started in construction | Prior positions and experience in construction |
|------|----------|-----------------------------------|------------------------------|------------------------------------------------|
|      |          |                                   |                              |                                                |

**CITY OF KELLER**  
**ACKNOWLEDGEMENT OF INSURANCE REQUIREMENTS**

I acknowledge that by submitting a bid for this project, I am aware of the insurance requirements outlined in these specifications. If I am awarded the bid, I will comply with all insurance requirements within 10 working days of the bid award, including providing proof that I have insurance which may include, but not be limited to, true and accurate copies of the policies. If I fail to forward all insurance requirements within the 10 working days of the award of the bid, I understand my bid bond will be forfeited.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed name

Name of Company: \_\_\_\_\_

Address of Company: \_\_\_\_\_

City, State & Zip: \_\_\_\_\_

Telephone Number: (    ) \_\_\_\_\_ Date: \_\_\_\_\_

**\*\*THIS PAGE MUST BE COMPLETED OR BID WILL BE REJECTED\*\***

# SAMPLE FORM

## CERTIFICATE OF INSURANCE

The Company indicated below certifies that the insurance afforded by the policies numbered and described below is in force as of the effective date on this certificate. This Certificate of Insurance does not amend or otherwise alter the Terms and Conditions of Insurance coverage contained in any policy or policies numbered and described below. This certificate shall apply to all work by subcontractors on this project.

Certificate Holder's Name and Address:

Insured Name and Address:

### DESCRIPTION SCHEDULE

| TYPE OF INSURANCE                                                                                                                                                                          | *POLICY NUMBER AND<br>ISSUING COMPANY | POLICY<br>EFFECT<br>DATE | POLICY<br>EXPIRE<br>DATE | LIMITS OF LIABILITY<br>(Stated in Thousands)                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>GENERAL LIABILITY</b><br>■ Premises-Operations<br>■ Products-Completed Operations<br>■ Personal and Advertising Injury<br>■ Medical Expense<br>■ Fire Damage Legal<br>■ Other Liability |                                       |                          |                          | General-<br>aggregate-<br>Pr. Comp. Op. Agg.-<br>Each Occurrence-<br>Any One Person<br>or Organization-<br>Any One Person-<br>Any One Fire-                       |
| <b>AUTOMOBILE LIABILITY</b><br>■ Comprehensive Form<br>■ Owned<br>■ Hired<br>■ Non-Owned                                                                                                   |                                       |                          |                          | <b>OCCURRENCE</b><br>Bodily Injury<br>(Each Person)-<br>Bodily Injury<br>(Each Accident)-<br>Property Damage<br>Bodily Injury and<br>Property Damage<br>Combined- |
| <b>EXCESS LIABILITY</b><br>■ Umbrella Form                                                                                                                                                 |                                       |                          |                          | Bodily Injury and<br>Property Damage<br>Combined:<br>Occurrence-<br>Aggregate-                                                                                    |
| ■ Worker's Compensation<br><br>and<br><br>■ Employer's Liability                                                                                                                           |                                       |                          |                          | <b>STATUTORY LIMITS</b>                                                                                                                                           |

Insurance in force for hazards indicated by X.  
Number

\*NOTE: Name/Address/Contact Person/Phone

Description of Operations/Project/Locations  
Vehicles/Restrictions/Special Items

Producer: Name/Address/Phone Number

Should any of the described policies be canceled before the expiration date, the insurance company will mail thirty(30) days written notice to the above named certificate holder.

Date Certificate Issued: \_\_\_\_\_

Authorized Representative \_\_\_\_\_

\_\_\_\_\_

# CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor or other person doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 1491, 80th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code by a person who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the person meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the person becomes aware of facts that require the statement to be filed. See Section 176.006, Local Government Code.

A person commits an offense if the person knowingly violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor.

## OFFICE USE ONLY

Date Received

**1** Name of person who has a business relationship with local governmental entity.

**2** ☐ Check this box if you are filing an update to a previously filed questionnaire.

(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date the originally filed questionnaire becomes incomplete or inaccurate.)

**3** Name of local government officer with whom filer has employment or business relationship.

\_\_\_\_\_  
Name of Officer

This section (item 3 including subparts A, B, C & D) must be completed for each officer with whom the filer has an employment or other business relationship as defined by Section 176.001(1-a), Local Government Code. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer named in this section receiving or likely to receive taxable income, other than investment income, from the filer of the questionnaire?

☐ Yes ☐ No

B. Is the filer of the questionnaire receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer named in this section AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

C. Is the filer of this questionnaire employed by a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership of 10 percent or more?

☐ Yes ☐ No

D. Describe each employment or business relationship with the local government officer named in this section.

**4**

\_\_\_\_\_  
Signature of person doing business with the governmental entity

\_\_\_\_\_  
Date

# LOCAL GOVERNMENT OFFICER CONFLICTS DISCLOSURE STATEMENT

FORM CIS

(Instructions for completing and filing this form are provided on the next page.)

This questionnaire reflects changes made to the law by H.B. 1491, 80th Leg., Regular Session.

This is the notice to the appropriate local governmental entity that the following local government officer has become aware of facts that require the officer to file this statement in accordance with Chapter 176, Local Government Code.

## OFFICE USE ONLY

Date Received

1 Name of Local Government Officer

2 Office Held

3 Name of person described by Sections 176.002(a) and 176.003(a), Local Government Code

4 Description of the nature and extent of employment or other business relationship with person named in item 3

5 List gifts accepted by the local government officer and any family member, excluding gifts described by Section 176.003(a-1), if aggregate value of the gifts accepted from person named in item 3 exceed \$250 during the 12-month period described by Section 176.003(a)(2)(B)

Date Gift Accepted \_\_\_\_\_ Description of Gift \_\_\_\_\_

Date Gift Accepted \_\_\_\_\_ Description of Gift \_\_\_\_\_

Date Gift Accepted \_\_\_\_\_ Description of Gift \_\_\_\_\_

(attach additional forms as necessary)

## 6 AFFIDAVIT

I swear under penalty of perjury that the above statement is true and correct. I acknowledge that the disclosure applies to a family member (as defined by Section 176.001(2), Local Government Code) of this local government officer. I also acknowledge that this statement covers the 12-month period described by Section 176.003(a), Local Government Code.

\_\_\_\_\_  
Signature of Local Government Officer

AFFIX NOTARY STAMP / SEAL ABOVE

Sworn to and subscribed before me, by the said \_\_\_\_\_, this the \_\_\_\_\_ day  
of \_\_\_\_\_, 20 \_\_\_\_\_, to certify which, witness my hand and seal of office.

\_\_\_\_\_  
Signature of officer administering oath

\_\_\_\_\_  
Printed name of officer administering oath

\_\_\_\_\_  
Title of officer administering oath

## **LOCAL GOVERNMENT OFFICER CONFLICTS DISCLOSURE STATEMENT**

Section 176.003 of the Local Government Code requires certain local government officers to file this form. A "local government officer" is defined as a member of the governing body of a local governmental entity; a director, superintendent, administrator, president, or other person designated as the executive officer of the local governmental entity; or an employee of a local governmental entity with respect to whom the local governmental entity has, in accordance with Section 176.005, extended the requirements of Sections 176.003 and 176.004. This form is required to be filed with the records administrator of the local governmental entity not later than 5 p.m. on the seventh business day after the date on which the officer becomes aware of the facts that require the filing of this statement.

A local government officer commits an offense if the officer knowingly violates Section 176.003, Local Government Code. An offense under this section is a Class C misdemeanor.

Please refer to chapter 176 of the Local Government Code for detailed information regarding the requirement to file this form.

### **INSTRUCTIONS FOR COMPLETING THIS FORM**

*The following numbers correspond to the numbered boxes on the other side.*

- 1. Name of Local Government Officer.** Enter the name of the local government officer filing this statement.
- 2. Office Held.** Enter the name of the office held by the local government officer filing this statement.
- 3. Name of person described by Sections 176.002(a) and 176.003(a), Local Government Code.** Enter the name of the person described by Section 176.002, Local Government Code with whom the officer has an employment or other business relationship as described by Section 176.003(a), Local Government Code.
- 4. Description of the nature and extent of employment or business relationship with person named in item 3.** Describe the nature and extent of the employment or other business relationship with the person in item 3 as described by Section 176.003(a), Local Government Code.
- 5. List gifts accepted, excluding gifts described by Section 176.003(a-1), if aggregate value of the gifts accepted from person named in item 3 exceed \$250.** List gifts accepted during the 12-month period (described by Section 176.003(a), Local Government Code) by the local government officer or family member of the officer, excluding gifts described by Section 176.003(a-1), from the person named in item 3 that in the aggregate exceed \$250 in value.
- 6. Affidavit.** Signature of local government officer.

## **LOCAL GOVERNMENT OFFICER CONFLICTS DISCLOSURE STATEMENT**

Section 176.003 of the Local Government Code requires certain local government officers to file this form. A "local government officer" is defined as a member of the governing body of a local governmental entity; a director, superintendent, administrator, president, or other person designated as the executive officer of the local governmental entity; or an employee of a local governmental entity with respect to whom the local governmental entity has, in accordance with Section 176.005, extended the requirements of Sections 176.003 and 176.004. This form is required to be filed with the records administrator of the local governmental entity not later than 5 p.m. on the seventh business day after the date on which the officer becomes aware of the facts that require the filing of this statement.

A local government officer commits an offense if the officer knowingly violates Section 176.003, Local Government Code. An offense under this section is a Class C misdemeanor.

Please refer to chapter 176 of the Local Government Code for detailed information regarding the requirement to file this form.

### **INSTRUCTIONS FOR COMPLETING THIS FORM**

*The following numbers correspond to the numbered boxes on the other side.*

- 1. Name of Local Government Officer.** Enter the name of the local government officer filing this statement.
- 2. Office Held.** Enter the name of the office held by the local government officer filing this statement.
- 3. Name of person described by Sections 176.002(a) and 176.003(a), Local Government Code.** Enter the name of the person described by Section 176.002, Local Government Code with whom the officer has an employment or other business relationship as described by Section 176.003(a), Local Government Code.
- 4. Description of the nature and extent of employment or business relationship with person named in item 3.** Describe the nature and extent of the employment or other business relationship with the person in item 3 as described by Section 176.003(a), Local Government Code.
- 5. List gifts accepted, excluding gifts described by Section 176.003(a-1), if aggregate value of the gifts accepted from person named in item 3 exceed \$250.** List gifts accepted during the 12-month period (described by Section 176.003(a), Local Government Code) by the local government officer or family member of the officer, excluding gifts described by Section 176.003(a-1), from the person named in item 3 that in the aggregate exceed \$250 in value.
- 6. Affidavit.** Signature of local government officer.

**Form TCG 2270**  
**VERIFICATION REQUIRED BY TEXAS GOVERNMENT CODE CHAPTER 2279**

By signing below, Company hereby verifies the following:

1. Company does not boycott Israel; and
2. Company will not boycott Israel during the term of the contract.

**SIGNED BY:** \_\_\_\_\_

**Print Name of Person:** \_\_\_\_\_  
**Signing, Title, and**  
**Company** \_\_\_\_\_

**Date signed:** \_\_\_\_\_

STATE OF TEXAS           §  
COUNTY OF \_\_\_\_\_ §

BEFORE ME, the undersigned Notary Public on this day personally appeared \_\_\_\_\_(Name), on behalf of \_\_\_\_\_ (Company) who being duly sworn, stated under oath that he/she has read the foregoing verification required by Texas Government Code Section 2270.002 and said statements contained therein are true and correct..

SWORN AND SUBSCRIBED TO before me, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
NOTARY OF PUBLIC,  
FOR THE STATE OF TEXAS

My Commission Expires:  
\_\_\_\_\_

Government Code § 2270.002. Provision Required in Contract  
Effective: September 1, 2017

A governmental entity may not enter into a contract with a company for goods or services unless the contract contains a written verification from the company that it:

- (1) does not boycott Israel; and
- (2) will not boycott Israel during the term of the contract.

**The following definitions apply:**

(1) "Boycott Israel" means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes.

(2) "Company" means a for-profit sole proprietorship, organization, association, corporation, partnership, joint venture, limited partnership, limited liability partnership, or limited liability company, including a wholly owned subsidiary, majority-owned subsidiary, parent company, or affiliate of those entities or business associations that exists to make a profit.

(3) "Governmental entity" means a state agency or political subdivision of this state.

**State law requires verification from a Company for contracts involving goods or services (regardless of the amount) before the City can enter into the contract.**

**Contract identifier:** \_\_\_\_\_  
**Department:** \_\_\_\_\_

**FOR DISADVANTAGED BUSINESS ENTERPRISES ONLY**

**Disadvantaged Business Enterprises (DEB)** are encouraged to participate in the City of Keller BID process. The City of Keller will provide additional clarification of specifications, assistance with BID Proposal Forms, and further explanation of bidding procedures to those DBEs who request it.

Representatives from DBE companies should identify themselves as such and submit a copy of the Certification.

The City recognizes the certifications of both the State of Texas Building and Procurement Commission HUB Program and the North Central Texas Regional Certification Agency. All companies seeking information concerning DBE certification are urged to contact:

State of Texas HUB Program  
Texas Building & Procurement Commission  
P O Box 13047  
Austin, TX 78711-3047  
(512) 463-5872

OR

North Central Texas Regional  
Certification Agency  
616 Six Flags Drive, #416-LB24  
Arlington, TX 76011  
(817) 640-0606

If your company is already certified, attach a copy of your certification to this form and return with BID.

COMPANY NAME: \_\_\_\_\_

REPRESENTATIVE: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY, STATE, ZIP: \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_ FAX NO. \_\_\_\_\_

INDICATE ALL THAT APPLY:

\_\_\_\_\_ Minority-Owned Business Enterprise  
\_\_\_\_\_ Women-Owned Business Enterprise  
\_\_\_\_\_ Disadvantaged Business Enterprise

## VENDOR COMPLIANCE TO STATE LAW

The 1985 Session of the Texas Legislature passed House Bill 620 relative to the award of contracts to non-resident bidders. This law provides that, in order to be awarded a contract as low bidder, non-resident bidders (out-of-state contractors whose corporate offices or principal place of business are outside of the state of Texas) bid projects for construction, improvements, supplies or services in Texas at an amount lower than the lowest Texas resident bidder by the same amount that a Texas resident bidder would be required to underbid a non-resident bidder in order to obtain a comparable contract in the state in which the non-resident's principal place of business is located. The appropriate blanks in Section A must be filled out by all out-of-state or non-resident contractors to do so will automatically disqualify that bidder. Resident bidders must check the blank in Section B.

- A. Non-resident vendors in \_\_\_\_\_ (give state), our principal place of business, are required to be \_\_\_\_\_ percent lower than resident bidders by state law. A copy of the statute is attached.
- B. \_\_\_\_\_ Our Principal place of business or corporate offices are in the State of Texas.

### BIDDER:

\_\_\_\_\_  
By: \_\_\_\_\_

\_\_\_\_\_  
Signature: \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_  
Title: \_\_\_\_\_

City                      State                      Zip

**THIS FORM MUST BE RETURNED WITH YOUR BID**

## CONTRACTOR COMPLIANCE TO TEXAS SALES TAX CODE

Comply with all requirements of the Texas Sales Tax Code. The Contractor hereby certifies that the Contract Amount is divided as follows:

Material incorporated into the Project  
(Resold to the Owner as defined in Tax Code) \$ \_\_\_\_\_

All other charges and costs \$ \_\_\_\_\_

Total \* \$ \_\_\_\_\_

\* The total must equal the total amount of the Contract:

CONTRACTOR:

\_\_\_\_\_

By: \_\_\_\_\_  
(signature of authorized person)

Address \_\_\_\_\_

Signature: \_\_\_\_\_

City State Zip

Title: \_\_\_\_\_

**THIS FORM MUST BE RETURNED WITH YOUR BID**

**Contractor BMP Adherence Agreement**

*I hereby certify that I have received and read the MS4 Standard Operating Procedures (SOPs) provided by the City of \_\_\_\_\_ and understand all requirements relating to the City's Best Management Practices (BMPs) as outlined in the Stormwater Master Plan (SWMP). I agree to conduct my work in a manner that complies with all pollution prevention and good housekeeping BMPs as appropriate. The City of \_\_\_\_\_ reserves the right to request proof of adherence to the aforementioned BMPs and to take appropriate actions of enforcement until sufficient proof is furnished.*

*Project Title: (City lists project title)*

*BMPs/SOPs Provided: (City lists BMPs/SOPs)*

\_\_\_\_\_  
*(Contractor Signature)*

\_\_\_\_\_  
*(Date)*

\_\_\_\_\_  
*(Printed Name)*

\_\_\_\_\_  
*(City Staff initials)*

\_\_\_\_\_  
*(Date Received)*

**SECTION 00 43 13**  
**BID BOND FORM**

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, \_\_\_\_\_ as Principal, hereinafter called the Principal, a corporation duly organized under the laws of the State of \_\_\_\_\_, and duly authorized to transact business in the state of Texas, as Surety, \_\_\_\_\_, hereinafter called the Surety, are held and firmly bound unto the Owner, hereinafter called Owner, in the sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_) for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid for 2024 Annual Street Maintenance.

NOW, THEREFORE, if the Owner shall accept the Bid of the Principal and the Principal shall enter into a Contract with the Owner in accordance with the terms of such Bid, and give such Bond or Bonds as may be specified in the Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such Bond or Bonds, if the Principal shall pay to the Owner the difference not-to-exceed the penalty hereof between the amount specified in said Bid and such larger amount for which the Owner may in good faith contract with another party to perform the Work covered by said Bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Principal)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Surety)

\_\_\_\_\_  
(Title)

**SECTION 00 43 45**  
**LEGAL STATUS OF BIDDER**

This Proposal is submitted in the name of:

(Print) \_\_\_\_\_

The undersigned hereby designates below his business address to which all notices, directions or other communications may be served or mailed:

Street \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip Code \_\_\_\_\_

The undersigned hereby declares that he has legal status checked below:

☐ ( ) SOLE PROPRIETOR

☐ ( ) SOLE PROPRIETOR DOING BUSINESS UNDER AN ASSUMED NAME

☐ ( ) CO-PARTNERSHIP

The Assumed Name of the Co-Partnership is registered in the County of \_\_\_\_\_, Texas

☐ ( ) CORPORATION INCORPORATORS UNDER THE LAWS OF THE STATE OF  
\_\_\_\_\_. The Corporation is

☐ ( ) AUTHORIZED TO CONDUCT BUSINESS IN THE STATE OF TEXAS

☐ ( ) NOT NOW AUTHORIZED TO CONDUCT BUSINESS IN THE STATE OF TEXAS

☐ ( ) POSSES ALL REQUIRED LICENSES FOR THE WORK BEING BID

☐ ( ) LIMITED LIABILITY

The name, title, and home address of all persons who are officers or partners in the organization are as follows:

NAME AND TITLE

HOME ADDRESS

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signed this \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
By (Signature)

\_\_\_\_\_  
Printed Name of Signer

\_\_\_\_\_  
Title

**SECTION 00 51 00  
NOTICE OF AWARD**

Attention: \_\_\_\_\_

Date: \_\_\_\_\_

Project: 2024 Annual Street Maintenance

Project Number: 502408

Pursuant to the provisions of Article 1.11 of the Instructions to Bidders, you are hereby notified that the \_\_\_\_\_ (Owner) during a \_\_\_\_\_ Meeting held on \_\_\_\_\_, 20\_\_\_\_ has directed the acceptance of your Bid for the above referenced Project in the amount of \_\_\_\_\_ Dollars

Dollars (\$\_\_\_\_\_).

This Project consists of: Rehabilitation of residential and collector asphalt streets with limited concrete and utility work.

as delineated in your Bid submitted to City of Keller on April 30, 2025.

Please comply with the following conditions within 15 days of the date of this Notice of Award; that is by \_\_\_\_\_, 20\_\_\_\_\_.

1. Deliver to Owner \_\_\_\_\_ (\_\_\_\_\_) fully executed counterparts of the Agreement including all the Contract Documents.
2. Deliver with the executed Agreement the Contract Security (Bonds), on the form included in the Contract Documents, as specified in the General Conditions (Article 5).
3. Deliver with the executed Agreement the Insurance Certificates (and other evidence of insurance) as specified in the General Conditions (Article 5).
4. Please do not date Agreement and Contract Security (Bonds), as these will be dated by the Owner when executed by them.

It is important to comply with these conditions and time limits as failure to comply with these conditions within the time specified will entitle Owner to consider your bid abandoned, to annul this Notice of Award and to declare your Bid Security forfeited.

Within ten (10) days after you comply with those conditions, Owner will return to you two (2) fully signed counterparts of the Agreement with the Contract Documents attached.

In accordance with paragraph 2.05 of the General Conditions, please submit to Engineer the required schedules prior to the scheduling of a Pre-Construction Meeting.

Owner: \_\_\_\_\_

Authorized Signature: \_\_\_\_\_

**Copy to Wade Trim, Inc.**

**SECTION 00 52 00  
AGREEMENT**

STATE OF TEXAS

COUNTY OF TARRANT

This Agreement, made and entered into this \_\_\_\_\_ day of \_\_\_\_\_ in the year 20\_\_\_\_, by and between the City of Keller of the County of Tarrant and the State of Texas, hereinafter called OWNER, and \_\_\_\_\_ hereinafter called CONTRACTOR, in consideration of the mutual covenants hereinafter sent forth, agree as follows:

**ARTICLE 1. WORK**

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: 2024 Annual Street Maintenance Project, Keller, TX

**ARTICLE 2. CONTRACT TIME**

2.1 The Work will be substantially completed on or before \_\_\_\_\_, 20\_\_\_\_, and completed and ready for final payment in accordance with the General Conditions on or before \_\_\_\_\_, 20\_\_\_\_.

2.2 The Work will be substantially completed within \_\_\_\_\_ calendar days after the date when the Contract Time commences to run as provided in the General Conditions and completed and ready for final payment in accordance with the General Conditions within \_\_\_\_\_ calendar days after the date when the Contract Time commences to run.

2.3 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not Substantially Complete within the time specified in paragraph 2.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by OWNER if the Work is not Substantially Complete on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as penalty) CONTRACTOR shall pay OWNER One Thousand Dollars (\$1000) for each day that expires after the time specified in paragraph 2.1 for Substantial Completion until the Work is Substantially Complete. Liquidated damages charged shall be deducted from the CONTRACTOR's progress payment.

**ARTICLE 3. CONTRACT PRICE**

3.1 OWNER shall pay CONTRACTOR as provided in the attached Proposal for performance of the Work in accordance with the Contract Documents.

**ARTICLE 4. PAYMENT PROCEDURES**

Progress payments and retainage under this Contract are governed by the provisions of Chapter 2253 of the Texas Government Code. This provision is incorporated herein by reference and made a part of this Contract. Without excluding any parts of this provision from this Contract, but in order to comply therewith and summarize certain provisions, the following shall apply:

4.1 The person representing the CONTRACTOR who will submit written requests for progress payments shall be: \_\_\_\_\_

4.2 The person representing the OWNER to whom requests for progress payments are to be submitted shall be: Rick Hardcopf, PE

4.3 The CONTRACTOR's representative, listed above, shall submit Applications for Payment on the form provided in the Contract Documents in accordance with the General Conditions. Applications for Payment will be processed as provided in the General Conditions.

## **ARTICLE 5. CONTRACTOR'S REPRESENTATIONS**

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

5.1 CONTRACTOR has considered the nature and extent of the Contract Documents, Work, locality, and all local conditions and federal, state and local laws, and regulations that may affect cost, progress, performance, or furnishing of the Work.

5.2 CONTRACTOR has studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which were relied upon in the preparation of the Plans and Specifications, and which have been identified in the Supplementary Conditions.

5.3 CONTRACTOR has made or caused to be made examinations, investigations and tests and studies of such reports and related data in addition to those referred to in paragraph 5.2 as he deems necessary for the performance of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are or will be required by CONTRACTOR for such purposes.

5.4 CONTRACTOR has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.

5.5 CONTRACTOR has given ENGINEER written notice of all conflicts, errors, or discrepancies that he has discovered in the Contract documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

## **ARTICLE 6. CONTRACT DOCUMENTS**

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

- 6.1 Procurement Requirements (including the Advertisement for Bids, Instructions to Bidders, Supplementary Instructions to Bidders, Proposal, Legal Status of Bidder, and other documents listed in the Sec 00 2113, 1.04 A. (f) and Table of Contents thereof).
- 6.2 This Agreement
- 6.3 Performance and other Bonds
- 6.4 Notice of Award
- 6.5 Notice to Proceed (if issued)
- 6.6 Conditions of the Contract (including General Conditions and Supplementary Conditions, if any)
- 6.7 Modifications to the Standard Specifications contained in Section 00 91 13, Standard Specification Section Revisions.

- 6.8 Specifications contained within Division 01 through 49 of the Project Manual dated April 2025.
- 6.9 Plans consisting of sheets numbered 1 through 96 inclusive with each sheet bearing the following general title: 2024 Annual Street Maintenance Project, Keller TX
- 6.10 Addenda numbers \_\_\_\_ to \_\_\_\_, inclusive
- 6.11 Documentation submitted by CONTRACTOR prior to Notice of Award
- 6.12 Any Modification, including Change Orders, duly delivered after execution of Agreement.

#### **ARTICLE 7. MISCELLANEOUS**

7.1 Terms used in this Agreement which are defined in the General Conditions shall have the meanings indicated in the General Conditions.

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

7.3 OWNER and CONTRACTOR each binds himself, his partners, successors, assigns and legal representatives to the other party hereto, his partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

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

#### **ARTICLE 8. OTHER PROVISIONS**

(Insert other provisions, if applicable)

IN WITNESS WHEREOF, the parties hereto have signed this Agreement in five (5) counterparts. Two (2) counterparts each have been delivered to OWNER and CONTRACTOR, one counterpart has been delivered to the ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR.

This Agreement will be effective on \_\_\_\_\_, 20\_\_\_\_.

OWNER: City of Keller, Texas

CONTRACTOR: \_\_\_\_\_

By \_\_\_\_\_  
Print Name

By \_\_\_\_\_  
Print Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

Owner Attest:

Contractor Attest:

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

Seal



Seal



**SECTION 00 61 12  
PERFORMANCE BOND**

Bond No. \_\_\_\_\_

KNOW ALL BY THESE PRESENT, That

we, \_\_\_\_\_, a  
corporation organized and existing under the laws of the State of, and duly authorized to transact  
business in the State of Texas, hereinafter called the "Principal,"  
and \_\_\_\_\_, a corporation organized and existing under the  
laws of the State of Texas, and duly authorized to transact business in the State of Texas, as Surety,  
hereinafter called "Surety", are held and firmly bound unto \_\_\_\_\_, as  
Obligee, and hereinafter called "Obligee," in the just and full sum  
of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) lawful money of the United States of  
America, to be paid to the said Obligee, to which payment well and truly to be made, we bind ourselves,  
our heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these  
presents.

THE CONDITIONS OF THIS OBLIGATION is such that, WHEREAS, the above Principal has entered into a  
contract with the said Obligee, dated the day of \_\_\_\_\_, 20\_\_\_\_, for \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Herein referred to and made a part hereof as fully and to the same extent as if the same were entirely  
written herein, and

WHEREAS, it was one of the conditions of the award of the said Obligee, pursuant to which said contract  
was entered into, that these presents should be executed.

AND THE SAID SURETY, for value received, hereby stipulates and agrees that no change, extension of  
time, or any other forbearance, alteration or addition to the terms of the contract or to the work to be  
performed thereunder or the Contract Documents accompanying the same shall in anywise affect its  
obligations on this bond, and it does hereby waive notice of any such change, extension of time, or any  
other forbearance, alteration or addition to the terms of the contract or to the Work or to the Contract  
Documents.

NOW, THEREFORE, if the above Principal shall in all respects comply with the terms and conditions of  
said contract, and his (their or its) obligations thereunder, including the Contract Documents therein

referred to and made a part thereof, and such alteration as may be made in such contract or Contract Documents, as herein or therein provided for, then this obligation shall be void; otherwise, this bond and obligation shall be and remain in full force and effect.

Signed and sealed this day of \_\_\_\_\_, 20\_\_\_\_.

Signed, sealed and delivered in the presence of:

Witness for Contractor: \_\_\_\_\_

\_\_\_\_\_ (Principal)

\_\_\_\_\_ (Title)

By: \_\_\_\_\_

Witness for Surety: \_\_\_\_\_

\_\_\_\_\_ (Surety)

\_\_\_\_\_ (Title)

By: \_\_\_\_\_

\_\_\_\_\_ (Attorney-in-Fact)

Seal

Address of Surety: \_\_\_\_\_

Telephone: \_\_\_\_\_

**SECTION 01 61 14**  
**PAYMENT BOND**

That we, \_\_\_\_\_, known as "Principal" herein, and \_\_\_\_\_, a corporate surety (sureties), duly authorized to do business in the State of Texas, known as "Surety" herein (whether one or more), are held and firmly bound unto the City of Keller, a municipal corporation created pursuant to the laws of the State of Texas, known as "City" herein, in the penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), lawful money of the United States, to be paid in City of Keller, Tarrant County, Texas, for the payment of which sum well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents:

**WHEREAS**, Principal has entered into a certain written Contract with City, awarded the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, which Contract is hereby referred to and made a part hereof for all purposes as if fully set forth herein, to furnish all materials, equipment, labor and other accessories as defined by law, in the prosecution of the Work as provided for in said Contract and designated as

2024 Annual Street Maintenance Project.

**NOW, THEREFORE**, THE CONDITION OF THIS OBLIGATION is such that if Principal shall pay all monies owing to any (and all) payment bond beneficiary (as defined in Chapter 2253 of the Texas Government Code, as amended) in the prosecution of the Work under the Contract, then this obligation shall be and become null and void; otherwise, to remain in full force and effect.

This bond is made and executed in compliance with the provisions of Chapter 2253 of the Texas Government Code, as amended, and all liabilities on this bond shall be determined in accordance with the provisions of said statute.

**IN WITNESS WHEREOF**, the Principal and Surety have each SIGNED and SEALED this instrument by duly authorized agents and officers on this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

PRINCIPAL:

\_\_\_\_\_  
\_\_\_\_\_

ATTEST:

BY: \_\_\_\_\_  
Signature

\_\_\_\_\_  
(Principal) Secretary

\_\_\_\_\_  
Name and Title

Address: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Witness as to Principal

SURETY:

\_\_\_\_\_  
\_\_\_\_\_

ATTEST:

BY: \_\_\_\_\_  
Signature

\_\_\_\_\_  
(Surety) Secretary

\_\_\_\_\_  
Name and Title

Address: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Witness as to Surety

Telephone Number: \_\_\_\_\_

Note: If signed by an officer of the Surety, there must be on file a certified extract from the bylaws showing that this person has authority to sign such obligation. If Surety's physical address is different from its mailing address, both must be provided.

The date of the bond shall not be prior to the date the Contract is awarded.

**END OF SECTION**



CITY OF KELLER, TEXAS

CONTRACTOR'S MAINTENANCE BOND

STATE OF \_\_\_\_\_|

KNOW ALL MEN BY THESE PRESENTS

COUNTY OF \_\_\_\_\_|

That \_\_\_\_\_ as principal, and  
(Name of Contractor)

\_\_\_\_\_, a corporation organized under the laws  
(Name of Surety)

of \_\_\_\_\_ as Sureties do hereby expressly acknowledge themselves to be held and bound to pay  
unto the CITY OF KELLER, TEXAS, a municipal corporation, the sum of

\_\_\_\_\_ Dollars (\$\_\_\_\_\_) for payment of which  
(One Hundred (100%) of Total Contract Price)

sum will truly be made unto said CITY OF KELLER, TEXAS, and its successors, said principal and  
sureties do hereby bind themselves, their assigns, and successors jointly and severally.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a  
certain contract with \_\_\_\_\_ dated the \_\_\_\_\_ day of \_\_\_\_\_, A.D.  
2023, a copy of which is hereto attached and made apart hereof for the installation of sanitary sewer  
systems, water systems, storm drainage systems and streets of the CITY OF KELLER to serve the \_\_\_\_\_  
\_\_\_\_\_ Addition, Block (s) \_\_\_\_\_, Lot(s) \_\_\_\_\_ to  
the City of Keller and,

WHEREAS, said Contract was entered into pursuant to the requirements of the City of Keller and,

WHEREAS, in said Contract, Contractor binds itself to use of materials and methods of  
construction such that improvements will be initially complete free of perceptible defects and will remain  
in good repair and condition and free of perceptible defects for and during the period of TWO (2) YEARS  
after the date of acceptance of the completed improvements by the City; and,

WHEREAS, said Contract binds itself to construct said improvements in such manner and obtain  
inspection approvals in proper sequence as are required to obtain acceptance by the City and to repair  
or reconstruct the said improvements in whole or in part at any time within said TWO (2) YEARS period  
to such extent as the City deems necessary to properly correct all defects except those which have been  
caused by circumstances and conditions occurring after the time of construction over which the  
Contractor had no control which are other than those arising from defect of construction by the  
Contractor; and,

WHEREAS, after acceptance of the improvements by the City, said Contractor binds itself, upon receiving notice from the City of the need therefore to repair or reconstruct said improvements and if the Contractor fails to make the necessary corrections the City of Keller may do and have done all said corrective work and shall have recovery hereon for all expenses thereby incurred.

NOW THEREFORE, if said Contractor shall keep and perform its said agreement to maintain, repair or reconstruct said improvements for a period of TWO (2) YEARS, as provided, then these presents shall be null and void, and have no further effect. Otherwise, this Bond shall be and remain in full force and effect, said City shall have and recover from the said Contractor and its Surety damages in the premises as prescribed by said Contract. This obligation shall be a continuing one and successive recoveries may be had hereon for successive breaches until the full amount hereof is exhausted.

IN WITNESS WHEREOF, the said \_\_\_\_\_ HAS CAUSED  
(Name of Contractor)

THESE PRESENTS TO BE EXECUTED BY \_\_\_\_\_ and the  
(Contractors Authorized Signature)

said \_\_\_\_\_ has caused these presents to be executed by its  
(Surety)

\_\_\_\_\_ has hereunto set his hand this the \_\_\_\_\_ day  
(Attorney-in-fact) or (Official)

of \_\_\_\_\_, A.D., 202\_\_\_\_,

\_\_\_\_\_  
SURETY

By: \_\_\_\_\_

Title \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

Phone \_\_\_\_\_

\_\_\_\_\_  
PRINCIPAL

By: \_\_\_\_\_

Title \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

Phone \_\_\_\_\_

The name and address of the Resident Agent of Surety is:

\_\_\_\_\_

\_\_\_\_\_ Phone \_\_\_\_\_

**SECTION 00 63 25**  
**SUBSTITUTION REQUEST FORM**

Specification Section: \_\_\_\_\_

Specified Product: \_\_\_\_\_

Proposed Substitution: \_\_\_\_\_

Does specified product exceed, in any respect proposed substitution? \_\_\_Y \_\_\_N

Does substitution affect dimensions shown on Plans? \_\_\_Y \_\_\_N

Does substitution affect other trades more than original product? \_\_\_Y \_\_\_N

Does warranty differ from that specified? \_\_\_Y \_\_\_N

Does substitution affect cost to Owner? \_\_\_Y \_\_\_N

Does substitution result in any license fee or royalty? \_\_\_Y \_\_\_N

If you indicated "Yes" to any of the items above, attach thorough explanation on your Company letterhead, as follows:

1. Explain any differences between proposed substitution and specified product.
2. Summarize experience with product and manufacturer in Project area.
3. Attach complete technical data and literature.

The undersigned states that the function, appearance, and quality of the proposed substitution is equivalent or superior to the specified item, and that all information above and attached is true and correct.

Submitted By: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Position: \_\_\_\_\_ Company: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Email: \_\_\_\_\_

## SECTION 00 63 70 CHANGE PROPOSAL FORM

Project: \_\_\_\_\_ Date: \_\_\_\_\_

Contractor: \_\_\_\_\_

Owner: \_\_\_\_\_

This Change Proposal is submitted in accordance with Paragraph 10.06 of Section 00 72 00. If this Change Proposal is accepted, either in whole or in part, a Change Order will be issued to modify the Contract Documents accordingly.

| Detailed Description of Proposed Change                                 |                                                                                                                            |
|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|                                                                         |                                                                                                                            |
| Attachments (List documents attached supporting requested change)       |                                                                                                                            |
|                                                                         |                                                                                                                            |
|                                                                         |                                                                                                                            |
|                                                                         |                                                                                                                            |
| Change in Contract Price                                                | Change in Contract Time                                                                                                    |
| Original Contract Price: \$ _____                                       | Original Contract Time:<br>Substantial Completion: _____<br>Final Completion: _____                                        |
| Increase or Decrease from previously approved Change Order(s): \$ _____ | Increase or Decrease from previously approved Change Order(s):<br>Substantial Completion: _____<br>Final Completion: _____ |
| Contract Price prior to this Change Proposal:<br>\$ _____               | Contract Time prior to this Change Proposal:<br>Substantial Completion: _____<br>Final Completion: _____                   |
| Increase or Decrease of this Change Proposal:<br>\$ _____               | Increase of this Change Proposal:<br>Substantial Completion: _____<br>Final Completion (days): _____                       |
| Contract Price incorporating this Change Proposal:<br>\$ _____          | Contract Time incorporating this Change Proposal:<br>Substantial Completion: _____<br>Final Completion: _____              |
| Engineer's Decision on Change Proposal                                  |                                                                                                                            |
|                                                                         |                                                                                                                            |

Engineer

By: \_\_\_\_\_

Date: \_\_\_\_\_

Owner

By: \_\_\_\_\_

Date: \_\_\_\_\_

Contractor

By: \_\_\_\_\_

Date: \_\_\_\_\_

STATE OF TEXAS  
COUNTY OF TARRANT

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That the following is a statement of each Subcontractor and Supplier and laborer, for which the payment of wages or fringe benefits and withholding is due but unpaid, with whom the (Contractor) (Subcontractor) has (contracted) (subcontracted) for performance under the contract with the Owner or lessee thereof, and that the amounts due to the persons as of the date hereof are correctly and fully set forth opposite their names, as follows:

| Name of Subcontractor/Supplier/Laborer                  | Type of Improvement Furnished | Total Contract Price | Amount Already Paid | Amount Currently Owning | Balance to Complete (optional) | Amount of Laborer Wages Due but Unpaid | Amount of Laborer Fringe Benefits and Withholdings Due But Unpaid |
|---------------------------------------------------------|-------------------------------|----------------------|---------------------|-------------------------|--------------------------------|----------------------------------------|-------------------------------------------------------------------|
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
|                                                         |                               |                      |                     |                         |                                |                                        |                                                                   |
| <b>TOTALS:</b>                                          |                               |                      |                     |                         |                                |                                        |                                                                   |
| (Some columns are not applicable to all persons listed) |                               |                      |                     |                         |                                |                                        |                                                                   |

The Contractor has not procured material from, or subcontracted with, any person other than those set forth on the reverse side and owes no money for the improvement other than the sums set forth on the reverse side.

Deponent further says that he or she makes the foregoing statement as the (Contractor) (Subcontractor) or as \_\_\_\_\_ of the (Contractor) (Subcontractor) for the purpose of representing to the Owner or lessee of the described on the reverse side premises and his or her agents that the property described on the reverse side is free from claims of construction liens, or the possibility of construction liens, except as specifically set forth on the reverse side and except for claims of construction liens by laborers which may be provided pursuant to Chapter 2253 of the Texas Government Code.

**Warning to Owner:** Owner or Lessee of the property described herein may not rely on this Sworn Statement to avoid claim of a subcontractor, supplier or laborer who has provided a Notice of Furnishing or a Laborer who may provide a Notice of Furnishing pursuant to the Designee or to the Owner or Lessee if the Designee is not named or has died.

**Warning to Deponent:** A person, who with intent to defraud, gives a false Sworn Statement, is subject to criminal penalties as provided in Chapter 2253 of the Texas Government Code.

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Notary Public: \_\_\_\_\_

\_\_\_\_\_ County, Texas

My Commission Expires: \_\_\_\_\_

#### INSTRUCTIONS

A Sworn Statement in the preceding form must be provided before any Contractor or Subcontractor can file a Complaint, Cross-Claim, or Counter-Claim to enforce a construction lien.

An Owner or lessee may withhold payment to a Contractor or Subcontractor who has not provided a Sworn Statement. Owner or lessee may withhold from a Contractor or Subcontractor who has provided a Sworn Statement the amount sufficient to pay all sums shown on the statement as owing Subcontractors, Suppliers, and laborers, or the amount shown to be due to lien claimants who have provided Notices of Furnishing pursuant to the Chapter 2253 of the Texas Government Code.

Owner or lessee may rely on a Sworn Statement to avoid a lien claim unless the lien claimant has provided the Owner or lessee with a Notice of Furnishing pursuant to the Chapter 2253 of the Texas Government Code.

If the contract provides for payments by the Owner to the Contractor, if any, in the normal course of construction, but the Owner elects to pay lien claimants directly, the first time the Owner elects to make payment directly to a lien claimant he or she shall provide at least 5 business days' notice to the Contractor of the intention to make direct payment. Subsequent direct disbursements to lien claimants need not be preceded by the 5-day notice provided in this section unless the Owner first returns to the practice of paying all sums to the Contractor.

## **SECTION 00 72 00 GENERAL CONDITIONS**

### **ARTICLE 1 DEFINITIONS**

#### **1.01 DEFINED TERMS**

- A. Wherever used in these General Conditions or in the other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural thereof:
1. Addenda -- Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the Contract Documents.
  2. Agreement -- The written Agreement 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.
  3. Bid -- The offer or proposal of the bidder submitted on the prescribed form setting forth the price(s) for the Work to be performed.
  4. Bidding Requirements -- The Advertisement for Bids, Instructions to Bidders, Supplementary Instructions to Bidders, Proposal, Legal Status of Bidder, Bid Bond, and any other documents identified in the Proposal, to be submitted with the Bid.
  5. Bonds -- Bid, Performance and Payment bonds and other instruments of security.
  6. Change Order -- A written order to Contractor, reviewed by Engineer and signed by Owner, issued after execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Price or the Contract Time. The Contract Price and Contract Time may be changed only by Change Order. A Change Order signed by Contractor indicates his agreement therewith, including that the Change Order constitutes a final adjustment in the Contract Price or Contract Time for all issues addressed or described in the Change Order.
  7. Change Proposal -- A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
  8. Claims --
    - a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.
    - b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.
    - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, arising after Engineer has issued a recommendation of final payment.
    - d. A demand for money or services by a third party is not a Claim.

9. Constituents of Concern -- Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
10. Contract -- The entire and integrated written contract between Owner and Contractor concerning the Work.
11. Contract Documents -- Those items so designated in the Agreement, and which together comprise the Contract.
12. Contract Price -- The monies or other considerations payable by Owner to Contractor for completion of acceptable Work in accordance with the Contract Documents as stated in the Agreement.
13. Contract Time -- The number of days or the date stated in the Agreement:
  - a. to achieve Substantial Completion of all or any specified portions of the Work, and;
  - b. 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 14.11.
14. Contractor -- The person, firm or corporation with whom Owner has entered into the Agreement.
15. Day -- A calendar day of 24 hours measured from midnight to the next midnight.
16. 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 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.
17. Drawings -- See Plans.
18. Effective Date of Agreement -- The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. Electronic Document -- Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
20. Electronic Means -- Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow:
  - a. the transmission or communication of Electronic Documents;
  - b. the documentation of transmissions, including sending and receipt;
  - c. printing of the transmitted Electronic Document by the recipient;
  - d. the storage and archiving of the Electronic Document by sender and recipient; and
  - e. the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.
21. Engineer -- The person, firm, or corporation identified in the Supplementary Instructions to Bidders hired by Owner to prepare Plans and Specifications for the Project and to assist Owner in interpreting Plans and Specifications during the performance of the Work. Engineer's authority and responsibility are set forth in the Contract between Owner and Engineer. Contractor acknowledges and agrees that Engineer's obligations and duties

under Engineer's contract with Owner are obligations and duties to Owner only, and Engineer has no independent obligation to Contractor of any kind, including but not limited to providing services, or to take any action or to refrain from taking action on behalf of Contractor or any Subcontractor, Sub-Subcontractor or Supplier.

22. Field Order -- A written order issued by Engineer which clarifies or interprets the Contract Documents or orders minor changes in the Work in accordance with paragraph 9.04 and paragraph 9.05 but which does not involve a change in the Contract Price or the Contract Time.
23. 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.
24. Lump Sum -- Construction Work where Owner pays a single stipulate price (Lump Sum) for the entire scope of Work; plus or minus alternates and/or allowances. However, unit prices may be required for individual items of Work for the purposes of changes, additions, or deletions.
25. Milestone -- A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of the Work.
26. 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.
27. Notice to Proceed -- A written notice given by Owner to Contractor (with a copy to Engineer) fixing the date on which the Contract Time will commence to run and on which Contractor shall start to perform his obligation under the Contract Documents.
28. Owner -- The public body or authority, corporation, limited liability company, association, partnership, or individual with whom Contractor has entered into the Agreement and for whom the Work is to be provided and as identified in the Supplementary Instructions to Bidders.
29. 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.
30. Plans -- The part of the Contract Documents which graphically show the extent, character and Scope of the Work to be furnished and performed by Contractor and which have been prepared or approved by Engineer or Owner; sometimes also referred to as Drawings.
31. Progress Schedule -- A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. Project -- The total 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.
33. Project Manual -- The volume assembled for the Project which may include, among other parts, Procurement Requirements, Contracting Requirements and Specifications.
34. Proposal -- The offer or bid of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
35. 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.
36. Schedule of Submittals -- A schedule, prepared and maintained by Contractor, of required Submittals and the time requirements for Engineer's review of the Submittals.

37. Schedule of Values -- A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
38. Shop Drawings -- All drawings, diagrams, illustrations, schedules and other data or information required by the Contract Documents which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate material or equipment for some portion of the Work.
39. Site -- Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
40. Specifications -- That part of the Contract Documents which consist of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.
  - a. Project Specifications are those portions of the Contract Documents which have been prepared specifically for this Project and which are identified by the job number in the lower right-hand corner of each page.
  - b. Standard Specifications are Specification sections that are the same from Project to Project as of the revision date shown in the lower left-hand corner of the page.
  - c. Standard Specification Section Revisions -- Section 00 9120 of the Specifications which amends or supplements the Standard Specification Sections.
41. 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.
42. Submittal -- A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
43. Substantial Completion -- The Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer as evidenced by the 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 was 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 14.11. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.
44. Supplementary Conditions -- The part of the Contract Documents which amends or supplements these General Conditions.
45. Supplementary Instructions to Bidders -- The part of the Contract Documents which amends or supplements the Instructions to Bidders.
46. Supplier -- A manufacturer, fabricator, supplier, distributor, material man, or vendor having a direct contract with Contractor, or with any Subcontractor, or with Owner, to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.

47. Unit Price -- Construction Work where Owner pays a fixed sum (Unit Price) per each completed unit of Work. Units are listed on the Proposal Form.
48. Utilities – Underground or above ground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any structures or encasements containing such facilities, which have been installed to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems, water or other liquids or chemicals.
49. Work -- The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.
50. Work Change Directive -- A written directive to Contractor, issued on or after the Effective Date of the Agreement and signed by Owner and reviewed 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 4.03 or to emergencies under paragraph 6.18. A Work Change Directive will not change the Contract Price or Contract Time 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 Time as provided in paragraph 10.01.

## **1.02 TERMINOLOGY**

- A. The following words, terms, or phrases are not defined but, when used in the Contract Documents, have the following meaning:
  1. Whenever in the Contract Documents the terms “as ordered,” “as directed,” “as required,” “as allowed,” “as approved” or terms of like effect or import are used; or the adjectives “reasonable,” “suitable,” “acceptable,” “proper” or “satisfactory” or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of Engineer as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate, in general, the completed Work for compliance with the technical requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to Engineer any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.10 or any other provision of the Contract Documents.
  2. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
  3. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
  4. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
  5. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.

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

## **ARTICLE 2 PRELIMINARY MATTERS**

### **2.01 DELIVERY OF BONDS AND INSURANCE**

- A. When the Contractor delivers the executed Agreements to Owner, Contractor shall also deliver to Owner such Bonds and Insurance Certificates and other evidence of Insurance requested as Contractor may be required to furnish in accordance with Article 5. No Work at the site may begin or progress payments made to Contractor until all Bonds and Insurance Certificates in the form and substance required in Article 5 have been submitted and approved by Owner.

### **2.02 COPIES OF DOCUMENTS**

- A. The Owner shall furnish to Contractor up to five (5) copies of the Contract Documents (including at least one fully signed counterpart of the Agreement) as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

### **2.03 COMMENCEMENT OF CONTRACT TIME; NOTICE TO PROCEED**

- A. Time is of the essence in the performance of the Work. The Contract Time will commence to run on the 30th day after the effective date of the Agreement, or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the effective date of the Agreement. In no event will the Contract Time commence to run later than the 30th day after the effective date of the Agreement. Time limits stated in the Contract Documents are of the essence of the Agreement.

### **2.04 STARTING THE PROJECT**

- A. The Contractor shall start to perform the Work within ten (10) days of when the Contract Time commences to run, but no Work shall be done at the Site prior to the date on which the Contract Time commences to run. The Contractor shall notify the Owner at least three (3) working days in advance of the time he intends to start Work.

### **2.05 PRECONSTRUCTION MEETING**

- A. Within ten (10) days of the Effective Date of the Agreement and prior to the delivery of materials or the start of any construction, Contractor shall request a Preconstruction Meeting from the Owner and the Engineer. A minimum of three (3) full working days' notice shall be required.
- B. Prior to the scheduling of the Preconstruction Meeting, Contractor shall submit to the Owner and the Engineer for review:
  - 1. A preliminary Progress Schedule indicating the starting and completion dates of the various stages of the Work, including any Milestones specified in the Contract Documents;
  - 2. A preliminary Schedule of Submittals which will list each required Submittal and the times for submitting, reviewing and processing such Submittal;
  - 3. An estimated monthly payment schedule, and a preliminary Schedule of Values for all of the Work.
- C. The Preconstruction Meeting will be held for review and acceptance of the schedules, to establish procedures for handling Shop Drawings and other Submittals, for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

### **2.06 ELECTRONIC TRANSMITTALS**

- A. Except as otherwise stated elsewhere in the Contract, Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.

- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

## **ARTICLE 3 CONTRACT DOCUMENTS INTENT AND REUSE**

### **3.01 INTENT**

- A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. The Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.
- G. Nothing in the Contract Documents creates:
  - 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
  - 2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations; or
  - 3. any obligation on the part of Engineer to Contractor.

### **3.02 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES**

- A. Reference to standards, specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, or Laws or Regulations in effect at the time of opening of Bids or, on the effective date of the Agreement if there were no Bids, except as may be otherwise specifically stated in the Contract Documents.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result shall be furnished and performed whether or not it is specifically called for.

- C. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning.
- D. No provision of any standard, specification, manual, code or instruction shall be effective to change the duties and responsibilities of Owner, Contractor or Engineer, or any of their Subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to Owner, Engineer or any of Engineer's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of paragraph 9.10 or any other provision of the Contract Documents.

### **3.03 REPORTING AND RESOLVING DISCREPANCIES**

- A. Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor has a duty to and shall promptly report in writing to the Owner and the Engineer any conflict, error, ambiguity, or discrepancy which Contractor should reasonably have discovered and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
- B. If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall report it to Engineer in writing at once, and, Contractor shall not proceed with the Work affected thereby (except in an emergency as authorized by paragraph 6.18) until receiving written instruction or clarification from Engineer or Owner. However, Contractor shall not be liable to Owner or Engineer for failure to report any such conflict, error, ambiguity or discrepancy unless Contractor knew or reasonably should have known thereof.
- C. Except as otherwise specifically stated in the Contract Documents or as may be provided by amendment or supplement issued by one of the methods indicated in paragraph 3.05, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity or discrepancy between the provisions of the Contract Documents and;
  - 1. the provisions of any standard, specification, manual, code or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
  - 2. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

### **3.04 REQUIREMENTS OF CONTRACT DOCUMENTS**

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation - RFIs) or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve
  - 1. the performance or acceptability of the Work under the Contract Documents,

2. the design (as set forth in the Drawings, Specifications, or otherwise), or
3. other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in paragraph 11.01.

### **3.05 ORDER OF PRECEDENCE**

- A. In resolving conflicts, errors or discrepancies between Plans and Specifications,
  1. figured dimensions shall govern over scaled dimensions;
  2. Plans shall govern over Standard Specifications;
  3. and Project Specifications shall govern over Standard Specifications and Plans.

### **3.06 AMENDING AND SUPPLEMENTING CONTRACT DOCUMENTS**

- A. The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:
  1. a Field Order (pursuant to paragraph 9.05), or,
  2. a Change Order (pursuant to paragraph 10.01.A.1), or
  3. a Work Change Directive Order (pursuant to paragraph 10.01.A.2)
- B. In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the following ways:
  1. a Field Order (pursuant to paragraph 9.05),
  2. Engineer's review of a Shop Drawing or Sample (pursuant to paragraph 6.21), or
  3. Engineer's written interpretation or clarification (pursuant to paragraph 9.04).

### **3.07 REUSE OF DOCUMENTS**

- A. Neither Contractor nor any Subcontractor, manufacturer, fabricator, Supplier, distributor, or other person or organization performing or furnishing any of the Work under a direct or indirect contract with Owner:
  1. shall have or acquire any title to or ownership rights in any of the Plans, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's Consultant, and
  2. they shall not reuse any of such Plans, Specification, other documents or copies on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

### **3.08 ELECTRONIC DATA**

- A. Except as otherwise stated elsewhere in the Contract Documents, Owner, Engineer and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information and graphics, including but not limited to Shop Drawings and other Submittals, in electronic media or digital format, either directly or through email or access to a secure Project website.
- B. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

## **ARTICLE 4 AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS**

### **4.01 AVAILABILITY OF LANDS**

- A. Owner shall furnish, as indicated in the Contract Documents and not later than the established date for beginning Work on the Contract, the lands upon which the Work is to be performed, rights of way and easements for access thereto, and such other lands which are designated for the use of Contractor. Owner shall identify any encumbrances or restrictions not of general application but specifically related to use of lands so furnished with which Contractor will have to comply in performing the Work. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by Owner, unless otherwise provided in the Contract Documents. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment unless otherwise provided in the Contract Documents.

### **4.02 SUBSURFACE AND PHYSICAL CONDITIONS; INVESTIGATIONS AND REPORTS**

- A. Reference is made to the Supplementary Conditions for identification of those reports of investigations and tests of subsurface and physical conditions at the Site or otherwise affecting cost, progress or performance of the Work which have been reviewed in preparation of the Contract Documents. Such reports are not guaranteed as to accuracy or completeness and are not part of the Contract Documents.
- B. The locations of utilities or other physical conditions relating to existing surface or subsurface structures at or contiguous to the Site as shown on the Plans are taken from drawings from sources believed to be reliable. Neither Owner nor Engineer will be responsible for any omissions of, or variations from, the indicated location of existing utilities which may be encountered in the Work.
- C. Contractor shall draw its own conclusions as to the general accuracy of the "technical data" contained in such reports and drawings, and confirms such reports and drawings are not Contract Documents. Contractor may not rely upon or make any Claim against Owner, Engineer or any of Engineer's Consultants with respect to:
  - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto, or
  - 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings, or
  - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such data, interpretations, opinions or information.
- D. The cost of all the following will be included in the Contract Price and Contractor shall have full responsibility for:
  - 1. reviewing and checking all such information and data,
  - 2. locating all Utilities during construction,
  - 3. coordination of the Work with the owners of such Utilities, and
  - 4. the safety and protection of all such Utilities as provided in paragraph 6.15 and repairing any damage thereto resulting from the Work.

### **4.03 UNFORESEEN PHYSICAL CONDITIONS**

- A. If Contractor discovers one or both of the following physical conditions of surface or subsurface at the Project or improvement Site, before disturbing the physical condition, Contractor shall

immediately notify Owner and Engineer of the physical condition; and follow up within 48 hours in writing:

1. A subsurface or a physical condition at the Site differing materially from those indicated in the Contract Documents, or
  2. An unknown physical condition at the Site of a nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for the improvement project.
- B. Engineer's Review. After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in paragraph 4.03.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. Owner's Statement to Contractor Regarding Site Condition. After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. Possible Price and Times Adjustments:
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
    - a. such condition must fall within any one or more of the categories described in paragraph 4.03.A;
    - b. with respect to Work that is paid for on a Unit Price basis, any adjustment in Contract Price will be subject to the provisions of paragraph 12.03; and
    - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times pursuant to paragraph 10.05.
  2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
    - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
    - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
    - c. Contractor failed to give the written notice as required by paragraph 4.03.A.
  3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order or Work Change Directive.

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

#### **4.04 UTILITIES**

- A. Contractor's Responsibilities. The information and data shown or indicated in the Contract Documents with respect to existing Utilities at or adjacent to the Site, if any, is based on information and data furnished to Owner or Engineer by the owners of such Utilities, including Owner, or by others.
  1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
  2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
    - a. reviewing and checking all information and data regarding existing Utilities at the Site;
    - b. locating all Utilities shown or indicated in the Contract Documents as being at the Site;
    - c. coordination of the Work with the owners (including Owner) of such Utilities, during construction; and
    - d. the safety and protection of all existing Utilities at the Site and repairing any damage thereto resulting from the Work.
- B. Notice by Contractor. If Contractor believes that an Utilities that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by paragraph 6.18), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.
- C. Engineer's Review. Engineer will:
  1. promptly review the Utilities and conclude whether such Utilities was not shown or indicated in the Contract Documents,
  2. or was not shown or indicated with reasonable accuracy;
  3. obtain any pertinent cost or schedule information from Contractor;
  4. prepare recommendations to Owner regarding Contractor's resumption of Work in connection with the Utilities in question;
  5. determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Utilities;
  6. and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- D. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- E. Owner's Statement to Contractor Regarding Utilities. After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Utilities in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- F. Possible Price and Times Adjustments:

1. All utilities shown on plans shall be vertically and horizontally field verified prior to construction. No Contract Price or Contract Times will be added for utilities not shown or not shown correct in the Plans.

#### **4.05 REFERENCE POINTS**

- A. Owner will not provide engineering surveys for construction to establish property corners, monuments, benchmarks and similar reference points.
- B. Data collected by the Engineer and provided by the Owner is represented in NAD83 Texas State Plane North Central, US Foot coordinate system. The Contractor shall field verify all information by using spray paint to show replacement limits and scheduling a walk-thru with the Owner's Construction Inspector prior to construction.

#### **4.06 CONSTITUENTS OF CONCERN**

- A. Owner shall be responsible for any Constituents of Concern uncovered or revealed at the Site which was not shown or indicated in Plans or Specifications or identified in the Contract Documents to be within the scope of the Work and which may present a substantial danger to persons or property exposed thereto in connection with the Work at the Site. Owner shall not be responsible for any such materials brought to the Site by Contractor, Subcontractor, Suppliers or anyone else for whom Contractor is responsible.
- B. Upon discovering any such material, Contractor shall immediately:
  1. stop all Work in connection with such Hazardous Environmental Condition and in any area affected thereby (except in emergency as required by paragraph 6.18), and
  2. notify Owner and Engineer (and thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such Hazardous Environmental Condition or take corrective action, if any.
- C. Contractor shall not be required to resume Work in connection with such Hazardous Environmental Condition or in any such affected areas until after Owner has obtained any required permits related thereto and delivered to Contractor special written notice:
  1. specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or
  2. specifying any special conditions under which such Work may be resumed safely.
- D. If Owner and Contractor cannot agree as to entitlement to, or the amount, or extent of an adjustment, if any, in Contract Price or Contract Terms as a result of such Work stoppage or such special conditions under which Work is agreed by Contractor to be resumed, either party may make a Claim therefor as provided in paragraph 11.01.
- E. If after receipt of such special written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe or does not agree to resume such Work under such special conditions, then Owner may order such portion of the Work that is in connection with such condition, or in such affected area, to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to, or the amount, or extent of an adjustment, if any, in Contract Price or Contract Time as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in paragraph 11.01. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with paragraph 7.01.
- F. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, Engineer, Engineer's Consultants and the officers, directors, employees, agents, other consultants and subcontractors of each and any of them from and against all claims, costs, losses, damages and expenses arising out of or resulting from such condition per this paragraph 4.06, provided that:

1. any such claim, cost, loss or damage is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, and
  2. nothing in this paragraph 4.06 shall obligate Owner to indemnify any person or entity from and against the consequences of that person's or entity's own negligence.
- G. The provisions of paragraph 4.03 are not intended to apply to the presence of Constituents of Concern or Hazardous Environmental Conditions uncovered or revealed at the Site.

## **ARTICLE 5 BONDS AND INSURANCE**

### **5.01 PERFORMANCE AND OTHER BONDS**

- A. Contractor shall furnish performance and payment Bonds, on the form included in the Contract Documents, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These Bonds shall remain in effect at least until one (1) year after the date when final payment becomes due, except as otherwise provided by Laws and Regulations or as specified in the Contract Documents or Bond. Contractor shall also furnish such other Bonds as are required by the Supplementary Conditions.
- B. All Bonds shall be in the forms prescribed by the Contract Documents and be executed by such Sureties as
  1. are licensed to conduct business in the state where the Project is located, and
  2. are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch.
- C. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.
- D. If Surety on any Bond furnished by Contractor is declared as bankrupt or becomes insolvent, or its right to do business is terminated in any state where any part of the Project is located, or it ceases to meet the requirements of clauses (1) and (2) of paragraph 5.01, Contractor shall within five (5) days thereafter substitute another Bond and Surety, both of which shall be acceptable to Owner.

### **5.02 LICENSED INSURERS AND SURETIES**

- A. Bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverages so required.

### **5.03 INSURANCE**

- A. Contractor shall purchase and maintain during the term of the Project such insurance as will protect him, Owner(s) and Engineer(s) from Claims arising out of the Work described in this Contract and performed by Contractor, Subcontractor(s) or Sub subcontractor(s) consisting of:
  1. Workers' Compensation Insurance including Employer's Liability to cover employee injuries or disease compensable under the Workers' Compensation Statutes of the states in which Work is conducted under this Contract; disability benefit laws, if any; or Federal compensation acts such as U.S. Longshoremen or Harbor Workers', Maritime Employment, or Railroad Compensation Act(s), if applicable. Self-insurance plans approved by the regulatory authorities in the state in which Work on this Project is performed are acceptable.
  2. An occurrence form Commercial General Liability policy to cover bodily injury to persons other than employees and for damage to tangible property, including loss of use thereof,

plus appropriate endorsements to protect Owner and Engineer against Claims, demands, and lawsuits from employees of Contractor and Subcontractors, including the following exposures:

- a. All premises and operations.
  - b. Explosion, collapse and underground damage.
  - c. Contractor's Protective coverage for independent contractors or Subcontractors employed by him.
  - d. Broad form blanket, contractual liability for the obligation assumed in the Indemnification or Hold Harmless agreement found in the General Conditions or Supplementary Conditions of this Contract.
  - e. Personal Injury Liability endorsement with no exclusions pertaining to employment.
  - f. Products and Completed Operations coverage. Coverage shall extend through the Contract guarantee period.
  - g. Broad form property damage.
  - h. Cross liability endorsement.
3. Comprehensive Automobile Liability policy to cover bodily injury and property damage arising out of the ownership, maintenance or use of any motor vehicle, including owned, non-owned and hired vehicles. Comprehensive General Liability and the Comprehensive Auto Liability shall be written by the same insurance carrier, though not necessarily in one policy.
  4. Contractor shall purchase for Owner an Owner's Protective Liability policy to protect Owner, Engineer, their consultants, agents, employees and such public corporations in whose jurisdiction the Work is located for their liability for Work performed by Contractor, the Subcontractor(s) or the Sub subcontractor(s) under this Contract.
  5. When a limit of liability is identified in the Supplementary Conditions, Contractor shall purchase a Builder's Risk Installation Floater in a form acceptable to Owner covering property of the Project for the full cost of replacement as of the time of any loss which shall include, as named insureds,
    - a. Contractor,
    - b. all Subcontractors,
    - c. all Sub subcontractors,
    - d. Owner, and Engineer(s), as their respective interests may prove to be at the time of loss, covering insurable property, which is the subject of this Contract, whether in place, stored at the Site, stored elsewhere, or in transit at the risk of the insured(s).
    - e. Coverage shall be effected on an "All Risk" form including, but not limited to, the perils of fire, wind, vandalism, collapse, theft, flood and earthquake, with removal of passive design error exclusion. Except as may otherwise be required by Owner, Contractor may arrange for such deductibles as Contractor deems to be within Contractor's ability to self-assume, but Contractor will be held solely responsible for the amount of such deductible and for any co-insurance penalties. Any insured loss shall be adjusted with Owner and Contractor and paid to Owner and Contractor as Trustee for the other insureds.
  6. Umbrella or Excess Liability:
    - a. Contractor is granted the option of arranging coverage under a single policy for the full limit required or by a combination of underlying policies with the balance provided by an Excess or Umbrella Liability policy equal to the total limit(s) requested. Umbrella or

Excess policy wording shall be at least as broad as the primary or underlying policy(ies) and shall apply both to Contractor's General Liability and Automobile Liability Insurance and shall be written on an occurrence basis.

7. Railroad Protective Liability:

- a. Where any of the Work is within a railroad right-of-way or where a limit of liability is identified in the Supplementary Conditions, Contractor will provide coverage in the name of each railroad company having jurisdiction over rights of way across which Work under the Contract is to be performed. The form of policy and the limits of liability shall be determined by the railroad company(ies) involved. See Section 00 73 00 - Supplementary Conditions for limits and coverage requested.

8. Contractor's Professional Liability Insurance:

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

#### **5.04 LIMITS OF LIABILITY**

- A. The required limits of liability for insurance coverages required in paragraphs 5.03 shall be not less than those specified in Section 00 73 00 - Supplementary Conditions .

#### **5.05 NOTICE OF CANCELTION OR INTENT NOT TO RENEW**

- A. Policies will be endorsed to provide that at least 30 days written notice shall be given to Owner and to Engineer of cancelation, intent not to renew, or material modification of the coverage.

#### **5.06 EVIDENCE OF COVERAGE**

- A. Prior to commencement of the Work, Contractor shall furnish to Owner and Engineer, Certificates of Insurance in force on current Accord® Certificate of Insurance form. Other forms of Certificate are acceptable only if;
  - 1. they include all of the items prescribed in the current Accord® Certificate of Insurance form, including agreement to cancelation provisions outlined in paragraph 5.05 above; and
  - 2. they have approval of Owner and Engineer.
- B. Prior to the commencement of the Work, Contractor shall furnish to Owner complete "originally signed" copies of the Owner's Protective Liability Policy. The number of copies shall be the same as the number of counterparts of the Agreement. Owner reserves the right to request complete copies of other policies if deemed necessary to ascertain details of coverage not provided by the certificates. Such policy copies shall be "Originally Signed Copies," and so designated.

#### **5.07 QUALIFICATION OF INSURERS**

- A. In order to determine financial strength and reputation of insurance carriers, all companies providing the coverages required shall be licensed or approved by the Insurance Bureau of the state in which the Project is located and shall have a financial rating not lower than XI and a policyholder's service rating no lower than B+ as listed in A.M. Best's Key Rating Guide, current edition. Companies with ratings lower than B+:XI will be acceptable only upon written consent of Owner.

## **5.08 DAMAGE CLAIMS - ACKNOWLEDGMENT AND REPORTS**

- A. Contractor shall furnish to Owner an acknowledgment receipt from the insurance carrier for each damage claim against the Project. The receipt shall include the insurance carrier's assigned claim number.
- B. Upon request, Contractor or his insurance carrier shall also furnish to Owner a status report on all damage claims. This report shall include inspections made, the disposition of claims, and what action has been taken towards settlement of each claim.
- C. Failure of Contractor to comply with this paragraph 5.08 may result in the amount of such damage claims being withheld from Contractor's monthly pay estimate. Such withholding shall be reimbursed in the monthly pay estimate following compliance with this paragraph.

## **5.09 COST OF INSURANCE**

- A. The unit cost of the insurance herein specified will not be a specific bid item, but the cost of such insurance will be included by Contractor in the various prices bid.

## **5.10 WAIVER OF RIGHTS**

- A. Owner and Contractor intend that all policies purchased in accordance with paragraph 5.03 will protect Owner, Contractor, Subcontractors, Engineer, Engineer's Consultants (and all other persons or entities identified in the Supplementary General Conditions to be listed as insureds or additional insureds in such policies) and will provide primary coverage for all losses and damages caused by the perils covered thereby. Such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder.
- B. Owner and Contractor waive all rights against each other and their respective officers, directors, employees and agents for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work; and in addition, waive all such rights against Subcontractors, Engineer, Engineer's Consultants and any other persons or entities identified in the Supplementary General Conditions to be listed as insureds or additional insureds under such policies for loss and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

## **5.11 RECEIPT AND APPLICATION OF INSURANCE PROCEEDS**

- A. Any insured loss under the policies of insurance required by paragraph 5.03.A.5 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause. If no other special agreement is reached the damaged Work shall be repaired or replaced, the monies so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order, Field Order or Work Change Directive.
- B. Owner as fiduciary shall have power to adjust and settle any loss under the policies required by paragraph 5.03.A.5 with the insurers unless one of the parties in interest shall object in writing within fifteen days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers.

# **ARTICLE 6 CONTRACTOR'S RESPONSIBILITIES**

## **6.01 SUPERVISION AND SUPERINTENDENCE**

- A. Contractor shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the

Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. Contractor shall be responsible to see that the finished Work complies with the Contract Documents. However, if specific means, methods, techniques, sequences and procedures of construction are prescribed in the Plans or Specifications, Contractor shall be responsible to comply therewith but may implement such prescribed Work in a manner of Contractor's choosing so long as the Work complies with the requirements of the Plans and Specifications.

- B. At all times during the progress of the Work, Contractor shall assign and maintain a competent superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. Any superintendent or foreman who neglects to have Work done in accordance with the Plans and Specifications shall be removed from the Project. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to the superintendent shall be as binding as if given to Contractor.

#### **6.02 LABOR AND WORKING HOURS**

- A. Contractor shall provide competent, suitably qualified personnel in their various duties. Contractor shall at all times maintain good discipline and order at the Site. Except as otherwise required for the safety or protection of persons, the Work, property at the Site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the Site shall be performed during regular working hours (6:00 AM to 7:00 PM, Monday - Thursday and 7:00AM to 6:00 PM, Friday, Saturday and Sunday), and Contractor will not permit the performance of Work on Sunday or any legal holiday without Owner's written consent given after prior written notice to Engineer.
- B. Request for Saturday work shall be made to the City Engineer prior to 12:00, noon on Wednesday.
- C. Official City hours for inspect-able work shall be between 7:30 AM - 5:30 PM Monday - Thursday. All hours outside of official City hours (Friday - Saturday), require the Contractor to pay overtime.

#### **6.03 SERVICES, MATERIALS, AND EQUIPMENT**

- A. Unless otherwise specified in the Contract Documents, Contractor shall furnish and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start up and completion of the Work.
- B. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Contract Documents shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence, (including reports of required tests) as to the kind and quality of materials and equipment to be incorporated in the Work. Contractor shall not use material in the Work until Shop Drawing or Submittals have been reviewed by Engineer. All materials which do not meet the requirements of the Specifications at the time they are to be used will be rejected, and unless otherwise permitted by Engineer, shall be plainly marked and removed immediately from the Work.
- C. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturer, fabricator, Supplier or distributor, except as otherwise provided in the Contract Documents.

#### **6.04 SUBSTITUTES AND "OR-EQUALS"**

- A. Whenever an item of materials or equipment is specified or described in the Contract Documents for installation in the Work by using the name of a proprietary item or the name of a particular manufacturer, fabricator, supplier or distributor; or means, methods, techniques,

sequences and procedures of construction are prescribed in the Plans or Specifications; the specification or description is intended to establish the type, function and quality required or the means, methods, techniques, sequences and procedures of construction required. Unless the specification or description contains or is followed by words indicating that no like, equivalent or "or-equal" item or no substitution is permitted, other items of material or equipment or materials or equipment of other manufacturers, fabricators, suppliers or distributors; or other means, methods, techniques, sequences and procedures of construction may be accepted by Engineer under the following circumstances:

1. "Or-Equal": If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items.
  2. Substitute Items: If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under paragraph 6.04.A; or a proposed means, methods, techniques, sequences and procedures of construction are different from what is prescribed in the Plans or Specifications, it will be considered a proposed substitute item.
- B. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment or means, methods, techniques, sequences and/or procedures proposed is essentially equivalent to that named and an acceptable substitute therefor. The procedure for review by Engineer will include the following, as supplemented in the Specifications, and as Engineer may decide is appropriate under the circumstances. Requests for review of substitute items of material and equipment will not be accepted by Engineer from anyone other than Contractor.
- C. If Contractor wishes to furnish or use a substitute, Contractor shall make written application to Engineer on the Substitution Request Form provided for acceptance thereof, certifying that the proposed substitute will:
1. perform adequately the functions and achieve the results called for by the general design,
  2. be similar in substance to that specified,
  3. and be suited to the same use and capable of performing the same function as that specified.
  4. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of Substantial Completion on time, whether or not acceptance of the proposed substitute for use in the Work will require a change in the Contract Documents (or in the provisions of any other direct contract with Owner for work on the Project) to adapt the design to the proposed substitute, and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty.
- D. All variations of the proposed substitute from that specified shall be identified in the application and available maintenance, repair and replacement service shall be indicated. The application shall also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by Engineer in evaluating the proposed substitute. Engineer may require Contractor to furnish additional data about the proposed substitute.
- E. All data to be provided by Contractor in support of any proposed "or-equal" or substitute item will be at Contractor's expense. Engineer will be the sole judge of acceptability, and Engineer's determination shall be final and binding, may not be reversed through an appeal under any provisions of the Contract Documents, and no "or-equal" or substitute shall be ordered, installed

or utilized without Engineer's prior written acceptance. Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any "or-equal" or substitute which has been approved by Engineer.

- F. Engineer will record time required by Engineer and Engineer's consultants in evaluating substitutions proposed by Contractor and in making changes in the Contract Documents occasioned thereby. Whether or not Engineer accepts a proposed substitute, Contractor shall reimburse Owner for the charges of Engineer and Engineer's consultants for evaluating any proposed substitute and in making any changes in the Contract Documents resulting therefrom.

#### **6.05 CONCERNING SUBCONTRACTORS**

- A. Contractor shall not employ any Subcontractor, Supplier or other person or organizations, including those who are to furnish the principal items of materials or equipment, whether initially or as a substitute, against whom Owner or Engineer may have reasonable objection. Contractor shall furnish Engineer a complete list of any Subcontractor, Supplier or other person or organization furnishing principal items of material or equipment within 4 days of request. Failure to object to any Subcontractor, Supplier, other person or organization by Owner or Engineer shall not constitute a waiver of any right of Owner or Engineer to reject defective Work.
- B. If Owner or Engineer, after due investigation, has reasonable objection to any Subcontractor, Supplier, other person or organization proposed by Contractor after the Notice of Award, Contractor shall submit an acceptable substitute and the Contract Price shall be increased or decreased by the difference in cost occasioned by such substitution, and an appropriate Change Order shall be issued. Contractor shall not be required to employ any Subcontractor, Supplier, other person or organization against whom Contractor has reasonable objection.
- C. Contractor shall not award Work to Subcontractor(s), in excess of 50% of the Contract Price, without prior written approval of Owner.
- D. Contractor shall be fully responsible for all acts and omissions of his Subcontractors, Suppliers and of persons and organizations performing or furnishing any of the Work under a direct or indirect contract with Contractor just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier or other person or organization any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any Subcontractor, Supplier or other person or organization. Owner or Engineer may furnish to any Subcontractor, Supplier or other person or organization, to the extent practicable, evidence of amounts paid to Contractor on account of specific Work done.
- E. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with Contractor. Contractor shall require all Subcontractors, Suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. If the amount of the subcontract or the nature of the Work to be performed thereunder warrants, Owner may require Subcontractor to furnish, for the benefit of Owner and Contractor jointly, Bonds in an amount proportioned to the amount of his subcontract, and for the same purpose and under the same specifications as those of the general Contract. The Surety on the general Contract shall not be eligible to furnish such Subcontract Bonds.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as and additional insured on the property insurance provided in paragraph 5.03.A.5, the agreement between Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against

Owner, Contractor, Engineer, Engineer's Consultants and all other additional insureds for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same. Contractor shall file a true copy of such agreement with Owner.

#### **6.06 PATENT FEES AND ROYALTIES**

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Contractor shall defend, indemnify and hold harmless Owner and Engineer and anyone directly or indirectly employed by either of them from and against all claims, costs, losses, damages and expenses arising out of or resulting from any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

#### **6.07 PERMITS AND LICENSES**

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

#### **6.08 LAWS AND REGULATIONS**

- A. Contractor shall give all notices and comply with all laws, ordinances, rules, and regulations applicable to furnishing and performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws, ordinances, rules, and Regulations.
- B. If Contractor performs any Work that is contrary to such laws, ordinances, rules and regulations, Contractor shall bear all claims, costs, losses, damages and expenses caused by, arising out of, or resulting therefrom. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Plans are in accordance with such laws, ordinances, rules, and regulations, but this shall not relieve Contractor of Contractor's obligations under paragraph 3.03.

#### **6.09 TAXES**

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

#### **6.10 USE OF PREMISES**

- A. Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project Site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights of way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area or to the owner or occupant thereof or of any adjacent land or areas resulting from the performance of the Work. Should any claim be

made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with any such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. Contractor's continuing obligations under paragraph 6.24 shall be applicable to any claim hereunder.

#### **6.11 REMOVAL OF DEBRIS AND CLEANING**

- A. During the progress of the Work, Contractor shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work Contractor shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the Site clean and ready for occupancy by Owner at Substantial Completion of the Work. Contractor shall restore to their original condition all property not designated for alteration by the Contract Documents. If Contractor shall fail to keep the above noted areas cleaned of dust or debris resulting from Contractor's operations, Contractor shall be so notified in writing by Engineer. If within 24 hours after receipt of such notice Contractor shall fail to clean such areas satisfactorily, Owner may have such other agency as he shall designate, perform the work and all costs of such cleaning shall be paid for by Contractor.

#### **6.12 LOADING STRUCTURES**

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

#### **6.13 PROTECTION OF UTILITIES**

- A. When it is possible for construction operations to endanger any public or private utility, conduit, or structure, Contractor shall notify the utility owner of this possibility, and safeguard and support such utilities, conduits, or structures. Where it is the policy of any utility owner to make its own repairs to damaged conduit or other structures, Contractor shall cooperate to the fullest extent with the utility, and he shall see that his operations interfere as little as possible with these operations, and Contractor shall assume the cost of any charge against Owner therefor. In cases where existing Utilities or Utility service connections are encountered, Contractor shall perform his operations in such a manner that service will be uninterrupted, and the cost thereof shall be at Contractor's expense, unless otherwise provided.

#### **6.14 RECORD DOCUMENTS**

- A. Contractor shall maintain in a safe place at the Site one (1) record copy of all Specifications, Plans, Addenda, Change Orders, Work Change Directives, and Field Orders, in good order and annotated to show all changes made during construction. These record documents together with all Samples and all Shop Drawings shall be available to Engineer for examination and shall be delivered to Engineer for Owner upon completion of the Work.

#### **6.15 SAFETY AND PROTECTION**

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
  - 1. all persons on the Work Site or who may be affected by the Work,
  - 2. all the Work and materials or equipment to be incorporated therein, whether in storage on or off the Site, and
  - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and Utilities and not designated for removal, relocation or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or

loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property, Utilities, and utility owners when prosecution of the Work may affect them.

- C. Contractor shall restore, at his own expense, any public or private property damaged or injured in consequence of any act or omission on his part, or on the part of his employees or agents, to a condition equal or better than that existing before such injury or damage was done. If Contractor neglects to restore or make good such damages or injury, Owner may, upon 48 hours' notice, proceed to restore or make good such damage or injury and to order the cost thereof deducted from any monies that are due, or may become due, to Contractor for this Work.
- D. Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with paragraph 14.11 that the Work is Acceptable.
- E. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. .
- F. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- G. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Owner has issued a written notice to Owner and Contractor in accordance with paragraph 14.11 that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- H. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

#### **6.16 SAFETY REPRESENTATIVE**

- A. Contractor shall be responsible to designate for itself and its employees, and its Subcontractors a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

#### **6.17 HAZARD COMMUNICATION PROGRAM**

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

#### **6.18 EMERGENCIES**

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor, without special instruction or authorization from Owner or Engineer, is obligated to act to prevent threatened damage, injury or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued to document the consequences of such action.

#### **6.19 SHOP DRAWINGS AND SAMPLES**

- A. Contractor shall submit Shop Drawings required by the Contract Documents to Engineer for review, in accordance with an accepted schedule. All Submittals will be identified as Engineer may require and in the number of copies specified in the Specifications. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show Engineer the materials and equipment

Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by paragraph 6.21.

- B. Contractor shall also submit all samples required by the Contract Documents to Engineer for review in accordance with an accepted schedule. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, the use for which intended, and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by paragraph 6.21. The number of each sample to be submitted will be as specified in the Specifications.

## **6.20 SUBMITTAL PROCEDURES**

- A. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:
  - 1. all field measurements, quantities, dimension, specified performance criteria, installation requirements, manufacturer's recommendations, material, catalog numbers and similar information with respect thereto,
  - 2. all materials with respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work, and
  - 3. all information relative to Contractor's responsibilities in respect of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.
- B. Contractor shall have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.
- C. Each Submittal will bear a stamp or specific written indication that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to review and approval of that Submittal.
- D. At the time of each submission, Contractor shall in writing call Engineer's attention to any deviations that the Shop Drawings or Samples may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review of each such variation.
- E. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.
- F. Contractor shall furnish required Submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
- G. If Contractor requests a change of a previously approved Submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

## **6.21 ENGINEER'S REVIEW**

- A. Engineer will review Shop Drawings and Samples in accordance with the Schedule of Submittals accepted by Engineer as required by paragraph 2.05. Engineer's review shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, sequences, techniques or procedures of construction or to safety precautions or programs

incident thereto. The review of a separate item as such will not indicate review of the assembly in which the item functions.

- B. Engineer's review of Shop Drawings or samples shall not relieve Contractor from responsibility for any variations from the Contract Documents unless Contractor has in writing called Engineer's attention to such variation at the time of submission and Engineer has given written concurrence to the specific variation, nor shall any concurrence by Engineer relieve Contractor from responsibility for errors or omissions in the Shop Drawings. Engineer's review shall not relieve Contractor from responsibility for complying with the requirements of paragraph 6.20.
- C. Where a Shop Drawing or sample is required by the Contract Documents or the Schedule of Submittals accepted by Engineer per paragraph 2.05, no related Work shall be commenced until the Submittal has been reviewed by Engineer.

## **6.22 CONTINUING THE WORK**

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

## **6.23 CONTRACTOR'S GENERAL WARRANTY AND GUARANTEE**

- A. Contractor warrants and guarantees to Owner, Engineer, and Engineer's Consultants that all work will be in accordance with the Contract Documents and will not be defective. Contractor's warranty and guarantee excludes defects or damage caused by:
  - 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or their employees, agents, or representatives, or any person or entity for whom Contractor is responsible; or
  - 2. normal wear and tear under normal usage.
- B. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
  - 1. observations by Engineer;
  - 2. recommendation of any progress or final payment by Engineer;
  - 3. the issuance of a certificate of Substantial Completion or any payment by Owner to Contractor under the Contract Documents;
  - 4. use or occupancy of any part of the Work by Owner;
  - 5. any acceptance by Owner or failure to do so;
  - 6. any review or approval of a Shop Drawing or Sample Submittal or the issuance of a notice of acceptability by Engineer per paragraph 14.11;
  - 7. any inspection, test or approval by others; or
  - 8. any correction of defective Work by Owner.
- C. If Contract requires Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned Contract.
- D. Contractor shall assign to Owner all warranties extended to Contractor by material Suppliers and Subcontractors. If an assignment of warranty requires the material Supplier or Subcontractor to consent to same, then Contractor shall secure the material Supplier's or Subcontractor's consent to assign said warranties to Owner.

- E. The warranties provided in this section shall be in addition to, and not in limitation of, any other warranty or remedy required by law.

#### **6.24 INDEMNIFICATION**

- A. To the fullest extent permitted by law, Contractor shall indemnify, defend (with counsel acceptable to Owner) and hold harmless Owner, Engineer and any additional indemnitees identified in the Supplementary Conditions and their respective directors, officers, members, partners, affiliates, employees, agents and successors, from and against any and all liabilities, claims, causes of action, lawsuits, liens, injuries, damages, losses and expenses (collectively "Demands") to the extent caused by, arising out of, resulting from or occurring in connection with:
  - 1. Contractor's breach of, or failure to comply with, the Agreement, the Contract Documents, or any other contract that it enters into regarding the Work, including any default in performance; or
  - 2. Personal injury or death to any person (including, but not limited to, Contractor, Contractor's employees, Subcontractors, Subcontractors' employees, and material Suppliers) or injury to or destruction of property (including claims for loss of use) caused by, arising out of, resulting from, or in any way connected with
    - a. the Work,
    - b. any activity associated with the Work, or
    - c. the operations or acts of commission or omission of Contractor, Contractor's employees, Subcontractors, Subcontractors' employees, material suppliers, or anyone for whom Contractor is legally liable in the performance of Work, whether arising before or after completion of the Work.
- B. To the extent caused by, arising out of, resulting from, or occurring in connection with the provisions of the above paragraph 6.24.A, Contractor's indemnity obligations under this Agreement shall include, but are not limited to:
  - 1. Indemnity for all damages and judgment interest, all costs and fees, including, but not limited to, all defense costs, expenses and actual attorneys' fees, and all settlement payments relating to, arising out of, resulting from or in any way connected with any demand requiring indemnity by this Agreement;
  - 2. All expenses, including but not limited to, costs, expenses and actual attorneys' fees, incurred in securing and enforcing indemnity from Contractor if Contractor fails or refuses promptly to fulfill any of the indemnity obligations under this Agreement;
  - 3. All indemnification obligations imposed upon Owner or Engineer, or both, arising out of or in connection with the Work; and
  - 4. Indemnification for any penalties and/or fines arising or resulting from Contractor's or any Subcontractor's failure to comply with laws and/or regulations applicable to its/their Work.
- C. Contractor's duty to indemnify under subpart A.2. of paragraph 6.24 is limited to the negligence of Contractor, Contractor's employees, Subcontractors, Subcontractor's employees, material Suppliers, or anyone for whom Contractor is legally liable in the performance of the Work, whether arising before or after the completion of the Work.
- D. The indemnification rights under this Agreement shall not be construed to negate, abridge, or otherwise reduce any other right or obligations of indemnity which would otherwise exist.
- E. Owner, at its option, may select counsel to defend any demand brought against it without impairing any obligation of Contractor to provide indemnification.
- F. The indemnification provisions under this Agreement shall survive the completion or termination of this Agreement.

- G. In the case of claims by any employee of Contractor, anyone directly or indirectly employed by Contractor, or anyone for whose acts Contractor may be liable, the indemnification obligations under this Agreement shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for Contractor under workers' compensation acts. Such obligations shall not be construed to negate, abridge or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Agreement.
- H. Indemnification, additional insured and hold harmless obligations of Contractor and Subcontractor under the Contract Documents shall survive the termination of this Agreement.
- I. Contractor and Subcontractors will compel their insurance company to waive subrogation against Owner, Engineer and Contractor and Subcontractors identified as additional insureds in the Contract Documents, including any municipal entity now existing or newly created during the term of the Contract Documents.

## **6.25 DELEGATION OF PROFESSIONAL DESIGN SERVICES**

- A. If professional design services or certifications by a design professional related to systems, materials, equipment, structures, means, methods, techniques, maintenance of traffic, erosion control, or sequences of construction are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a professional properly licensed in the state in which the project is located, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other Submittals prepared by such professional. Shop Drawings and other Submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- B. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals.
- C. Pursuant to this paragraph 6.25, Engineer's review or approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review or approval of Shop Drawings and other Submittals (except design calculations and design drawings) will be only for the purpose stated in paragraph 6.21.
- D. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

## **ARTICLE 7 WORK BY OTHERS**

### **7.01 RELATED WORK AT SITE**

- A. In addition to and apart from the Work under the Contract Documents, Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If any part of Contractor's Work depends on proper execution or results upon the work of any such other contractor or utility owner, Contractor shall inspect and promptly report to Engineer in writing any delays, defects or deficiencies in such other work that render it unavailable, or unsuitable for such proper execution and results of Contractor's Work. Contractor's failure to so report shall constitute an acceptance of the other work as fit and proper for integration with Contractor's Work except for latent or non-apparent defects and deficiencies in the other work.
- C. Contractor shall afford each contractor who is party to such a direct contract, and each utility owner, (and Owner, if Owner is performing the additional work with Owner's employees), proper and safe access to the Site and a reasonable opportunity for the introduction and storage of

materials and equipment and the execution of such other work and shall properly connect and coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, Contractor shall do all cutting, fitting and patching of Contractor's Work that may be required to make its several parts come together properly and integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected.

- D. If the performance of additional work by other contractors, utility owner, or Owner was not noted in the Contract Documents, written notice thereof shall be given to Contractor prior to starting any such additional work. If Contractor believes that the performance of such additional work by Owner or others involves additional expense to Contractor, or requires an extension of the Contract Time, Contractor may make a Claim therefor as provided in paragraph 11.01. Claims for delay or inconveniences due to operations of such other parties for work noted in the Contract Documents will not be allowed.

## **ARTICLE 8 OWNER'S RESPONSIBILITIES**

### **8.01 COMMUNICATION TO CONTRACTOR**

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

### **8.02 FURNISHING DATA**

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

### **8.03 PAY WHEN DUE**

- A. Owner shall make payments to Contractor promptly after they are due as provided in paragraphs 14.05 and 14.11.

### **8.04 LANDS AND EASEMENTS; REPORTS AND TESTS**

- A. Owner's duties in respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of investigations and tests of subsurface and latent physical conditions at the Site.

### **8.05 CHANGE ORDERS**

- A. In connection with Owner's rights to request changes in the Work in accordance with Article 10, Owner (especially in certain instances as provided in paragraph 10.01) is obligated to execute Change Orders.

### **8.06 INSPECTIONS, TESTS, AND APPROVALS**

- A. Owner's responsibility in respect to certain inspections, tests and approvals is set forth in paragraph 13.02.

### **8.07 LIMITATION ON OWNER'S RESPONSIBILITY**

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

### **8.08 UNDISCLOSED HAZARDOUS MATERIALS**

- A. Owner's responsibility in respect of undisclosed Constituents of Concern uncovered or revealed at the Site is set forth in Paragraph 4.06.

## **8.09 OWNER'S DESIGNATED REPRESENTATIVE**

- A. Owner shall designate a person to act as its representatives during the performance of the Work. Owner's designated representative will attend meetings and perform on behalf of Owner all obligations required of Owner under the provisions of the Contract Documents.

## **ARTICLE 9 ENGINEER'S STATUS DURING CONSTRUCTION**

### **9.01 VISITS TO SITE**

- A. Engineer may make visits to the Site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work, and to determine solely for the benefit of Owner, in general, if the Work is proceeding in accordance with the technical requirements of the Contract Documents. It will not be the responsibility of Engineer to make exhaustive or continuous on Site inspections to check the quality or quantity of the Work.

### **9.02 CLARIFICATIONS AND INTERPRETATIONS**

- A. Engineer will issue with reasonable promptness such written clarifications or interpretations of the Contract Documents as Engineer may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.

### **9.03 LIMITATIONS ON ENGINEERS RESPONSIBILITIES**

- A. Neither Engineer's authority to act under this Article 9 or elsewhere in the Contract Documents, nor any decision made by Engineer in good faith either to exercise or not exercise such authority, shall give rise to any duty or responsibility of Engineer to Owner or Contractor, any Subcontractor, any manufacturer, fabricator, Supplier, distributor, surety, or any other person, employee, or agent of any of them.
- B. Engineer will not supervise, direct, control or have authority over, or be responsible for Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the furnishing or performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents. These limitations on authority and responsibility shall also apply to Engineer's Consultant's, Resident Project Representative and assistants.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer will not be responsible to Contractor or any Subcontractor, or Supplier, or to their agents or employees for injuries, damages, claims, losses, or expenses (including attorney's fees) of whatsoever kind resulting from or caused by any act or omission of Engineer in preparation for, arising from, relating to, or concerning the Project. Such acts or omissions include, but are not limited to, Engineer's negligence, tortuous conduct, errors, omissions, strict liability, breach of contract, or breach of warranty. Engineer makes no representations to Contractor, Subcontractors, Suppliers or their agents or employees regarding or respecting any work performed by Engineer in preparation for, arising from, relating to, or concerning the Project.
- E. Neither Contractor, its agents or employees, nor any Subcontractors or Suppliers or their agents or employees, are intended beneficiaries of Engineer's agreement with Owner, nor are such parties intended beneficiaries of Engineer's duties or responsibilities arising therefrom. Engineer disclaims all duties to Contractor, Subcontractors, Suppliers or their agents or employees arising from, relating to, or concerning Engineer's involvement in the Project. Owner and Contractor further agree to notify all Contractor's, Subcontractors or Suppliers of this disclaimer of Engineer's liability and require them to abide by this disclaimer.

## **ARTICLE 10 AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK**

### **10.01 AMENDING AND SUPPLEMENTING CONTRACT DOCUMENTS**

- A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
  - 1. Change Orders:
    - a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
    - b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve;
      - 1) the performance or acceptability of the Work,
      - 2) the design (as set forth in the Drawings, Specifications, or otherwise), or
      - 3) other engineering or technical matters, without the recommendation of Engineer. Such an amendment shall be set forth in a Change Order.
  - 2. Work Change Directives:
    - a. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including paragraph 10.04 regarding change of Contract Price.
    - b. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the issuance of the Work Change Directive.
    - c. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.
  - 3. Field Orders:
    - a. Owner may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and Contractor, which shall perform the Work involved promptly.
    - b. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

### **10.02 OWNER-AUTHORIZED CHANGES IN THE WORK**

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive.

- B. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph 10.02 shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

#### **10.03 UNAUTHORIZED CHANGES IN THE WORK**

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in paragraph 6.18 or in the case of uncovering Work as provided in paragraph 13.03.

#### **10.04 CHANGE OF CONTRACT PRICE**

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of paragraph 10.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of paragraph 11.01.
- B. An adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by Unit Prices contained in the Contract Documents, then by application of such Unit Prices to the quantities of the items involved (subject to the provisions of paragraph 12.03); or
  2. where the Work involved is not covered by Unit Prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 10.04.C.2); or
  3. where the Work involved is not covered by Unit Prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in paragraph 12.01) plus a Contractor's fee for overhead and profit (determined as provided in paragraph 10.04.C).
- C. Contractor's Fee: When applicable, Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
  2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
    - a. for costs incurred under paragraph 12.01.B.1 and 12.01.B.2, Contractor's fee shall be 15 percent;
    - b. for costs incurred under paragraph 12.01.B.3, Contractor's fee shall be five percent;
    - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of paragraphs 10.04.C.2.a and 10.04.C.2.b is that Contractor's fee shall be based on:
      - 1) a fee of 15 percent of the costs incurred under paragraphs 12.01.B.1 and 12.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and
      - 2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor;
      - 3) provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;

- d. no fee shall be payable on the basis of costs itemized under paragraphs 12.01.B.4, 12.01.B.5, and 12.01.C;
- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to 5 percent of such net decrease; and
- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with paragraphs 10.04.C.2.a through 10.04.C.2.e, inclusive.

#### **10.05CHANGE OF CONTRACT TIMES**

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of paragraph 10.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of paragraph 11.01.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in paragraph 12.04, concerning delays in Contractor's progress.

#### **10.06CHANGE PROPOSALS**

- A. Contractor shall submit a Change Proposal to the Owner and the Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Owner concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seeking other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.
  - 1. Procedures: Contractor shall submit each Change Proposal to Owner promptly (but in no event later than 5 days) after the start of the event giving rise thereto, or after such initial decision. Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any) to Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal and consider any comments or response from Owner regarding the Change Proposal.
  - 2. Engineer's Action: Engineer will review each Change Proposal and, within 30 days after receipt of Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under paragraph 11.01.
- B. Resolution of Certain Change Proposals: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of paragraph 11.01.

## **10.07 EXECUTION OF CHANGE ORDERS**

- A. Owner and Contractor shall execute appropriate Change Orders covering:
  - 1. changes in the Contract Price or Contract Times which are agreed to by the Parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
  - 2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
  - 3. changes in the Work which are:
    - a. ordered by Owner pursuant to paragraph 10.02,
    - b. required because of Owner's acceptance of defective Work under paragraph 13.08 or Owner's correction of defective Work under paragraph 13.09, or
    - c. agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
  - 4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under paragraph 10.06, or Article 16.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this paragraph 10.07, it shall be deemed to be of full force and effect, as if fully executed.

## **10.08 NOTIFICATION TO SURETY**

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

## **ARTICLE 11 CLAIMS**

### **11.01 CLAIMS**

- A. Claims Process: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:
  - 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
  - 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
  - 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.
- B. Submittal of Claim: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 10 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

- C. Review and Resolution: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.
- D. Mediation:
1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
  2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.
  3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. Partial Approval: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 16 for final resolution of disputes.
- F. Denial of Claim: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 16 for final resolution of disputes.
- G. Final and Binding Results: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

## **ARTICLE 12 COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

### **12.01 COST OF WORK**

- A. Purposes for Determination of Cost of the Work: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this paragraph 12.01 are used to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. Costs Included: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in paragraph 12.01.C, and shall include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the

Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Costs of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from Subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this paragraph 12.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
  - a. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
  - b. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
    - 1) The rental rate established for each piece of Contractor owned equipment, including appurtenances and attachments to the equipment, used will be determined by use of the Rental Rate Blue Book for Construction Equipment, Volume 1, 2 or 3, as applicable; the edition which is current at the time the Work was started will apply. The established rental rate will be equal to the "Monthly" rate divided by 176; modified by the rate adjustment factor and the applicable map adjustment factor, plus the "Estimated Operating Costs per Hour."
    - 2) For equipment not listed in the Rental Rate Blue Book, Volume 1, 2 or 3, the rental rate will be determined by using the rate listed for a similar piece of equipment or by proportioning a rate listed so that the capacity, size, horsepower, and age are properly considered.
    - 3) For equipment for which there are no comparables in the Rental Rate Blue Book, Volume 1, 2 or 3, the monthly rate shall be reasonable, but not more than 5 percent of the current list price, or invoice, of the equipment. The base hourly rate shall then

be determined by dividing the monthly rate by 176 to which 20 percent will be added to the sum which will account for adjustments and operating costs.

- c. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by laws and regulations.
- d. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- e. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with paragraph 5.03), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining
- f. The cost of utilities, fuel, and sanitary facilities at the Site.
- g. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

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

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 12.01.B.1 or specifically covered by paragraph 12.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by Contractor's fee.
  - 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
  - 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
  - 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
  - 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 12.01.B.
- D. Contractor's Fee: When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in paragraph 10.04.C.
- E. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 12, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer on a daily basis, an itemized cost breakdown together with supporting data.

## **12.02 ALLOWANCES**

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. Cash Allowances: Contractor agrees that:
  - 1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
  - 2. Contractor's costs for unloading and handling of the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. Contingency Allowance: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

## **12.03 UNIT PRICE WORK**

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Proposal.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each Unit Price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Owner will review Owner's preliminary determinations with Contractor on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Owner's written decision thereon will be final and binding (except as modified by Owner to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph 12.03.E.
- E. Within 30 days of Owner's written decision under the preceding paragraph 12.03.D, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking and adjustment in the Contract Price if:
  - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimate quantity of such item indicated in the Proposal (in no event will any change in quantities of less than 25% be considered a material or significant change from the estimated quantities); and
  - 2. there is no corresponding adjustment with respect to any other item of Work.

## **12.04 DELAYS IN CONTRACTOR'S PROGRESS**

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to request an equitable adjustment in the Contract Times. However, Contractor's entitlement to an adjustment of the Contract Times is expressly conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include only the following:
  - 1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
  - 2. acts or failures to act of utility owners (other than those performing other works at or adjacent to the Site by arrangement with Owner, as specified in paragraph 7.01); and
  - 3. acts of war or terrorism.
- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
  - 1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
  - 2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
  - 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 10.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
  - 1. The circumstances that form the basis for the requested adjustment;
  - 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
  - 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
  - 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
  - 5. The impact on Contract Price, in accordance with the provisions of paragraph 10.04.
- F. Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised Progress Schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- G. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by paragraphs 4.03 and 4.06.

- H. Paragraph 7.01 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- I. Contractor shall not be entitled to any adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.
- J. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 5 days of the commencement of the delaying, disrupting, or interfering event.
- K. Where Contractor is prevented from completing any part of the Work within the Contract Time (or Milestones) due to delay beyond the control of both Owner and Contractor, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be Contractor's sole and exclusive remedy for such delay. In no event shall Owner or Engineer be liable to Contractor, any Subcontractor, any Supplier, or any other person or organization, or to any surety or employee or any agent of them, for damages, including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs, arising out of or resulting from:
  - 1. delays caused by or within the control of Contractor (or Subcontractor or Supplier);
  - 2. delays beyond the control of both Owner and Contractor, including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts of neglect by utility owners or other contractors performing other work;
- L. Nor shall Owner or Engineer or each of them be liable to Contractor for any claims, costs, losses or damages sustained by Contractor on or in connection with any other project or anticipated project.
- M. Nothing in this paragraph 12.04 bars a change in Contract Price to compensate Contractor due to delay, interference, or disruption directly attributable to actions or inactions of Owner or anyone for whom Owner is responsible. Except for an adjustment to the Contract Times and Contract Price, Contractor shall not be entitled to and hereby waives any and all damages that it may suffer by reason of such delay or for any Act of God, including but not limited lost profits, overhead, and other consequential damages.

## **ARTICLE 13 TESTS AND INSPECTION; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

### **13.01 ACCESS TO WORK**

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

### **13.02 TESTS AND INSPECTIONS**

- A. Contractor shall give Owner at least 24-hour notice, unless otherwise specified, of readiness of the Work for all required inspections, tests or approvals, and shall cooperate with inspection personnel to facilitate required inspections or tests.
- B. If any Law and Regulation, code, or order of any public body having jurisdiction requires any Work or part thereof to specifically be inspected, tested or approved, Contractor shall assume full responsibility therefor, pay all costs in connection therewith and furnish the required certificates of inspection, testing or approval.
- C. Contractor shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with Owner's or Engineer's acceptance of a manufacturer, fabricator, Supplier or distributor of materials or equipment proposed to be incorporated in the

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

- D. The cost of all other overtime inspections, tests and approvals required by the Contract Documents shall be paid by Contractor.
- E. All inspections, tests or approvals other than those required by law, ordinance, rule, regulation, code or order of any public body having jurisdiction shall be performed by organizations acceptable to Owner and Contractor or by Engineer if so specified.
- F. Cost of materials to be used in inspection and transportation costs shall be paid for by Contractor.
- G. Neither observations by Engineer, Contractor, nor inspections, tests or approvals by others shall relieve Contractor from his obligations to perform the Work in accordance with the Contract Documents.

### **13.03 UNCOVERING WORK**

- A. If any Work that is to be tested, inspected or approved is covered without written concurrence of Owner, or contrary to the written request of Owner, it shall, if requested by Owner, be uncovered by Contractor for Owner's observation. Such uncovering shall be at Contractor's expense unless Contractor has given Owner timely written notice of his intention to cover such Work and Owner has not acted with reasonable promptness in response to such notice.
- B. If Owner considers it necessary or advisable that covered Work be observed by Owner or inspected or tested by others, Contractor, at Owner's request, shall uncover, expose or otherwise make available for observation, inspection or testing as Owner may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment. Except as otherwise specified in paragraph 13.04, the cost of Work shall be paid for as follows:
  - 1. If it is found that such Work is defective, Contractor shall bear all the expenses of such uncovering, exposure, observation, inspection and testing, and of satisfactory reconstruction, (including, but not limited to, fees and charges of engineers, architects, attorneys, and other professionals) and an appropriate deductive Change Order shall be issued. If the parties are unable to agree as to the amount or extent of any change in Contract Price or Contract Time, Owner may make a Claim as provided in paragraph 11.01.
  - 2. If, however, such Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Time or both, directly attributable to such uncovering, exposure, observation, inspection, testing, and reconstruction. If the parties are unable to agree as to the amount or extent of any change in Contract Price or Contract Time, Contractor may make a Claim as provided in paragraph 11.01.

### **13.04 DEFECTIVE WORK**

- A. Contractor's Obligation: It is Contractor's obligation to assure that the Work is not defective.
- B. Owner's Authority: Owner has the authority to determine whether Work is defective, and to reject defective Work.

### **13.05 OWNER MAY STOP THE WORK**

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

### **13.06 CORRECTION OR REMOVAL OF DEFECTIVE WORK**

- A. If required by Engineer or Owner, Contractor shall promptly either correct all defective Work, whether or not fabricated, installed or completed, or if the Work has been rejected by Owner, remove it from the Site and replace it with non-defective Work. Contractor shall pay all claims, costs, losses, damages and expenses caused by or resulting from such correction or removal (including, but not limited to all costs of repair or replacement of work of others) and shall take no action that would void or otherwise impair Owner's special warranty or guarantee, if any, on such Work.

### **13.07 GUARANTEE PERIOD**

- A. If within two (2) year after the date of Substantial Completion (or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents), or by any specific provision of the Contract Documents, any Work is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
  - 1. repair defective land or areas;
  - 2. correct such defective Work;
  - 3. if the defective Work has been rejected by Owner, remove it from the Site and replace it with Work that is not defective, and
  - 4. satisfactorily correct or repair or remove and replace any damage to other Work or the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or the rejected Work removed and replaced, and all claims, costs, losses, damages and expenses caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement or work of others) shall be paid by Contractor.
- C. Repair or replacements made under the guarantee shall bear an additional one (1) year guarantee dated from the acceptance of repair or replacement.

### **13.08 ACCEPTANCE OF DEFECTIVE WORK**

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, also Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, damages and expenses attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Owner as to reasonableness). In such case, if acceptance occurs prior to Engineer's recommendation of final payment, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate reduction in the Contract Price. If the acceptance occurs after such recommendation, an appropriate amount shall be paid by Contractor to Owner.

### **13.09 OWNER MAY CORRECT DEFECTIVE WORK**

- A. If Contractor fails within a reasonable time after written notice from Owner to correct defective Work, or to remove and replace rejected Work as required by Owner in accordance with paragraph 13.06, or if Contractor fails to perform the Work in accordance with the Contract Documents (including any requirements of the Progress Schedule), Owner may, after 48 hours' written notice to Contractor and his Surety without prejudice to any other remedy he may have, correct and remedy any such deficiency.
- B. In exercising his rights and remedies under this paragraph 13.09, Owner shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work, and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site and incorporate in the Work all

materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer's consultants such access to the Site as may be necessary to enable Owner to exercise his rights and remedies under this paragraph 13.09.

- C. All claims, costs, losses, damages and expenses incurred or sustained by Owner in exercising such rights and remedies shall be charged against Contractor and a Change Order shall be issued incorporating the necessary revisions in the Contract Documents with respect to the Work. Owner shall be entitled to an appropriate reduction in the Contract Price equivalent to such claims, costs, losses, damages and expenses including but not be limited to all costs of repair or replacement of work of others destroyed or damaged by correction, removal or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by Owner of Owner's rights under this Article 13.

## **ARTICLE 14 PAYMENTS TO CONTRACTOR AND COMPLETION**

### **14.01 SCHEDULES**

- A. At least ten (10) days prior to submitting the first Application for Payment, Contractor shall submit to Owner a final Schedule of Submittals, and, where applicable, a Schedule of Values for the Work. These schedules shall be satisfactory in form and substance to Owner as provided in Article 2.
- B. The Schedule of Values shall include quantities and unit prices aggregating the Contract Price and shall subdivide the Work into component parts. Each unit cost so established shall include its proportionate share of Contractor's general operating charges such as profit, overhead, supervision, insurance, bond premiums, interest, equipment cost, depreciation and rental, contingencies, expendable tools, equipment and supplies. The total cost of the items and quantities Contractor lists in the Schedule of Values shall equal the total Contract Price established in the Proposal.
- C. The Schedule of Values shall include a complete set of detailed work sheets on bid take off and bid summary covering estimated general conditions expense (field overhead), general overhead, profit mark ups and revisions leading to the final bid amount.
- D. When the Schedule of Values is approved by Owner, it shall become part of the Agreement and shall be used as the basis for Contractor progress payments.
- E. Progress payments based upon Unit Price Work will be based upon the number of units completed.

### **14.02 APPLICATION FOR PROGRESS PAYMENT**

- A. At least 20 days before each Application for Payment falls due (but not more often than once a month), Contractor shall submit to Owner for review an Application for Payment, Contractor's Declaration, Payment Schedule, and updated Progress Schedules indicating the anticipated completion dates of the various stages of the Work and estimated payments during the next 3 months. Contractor's Application for Payment shall be filled out on the form provided in the Contract Documents and signed by Contractor covering the Work completed as of the date of the Application for Payment and accompanied by such supporting documentation as is required by the Contract Documents and as Engineer or Owner may reasonably require. The Payment Schedule shall be on the form provided in the Contract Documents or in a format acceptable to Engineer or Owner. On the second and all subsequent payments, partial Waivers of Lien and Sworn Statement shall be required for all Work completed and paid for on previous certificates.
- B. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the

Application for Payment shall also be accompanied by such data, satisfactory to Owner, as will establish Owner's title to the material and equipment and protect Owner's interest therein, including applicable insurance. A receipted vendor's invoice showing the quantities of materials, and the amounts paid will be required and shall accompany the Application for Payment.

- C. Retainage with respect to progress payments will be in accordance with paragraph 14.03, and it will be retained until after completion of the entire Work and its final acceptance. When the amount to be retained is reduced to less than ten (10) percent, Contractor shall file with Owner the written consent of the Surety to such reduction and shall furnish an affidavit that all Contractor's indebtedness by reason of the Contract has been paid.

#### **14.03 RETAINAGE**

- A. On Contracts with a dollar value of \$30,000 and greater or on Contracts that provide for more than three (3) progress payments, progress payments and retainage shall be governed by the provisions of any statutes, rules or regulations regarding retention and these are incorporated herein by reference and made a part of this Contract.
- B. If there are no statutes, rules, or regulations applicable to retention, retainage shall be 10%, or such an amount as Owner deems necessary.

#### **14.04 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT**

- A. Owner will, within ten (10) days after receipt of each Contractor's Application for Payment and Payment Schedule, including each resubmittal, either indicate in writing a recommendation of payment and present an Engineer's Certificate for Payment to Owner, or may return the Application to Contractor indicating in writing Owner's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
- B. Owner's recommendation of any payment requested in Contractor's Application for Payment based on Owner's review of the Contractor's Application for Payment and Certificate for Payment and the accompanying data and schedules, as an experienced and qualified design professional that to the best of Owner's knowledge, information and belief;
  - 1. the Work has progressed to the point indicated;
  - 2. the quality of the Work is in accordance with the technical aspects of the Contract Documents subject to an evaluation of the Work as a functioning Project upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for any Unit Price Work under paragraph 12.03, and any qualifications stated in the recommendation; and
  - 3. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Owner's responsibility to observe the Work.
- C. However, by recommending any such payment Owner will not thereby be deemed to have represented that:
  - 1. exhaustive or continuous on-Site inspections have been made to check the quality or the quantity of the Work; or
  - 2. involved detailed inspections of the Work beyond the responsibilities specifically assigned to Owner in the Contract; or
  - 3. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
- D. Neither Owner's review of Contractor's Work for the purpose of recommending payments nor Owner's recommendation of any payment, including final payment, will impose responsibility on Engineer:
  - 1. to supervise, direct or control the Work;

2. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
  3. for the failure of Contractor to comply with Laws and Regulations applicable to the furnishing or performance of Work;
  4. for any failure of Contractor to perform or furnish Work in accordance with the Contract Documents;
  5. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price;
  6. to determine that title to any Work, materials, or equipment has passed to Owner free and clear of Liens.
- E. Owner may refuse to recommend the whole or any part of any payment if, in Owner's opinion, it would be incorrect to make such representations as stated above to Owner. Owner may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended to such extent as may be necessary in Owner's opinion to protect Owner from loss because:
1. the Work is defective, or completed Work has been damaged requiring correction or replacement;
  2. the Contract Price has been reduced because of Change Orders;
  3. Owner has been required to correct defective Work in accordance with paragraph 13.09, or has accepted defective Work in accordance with paragraph 13.08;
  4. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
  5. Owner has actual knowledge of the occurrence of any of the events enumerated in paragraph 15.02.

#### **14.05 PAYMENT BECOMES DUE**

- A. Thirty (30) days after presentation of the Application for Payment to Owner, the amount recommended will (subject to the provisions of paragraph 14.05.B) become due, (or only if Owner is a public agency, within 15 days after Owner receives the funds which are to be provided by a department or agency of the federal or state government, whichever is later, or in accordance with any time periods required by any applicable statute, rule or regulation) and when due will be paid by Owner to Contractor.
- B. Owner may refuse to make payment of the full amount recommended because:
1. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries,
  2. adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
  3. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
  4. Contractor has failed to provide and maintain required bonds or insurance;
  5. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

6. Owner has incurred extra charges or engineering costs related to Submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
  7. The Work is defective, requiring correction or replacement;
  8. Owner has been required to correct defective Work in accordance with paragraph 13.09, or has accepted defective Work pursuant to paragraph 13.08;
  9. The Contract Price has been reduced by Change Orders;
  10. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
  11. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
  12. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
  13. there are other items as set forth in the Contract Documents entitling Owner to a set off against the amount recommended; or
  14. Owner has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.04.E.1 through 14.04.E.5.
- C. If Owner refuses to make payment of the full amount recommended, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects, to Owner's satisfaction, the reasons for such action. The reduction imposed shall be binding on Contractor unless Contractor duly submits a Change Proposal contesting the reduction.
- D. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by paragraph 14.05.

#### **14.06 CONTRACTOR'S WARRANTY OF TITLE**

- A. Contractor warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner at the time of payment free and clear of all Liens, claims, security interests and encumbrances (hereafter in these General Conditions referred to as "Liens").

#### **14.07 SUBSTANTIAL COMPLETION**

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Owner issue a Certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If does not consider the Work substantially complete, Engineer or Owner will notify Contractor in writing giving the reasons therefor.
- C. At the time of receipt of the preliminary Certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

- D. After Substantial Completion Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

#### **14.08 FINAL INSPECTION**

- A. Upon written notice from Contractor that the Work is complete, Owner will make a final inspection with Engineer and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### **14.09 FINAL APPLICATION FOR PAYMENT**

- A. After Contractor has completed all corrections to the satisfaction of Owner and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked up record documents and other documents (all as required by the Contract Documents), and after Owner has indicated that the Work is acceptable, subject to the provisions of paragraph 14.13, Contractor may make application for final payment following the procedure for progress payments.
- B. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents and such other data and schedules as Owner may reasonably require, consent of Surety, if any, to final payment, together with complete and legally effective releases or waivers, satisfactory to Owner, of all Liens arising out of or filed in connection with the Work.
- C. In lieu of the releases or waivers of Lien, if approved by Owner, Contractor may furnish receipts or releases in full; an affidavit of Contractor that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or his property might in any way be responsible, have been paid or otherwise satisfied.
- D. If any Subcontractor, manufacturer, fabricator, Supplier or distributor fails to furnish a release or receipt in full, Contractor may furnish a Bond or other collateral satisfactory to Owner to indemnify Owner against any Claim or Lien.

#### **14.10 FINAL PAYMENT AND ACCEPTANCE**

- A. If, on the basis of Owner's observation of the Work during construction and final inspection, and Owner's review of the final Application for Payment and accompanying documentation (all as required by the Contract Documents), Owner is satisfied that to the best of Owner's knowledge, information and belief as a design professional that the Work has been completed and Contractor has fulfilled all of his obligations under the Contract Documents, Owner will, within ten (10) days after receipt of the final Application for Payment, indicate in writing Owner's Certificate for Payment and present the application for payment. At that time Owner will give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of paragraph 14.13.
- B. Otherwise, Owner will return the Application to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application.
- C. If the Application and accompanying documentation are appropriate as to form and substance, Owner shall, within 45 days (or within the time period required by any applicable statute, rule or regulation) after receipt thereof pay Contractor the amount recommended by Owner less any amounts of Owner claimed set-offs allowed under the Contract Documents, including but not limited to any applicable liquidated damages as determined by Owner. If Owner rejects the

Application, Owner shall do so in writing stating the appropriate sections of the Contract Documents upon which the rejection is based. Contractor may take the necessary remedial actions and resubmit the Application.

#### **14.11 FINAL COMPLETION DELAYED**

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, Owner shall, upon receipt of Contractor's final Application for Payment and recommendation, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.01, the written consent of the Surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Owner with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

#### **14.12 WAIVER OF CLAIMS**

- A. The making and acceptance of final payment shall constitute:
  - 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.09, or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; and shall not constitute a waiver by Owner of any rights in respect of Contractor's existing or continuing obligations under the Contract Documents; and,
  - 2. a waiver of all Claims by Contractor against Owner other than those previously made in writing and still pending in accordance with Article 16.

#### **14.13 LATE PAYMENTS**

- A. All monies not paid when due hereunder, except monies involving Federal and/or State Loans, Grants, or other sources which are delinquent because of no fault of Owner, shall bear interest at the maximum rate allowed by law at the time and place of the Project.

### **ARTICLE 15 SUSPENSION OF WORK AND TERMINATION**

#### **15.01 OWNER MAY SUSPEND WORK**

- A. Owner may, at any time and without cause, suspend the Work or any portion thereof for a period as Owner may deem necessary by notice in writing to Contractor and Engineer. If it should become necessary to stop work for an indefinite period, Contractor shall store all materials in such manner that they will not become an obstruction, nor become damaged in any way, and Contractor shall take every precaution to prevent damage or deterioration of the Work performed; provide suitable drainage by opening ditches and drains, and erect temporary structures where necessary. Contractor may request an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if he makes a Claim therefor as provided in paragraph 11.01.

#### **15.02 OWNER MAY TERMINATE FOR CAUSE**

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
  - 1. Contractor commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if Contractor takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time;
  - 2. a petition is filed against Contractor under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or

similar relief against Contractor under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

3. Contractor makes a general assignment for the benefit of creditors;
  4. a trustee, receiver, custodian or agent of Contractor is appointed under applicable law or under contract, whose appointment or authority to take charge of property of Contractor is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of Contractor's creditors;
  5. Contractor admits in writing an inability to pay its debts generally as they become due;
  6. Contractor persistently fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under paragraph 2.05 as revised from time to time);
  7. Contractor disregards Laws and Regulations of any public body having jurisdiction;
  8. Contractor disregards the authority of Engineer or Owner; or,
  9. Contractor otherwise violates any provisions of the Contract Documents.
- B. Owner may, after giving Contractor (and the Surety, if there be one) 7 days' written notice, and to the extent permitted by Laws and Regulations, terminate the services of Contractor, exclude Contractor from the Site, take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the site and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion), incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, finish the Work as Owner may deem expedient, and/or enforce the rights available to Owner under any applicable Performance Bond.
- C. In such case, Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, damages and expenses sustained by Owner arising out of or resulting from completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, damages and expenses exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, damages and expenses incurred by Owner will be reviewed as to reasonableness by Engineer and when so approved, incorporated in a Change Order, but when exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Where Contractor's services have been so terminated by Owner, the termination shall not affect any rights or remedies of Owner against Contractor or its Surety then existing or which may thereafter accrue. Any retention or payment of monies due Contractor by Owner will not release Contractor from liability.

#### **15.03 TERMINATION FOR CONVENIENCE**

- A. Upon seven (7) days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy, elect to terminate the Agreement. In such case, Contractor shall be paid (without duplication of any items):
1. for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination;
  2. for actual expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials or equipment as required by the Contract Documents in connection with uncompleted Work; and
  3. for reasonable expenses directly attributable to protecting work as a result of termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

C. Upon such termination, Contractor shall:

1. Immediately discontinue Work on the date and to the extent specified in the notice except to the extent necessary to protect Work in place;
2. Place no further orders for materials, services, or facilities, other than as may be necessary or required for completion of such portion of Work under the Contract that is not terminated;
3. Promptly make every reasonable effort to obtain cancellation upon terms reasonably satisfactory to Owner of all purchase orders and subcontracts to the extent they relate to the performance of Work terminated or assign to Owner those orders and subcontracts and revoke agreements specified in such notice;
4. Reasonably assist Owner, as specifically requested in writing, in the maintenance, protection and disposition of property acquired by Owner under the Contract Documents, as may be necessary;
5. Complete performance of any Work which is not terminated; and
6. Deliver to Owner an affidavit regarding the identity of potential unpaid Subcontractors or Suppliers and the amounts due to each.

#### **15.04 CONTRACTOR MAY STOP WORK OR TERMINATE**

- A. If Owner has failed to pay Contractor any sum finally determined to be due in accordance with the time limits specified in paragraph 14.05, Contractor may upon seven (7) days' written notice to Owner and Engineer, stop the Work until payment of all amounts then due.
- B. If through no act or fault of Contractor, the Work is suspended for a period of more than ninety (90) days by Owner, or under an order of court or other public authority, then Contractor may, upon seven (7) days written notice to Owner and Engineer and provided Owner or Engineer does not remedy such suspension or failure within that time, terminate the Agreement and recover from Owner payment on the same terms as provided in paragraph 15.03.
- C. The provisions of this paragraph 15.04 shall not relieve Contractor of his obligations under paragraph 6.22 to carry on the Work in accordance with the Progress Schedule and without delay during disputes and disagreements with Owner.

### **ARTICLE 16 FINAL RESOLUTION OF DISPUTES**

#### **16.01 METHODS AND PROCEDURES**

- A. Disputes Subject to Final Resolution: The following disputed matters are subject to final resolution under the provisions of this Article:
  1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
  2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents and arising after final payment has been made.
- B. Final Resolution of Disputes: For any dispute subject to resolution under this Article, Owner or Contractor may:
  1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
  2. agree with the other party to submit the dispute to another dispute resolution process; or
  3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, the following dispute resolution process shall be followed:
    - a. The parties shall submit the dispute to mediation under the mediation procedures outlined in the Construction Industry Arbitration Rules and Mediation Procedures of the American Arbitration Rules.

- b. If the dispute is not resolved by mediation, the parties shall proceed to resolve the dispute by arbitration in accordance with the Construction Industry Arbitration Rules and Mediation Procedures of the American Arbitration Association. The decision of the arbitrator(s) shall be final and binding and is enforceable in a court of competent jurisdiction.

## **ARTICLE 17 MISCELLANEOUS**

### **17.01 GIVING NOTICE**

- A. Whenever any provision of the Contract Documents requires the giving of written notice to Owner, Engineer, or Contractor, it shall be deemed to have been validly given only if delivered:
  - 1. in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended;
  - 2. by registered or certified mail postage prepaid to, the last business address known to the giver of the notice;
  - 3. or delivered in person to such person by a commercial courier service or otherwise to the recipient's place of business; or
  - 4. by secure file transfer with receipt documentation or other document control software.

### **17.02 COMPUTATION OF TIME**

- A. When any period of time is referred to in the Contract Documents by days, it shall be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday, or on a day made a legal holiday by the Law of the applicable jurisdiction, such day shall be omitted from the computation.

### **17.03 GENERAL**

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to and shall not be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Law or Regulation, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this paragraph shall be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply.
- B. All representations, warranties and guarantees made in the Contract Documents shall survive final payment and termination or completion of this Agreement.

### **17.04 PROFESSIONAL FEES AND COURT COSTS INCLUDED**

- A. Whenever reference is made to "claims, costs, losses, damages and expenses," it shall include in each case, but not be limited to, all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs.

### **17.05 NONDISCRIMINATION OF EMPLOYMENT**

- A. Contractor shall covenant and agree not to discriminate against any employee or applicant for employment, to be employed in the performance of this Contract, with respect to his hire, tenure, terms, conditions or privileges of employment, or any matter directly or indirectly related to employment, because of race, color, sex, age, religion, national origin or ancestry, height, weight, or marital status, or any other classification protected by law, and to require a similar covenant on the part of any Subcontractor employed in the performance of the Contract.

### **17.06 WAIVER OF CONSEQUENTIAL DAMAGES**

- A. Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract or the Work. This mutual waiver includes but is not limited to:

1. damages incurred by Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
  2. damages incurred by Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit in connection with any other project or anticipated project.
- B. This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination or default. Nothing contained in this Section shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents. Contractor also waives any Claim for consequential damages against Engineer where such Claims arise out of or relate in any way to the Project or the Contract Documents.

#### **17.07 NO WAIVER**

- A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

#### **17.08 CONTROLLING LAW**

- A. This Contract is to be governed by the Law of the state in which the Project is located.

#### **17.09 HEADINGS**

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

### **END OF SECTION**

## **SECTION 00 73 00 SUPPLEMENTARY CONDITIONS**

### **PART 1 GENERAL**

#### **1.01 SUMMARY**

- A. These Supplementary Conditions amend and supplement Section 00 72 00 - General Conditions and other provisions of Contract Documents as indicated below. Provisions that are not so amended or supplemented remain in full force and effect.
- B. The terms used in these Supplementary Conditions that are defined and have the meanings assigned to them in Section 00 72 00.

#### **1.02 MODIFICATIONS TO GENERAL CONDITIONS**

##### **A. SGC-1.01 Defined Terms**

- 1. The definition for "Substantial Completion" in shall be revised as follows:

Substantial Completion -- The Work (or a specified part thereof) has progressed to the point where, in the opinion of the Owner as evidenced by the 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 was intended; or if no such certificate is issued, when the Work is complete and ready for final payment as evidenced by the Owner's written recommendation of final payment in accordance with Article 14.11 of Section 00 72 00 - General Conditions. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

##### **B. SGC-4.02 Subsurface and Physical Conditions; Investigations and Reports**

- 1. In the preparation of Plans and Specifications, the Engineer has relied upon the following reports and tests of subsurface and latent physical conditions at the site: 2024 Annual Street Maintenance Project Geotechnical Engineering Report
- 2. The report identified above are not part of the Contract Documents, but the "technical data" contained herein upon which Contractor may rely, as expressly identified and established above, are incorporated in the Contract Documents by reference.
- 3. Copies of the following reports and/or tests are attached as Exhibits: 2024 Annual Street Maintenance Project Geotechnical Engineering Report

##### **C. SGC-5.03.D Additional Insured**

- 1. Add the following language at the end of Article 5.03.A.4 of the Section 00 72 00 - General Conditions:

Additional named insured on Owner's and Contractor's Protective Policy shall include:

- 1) Wade Trim, Inc.

##### **D. SGC-5.04 Limits of Liability**

- 1. The required limits of liability for insurance coverages requested in Article 5.03 of Section 00 72 00 - General Conditions shall be not less than the following:

SGC-5.04.A Worker's Compensation

Coverage A – Compensation: Statutory

Coverage B – Employer's Liability

Each Accident: \$500,000

Disease – Policy Limit: \$500,000

Disease – Each Employee: \$500,000

SGC-5.04.B Comprehensive General Liability

General Aggregate: \$2,000,000

Products – Com/Ops Aggregate: \$2,000,000

Personal and Advertising Injury: \$1,000,000

Each Occurrence: \$1,000,000

Fire Damage (any one fire): \$50,000

Medical Expense (any one person): \$5,000

Personal Injury Liability (claims arising of Employment Practice Liability):  
\$1,000,000

Property Damage Liability (explosion, collapse, and underground coverage):  
\$1,000,000

SGC-5.04.C Comprehensive Automobile Liability

Bodily Injury: \$1,000,000

Property Damage: \$1,000,000

or combined single limit: \$1,000,000

SGC-5.04.D Owner's Protective - Coverage shall be Occurrence Form

General Aggregate:\$1,000,000

Each Occurrence: \$1,000,000

SGC-5.04.F Umbrella or Excess Liability: \$2,000,000

Liquidated Damages: \$1,000/day

**E. SGC- 12.04 Lump Sum Work**

1. Add the following new paragraph after Article 12.03 of Section 00 72 00 - General Conditions, which is to read as follows:

**12.04 LUMP SUM WORK**

- a. When additional work or deletion of work, which is covered by a lump sum item, is required due to a modification, not a normal overrun or underrun in estimated quantities, payment or credit for the work will be based upon apparent unit prices which will be derived by dividing the lump sum price by the estimated plan quantities.
- b. Renumber subsequent paragraphs accordingly.

**F. SGC-18 Liquidated Damages**

1. Liquidated damages, if applicable, are referenced in the Proposal and Agreement. The requirements for liquidated damages should be included herein.

**ARTICLE 18 LIQUIDATED DAMAGES**

- a. If the Contractor shall fail to Substantially Complete the Work within the Contract Time, or extension of time granted by the Owner, then the Contractor will pay to the Owner the amount for liquidated damages as specified in the Agreement for each calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents. The liquidated damages charged shall be deducted from the Contractor's progress payments.

- b. Contractor shall not be charged with liquidated damages or any excess cost when the delay in Substantial Completion of the Work is due to the following and the Contractor has given written notice of such delay within seven (7) calendar days to Owner or Engineer.
- c. To any preference, priority or allocation order duly issued by the Owner.
- d. To unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a Contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and
- e. To any delays of subcontractors occasioned by any of the causes specified in Items A and B of this Article.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 00 91 13**  
**ADDENDUM**

To all prospective bidders and others concerned, YOU ARE HEREBY ADVISED THAT the Contract Documents for the above referenced Project are revised in the following particulars:

| Section | Description of Change |
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This Addendum is hereby incorporated into the original Contract Documents for the bidding referred to above and is considered as binding as though originally appearing therein. Receipt of this Addendum must be noted in the place provided in Section 00 42 43 - Proposal, dated \_\_\_\_\_, 20\_\_\_\_.

## **SECTION 01 11 00 SUMMARY OF WORK**

### **PART 1 GENERAL**

#### **1.01 WORK COVERED BY CONTRACT DOCUMENTS**

- A. This Project includes asphalt street reconstruction, water system improvements, and drainage improvements.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 33 00 - Submittal Procedures
- B. Section 01 50 00 - Temporary Facilities and Controls

#### **1.03 WORK BY OTHERS**

- A. There is no other work in the Project area, known to the Owner, which would affect this Contract.

#### **1.04 RIGHT-OF-WAY JURISDICTION/PERMITS**

- A. Work in the City of Keller right-of-way requires a City Right of Way Permit. The Contractor shall obtain the permit and pay all fees in connection with obtaining the permit.
- B. Contractor shall secure any permits required by the agency having jurisdiction, shall abide by all rules and regulations of each, and shall pay all costs in connection with the permits. Contractor shall pay for all permit and inspection fees as the agencies may charge to ensure compliance with their requirements.

#### **1.05 COORDINATION**

- A. A shutoff notice shall be delivered by the Contractor to all affected residences and businesses a minimum of 48 hour before any water main is shut off for construction.
- B. Whenever an existing gate valve must be opened or closed, the City of Keller's Water Department shall be notified. Valves shall be opened or closed only by the City's Water Department.
- C. While both existing and new fire hydrants are in place, the Contractor shall clearly mark those hydrants not in service and notify the City of Keller's Fire Department of hydrants not in service.
- D. It shall be the responsibility of the Contractor to coordinate his operations and those of his subcontractors in such a manner so as to avoid interference and delays in the areas of common construction activities.
- E. It shall be the responsibility of the Contractor to coordinate his operations and those of his subcontractors with all utility companies that may be affected.
- F. It shall be the responsibility of the Contractor to coordinate the testing of soils, concrete and materials specified within each specification.
- G. The Contractor shall comply with all applicable state and local codes and regulations pertaining to the nature and character of the Work being performed.

#### **1.06 CONTRACTOR'S USE OF PREMISES**

- A. Contractor shall maintain his construction operations within the presently existing road rights-of-way and easements throughout the Project area. In the event that the Contractor deems it necessary or advisable to operate beyond the limits of the existing rights-of-way or easements, he shall be responsible for making special written agreements with the property owners and shall furnish such copies of agreement to the Owner.
- B. The Contractor shall:

1. Assume full responsibility for protection and safekeeping of materials and equipment stored on the Site.
2. Ensure excavated and waste materials shall be stored in such a way as not to interfere with the use of spaces that may be designated to be left free and unobstructed and so as not to inconvenience occupants of adjacent property.
3. Preserve and use every precaution to prevent damage to, all trees, shrubbery, plants, lawns, fences, culverts, curbing, and all other types of structures or improvements, to all water, sewer, and gas lines, to all conduits, overhead pole lines, or appurtenances thereof, including the construction of temporary fences and to all other public or private property adjacent to the Work.
4. Unless specifically provided otherwise, clear all rights-of-way or easements of obstructions which must be removed to make possible proper prosecution of the Work as a part of the project construction operations.
5. Notify the proper representatives of the owners or occupants of the public or private lands of interest in lands which might be affected by the Work.
  - a. Such notice shall be made at least 48 hours in advance of the beginning of the Work.
  - b. Notices shall be applicable to both public and private utility companies and any corporation, company, individual, or other, either as owners or occupants, whose land or interest in land might be affected by the Work.
  - c. Be responsible for all damage or injury to property of any character resulting from any act, omission, neglect, or misconduct in the manner or method or execution of the Work, or at any time due to defective work, material, or equipment.

#### **1.07 PHOTOGRAPHS**

- A. Photographs as specified in Section 01 33 00 - Submittal Procedures shall be required for this Project.

#### **1.08 AUDIO/VIDEO ROUTE SURVEY**

- A. An audio/video route survey as specified in Section 01 33 00 - Submittal Procedures shall be required for this Project. Complete coverage shall include the area shown in the Plans and shall cover at least 25 feet outside of the right of way.
- B. The audio/video route survey shall be on USB Flash Drive.

#### **PART 2 PRODUCTS (NOT USED)**

#### **PART 3 EXECUTION (NOT USED)**

#### **END OF SECTION**

## **SECTION 01 21 00 ALLOWANCES**

### **PART 1 GENERAL**

#### **1.01 GENERAL**

- A. Contractor shall include Allowance(s) listed in the Bid Proposal that shall cover work, manufactured equipment or services that will be provided either by Contractor or by others who may be selected by Owner.
- B. Work performed under Allowances shall be subject to Owner approval and under special terms described herein. Contractor shall coordinate and cause the work covered by these Allowances.
- C. It is understood that Contractor has included in the Contract Price Allowances so named in the Contract Documents and shall cause the work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner.

#### **1.02 REQUIREMENTS**

- A. Allowances shall be administered in accordance with the provisions of the General Conditions of the Contract. Contractor shall be required to coordinate this work with the agency involved.
- B. Thereafter, if the actual price for this work is more or less than the allowance, the Contract Price shall be adjusted accordingly by Change Order. The adjustment in Contract Price shall be made on the basis of the actual invoice price without additional charge or markups for overhead, insurances, bonds, or any other incidental expenses.
- C. Contractor shall be responsible for all coordination with the agency involved and for the timely completion of the Work to fit his schedule. Contractor shall not be allowed any additional compensation for the failure of the agency involved to meet any schedule.

#### **1.03 RELATED REQUIREMENTS**

- A. The requirements of Section 00 72 00 and all Division 01 sections shall also apply to this work.

#### **1.04 DEFINITIONS**

- A. Lump Sum Allowance: A monetary sum that includes, as part of the Contract Price, the associated costs and requirements to complete the specified Allowance.
- B. Owner-Controlled Change Allowance: A monetary sum that is, as part of the Contract Price, the sole use of Owner to cover unanticipated costs and will be used only under the direction of Owner.

#### **1.05 SUBMITTALS**

- A. Submit invoices or delivery slips to indicate actual quantities of materials delivered to the Site for use in fulfillment of each Allowance.

#### **1.06 INSTRUCTIONS**

- A. At the earliest feasible date after Contract Award, Contractor shall advise Owner of the date when the final selection and purchase of each product or system described by an Allowance must be completed in order to avoid delay in performance of the work.
- B. When requested by Engineer or Owner, Contractor shall obtain Bids for each Allowance for use in making final selections; include recommendations that are relevant to performance of the Work.
- C. Contractor shall purchase products and systems as selected by Engineer from the designated Supplier.
- D. Allowances shall be used only as directed for Owner's purposes, and only by Change Orders which designate amounts to be charged to the Allowance.

- E. If the actual price for the specified Allowance is more or less than the stated Allowance, the Contract Price shall be adjusted accordingly by Change Order. The adjustment in Contract Price shall be made in accordance with the General Conditions.
- F. At Project closeout, any amounts remaining in Allowances will be credited to Owner by Change Order.

#### **1.07 SPECIFIC ALLOWANCES**

##### **A. Unforeseen Conditions:**

1. In the event that unforeseen physical conditions should be encountered on the Project, this allowance item shall be used to remedy the situation. The Contractor shall comply with all provisions of the Contract Documents when encountering and contending with an unforeseen physical condition. Engineer or Owner may require the Contractor to furnish a written report from a certified professional supporting his proposed scope and method for handling the unforeseen physical condition.
2. Contractor is required to present a detailed scope of work and detailed costs for any Work contemplated under the unforeseen conditions. No Work is to begin until scope and costs have been finalized and approval by the Engineer and Owner has been received in writing.
3. Unforeseen conditions will be paid for at the negotiated price after the Work has been authorized by the Owner. Price paid shall be payment in full for all labor, material, and equipment required for remedying unforeseen conditions and shall include, but is not limited to, scheduling, preparation, cleanup, restoration, and any other items necessary to complete the Work whether specifically mentioned or implied. Payment for unforeseen conditions will be based upon an agreement negotiated and approved prior to beginning the Work.
4. Thereafter, if the actual price for this work is more or less than the allowance amount in the Contract, the Contract Price shall be adjusted accordingly by Change Order. The payment shall be made on the basis of the actual approved amount without additional charge or markups for overhead, insurances, bonds, or any other incidental expenses. The Contractor shall be responsible for all coordination involved and for the timely completion of the Work to fit his schedule.
5. This allowance is not for solving and problems caused by the Contractor's own neglect, errors, omissions or other deeds of the Contractor's own fault.

#### **PART 2 PRODUCTS (NOT USED)**

#### **PART 3 EXECUTION (NOT USED)**

## **SECTION 01 22 00 UNIT PRICES**

### **PART 1 GENERAL**

#### **1.01 SCOPE**

- A.** This Section describes the method of measurement and basis of payment for all items of Work included in the Contract and specified in the Proposal. Contractor shall provide all labor, material, tools, equipment and services required to complete the Work specified herein and indicated on the Plans.
- B.** Owner will make no allowances for items not included in Section 00 42 43 - Proposal.

#### **1.02 ITEMS OF THE PROPOSAL**

##### **A. General & Miscellaneous Items**

##### **1. Item G1 – Mobilization**

- a. This pay item shall consist of mobilization and demobilization for the construction of the project. The project shall be constructed in phases as shown in the Plans.
- b. Mobilization shall be defined as all necessary equipment, supplies, materials, and personnel on the job site ready to begin construction. The cost of all bonds and insurance for the project will also be considered part of this specification. Mobilization will be measured as a lump sum (LS) item. Note: The total amount bid for mobilization and demobilization shall not exceed five percent (5%) of the total contract amount, exclusive of this pay item (adjusted contract amount).
- c. Measurement and Payment shall be as follows:
  - 1) Ten percent (10%) of the amount bid shall be paid with the first pay estimate.
  - 2) On all subsequent pay estimates, measurement and payment shall be prorated based on the value of the adjusted contract amount completed, plus the initial 10%. Prorated payment shall be as follows:
    - (a) When 1% of the adjusted contract amount has been earned, 50% of lump sum bid for mobilization, less retainage, will be paid.
    - (b) When 5% of the adjusted contract amount has been earned, 75% of the lump sum bid for mobilization, less retainage, will be paid.
    - (c) When 10% of the adjusted contract amount has been earned, 90% of the lump sum bid for mobilization, less retainage, will be paid.
    - (d) Payment for the remaining 10% of the lump sum bid for mobilization, less retainage, will be paid on the next monthly estimate following the 90% payment.
- d. Payment shall be total compensation for furnishing all labor, materials, tools, and equipment necessary to complete the work.

##### **2. Item G2 – Right-of-Way Preparation**

- a. This pay item shall consist of the preparation of the existing right-of-way for construction as required by the Plans, Specifications, and the nature of the work. Work shall be in accordance with Section 31 10 11 – Right of Way Preparation.
- b. Measurement and payment for this bid item shall be full compensation for all materials, equipment, labor, and any other incidentals necessary to complete Work and paid for at the Lump Sum (LS) price bid for "Right-of-Way Preparation".

### 3. Item G3 – Traffic Control

- a. The following work shall be performed under this Item:
  - 1) The work performed under this item shall be completed in accordance with TxDOT Item 502 - Barricades, Signs and Traffic Handling.
  - 2) Modification to TxDOT Item 502:
    - (a) *The traffic control details provided in the Plans represents a typical situation it is not all inclusive and does not relieve the contractor from providing additional traffic control devices as needed to control traffic.*
  - 3) The Contractor shall submit a detailed traffic control plan to the City Engineer for approval at least two (2) weeks prior to the beginning of construction, the plan shall be prepared by a licensed professional engineer in the State of Texas.
  - 4) The Contractor shall provide barricades as per the Traffic Control Plan and as per guidelines in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), Latest Revision.
  - 5) Removal of existing and temporary pavement and pavement markings shall be subsidiary to this bid Item.
  - 6) Modifications to TxDOT Item 502.3 "Measurement" & 502.4 "Payment" sections are subsidiary to the Traffic Control pay item.
  - 7) Any residential access removed or inhibited in anyway must be provided with an alternate access the same day by the Contractor and shall be considered incidental to this item.
  - 8) ***The Contractor shall limit construction area to two (2) streets (work areas) at one time including any and all utility work, demolition, paving, concrete work, and final restorations.*** Proposed construction phasing shall be submitted to the City Engineer for approval prior to construction commencing.
- b. Measurement and payment for this bid item shall be full compensation for all materials, equipment, labor, and any other incidentals necessary to complete work and paid for at the Lump Sum (LS) price bid for "Traffic Control".

### 4. Item G4 – SW3P Implementation & Maintenance

- a. Work shall be in accordance with Section 01 57 13 - Storm Water Pollution Prevention Plan.
- b. This item consists of furnishing all labor and materials necessary for the installation and maintenance of erosion controls and implementation of the Storm Water Pollution Prevention Plan (SWPPP).
- c. Measure and Payment for this item shall be made per the Lump Sum (LS) price bid for erosion control and SWPPP implementation for the limits of construction on each of the street and shall be full payment for all materials, labor, equipment, and other incidentals necessary to install and maintain the erosion controls complete and in place and fully comply with the SWPPP and the TPDES General Permit. The costs of maintenance or any additional erosion controls above and beyond those described in the SWPPP and ECP details necessary to maintain compliance with the TPDES permit are subsidiary to this pay item. The Contractor shall be responsible for conducting inspections of BMPs, devices and controls as prescribed in the SWPPP and in accordance with TPDES General Permit.

### 5. Item G5 – Audio & Video Survey

- a. Audio-video route survey will be paid for at the Contract Lump Sum (LS) price as specified in the Proposal. Price paid shall be payment in full for all labor, material,

equipment, and supplies necessary for furnishing an audio-video route survey in accordance with Section 01 11 00 – Summary of Work and Section 01 33 00 – Submittal Procedure.

**6. Item M1 – Sodding**

- a. Sodding shall be in accordance with Section 32 92 23 – Sodding.
- b. Sodding shall be installed at locations as directed by the Owner with six (6) inches of topsoil.
- c. Measurement and payment for block sodding shall be made at the unit price bid per Square Yard (SY) and shall be full compensation for all labor, materials, equipment, tools, fertilizer, watering, and incidentals necessary to install item complete in place.
- d. This Item shall be used at the discretion of the City. Any work performed without the authorization of the City shall not be paid for under this bid item.
- e. At the completion of the project, funds not utilized under this item shall be removed from the contract agreement via a construction change order.

**7. Item M2 – Furnishing & Placing Topsoil (6" Min)**

- a. Topsoil shall be in accordance with Section 32 92 23 – Sodding.
- b. Furnish and place topsoil to the depths directed by the Owner.
- c. Measurement and payment for topsoil shall be made at the unit price bid per Square Yard (SY) completed in place and shall be full compensation for all labor, materials, equipment, tools, watering, rolling, furnishing, and placing topsoil, and incidentals necessary to install item complete in place.
- d. This Item shall be used at the discretion of the City. Any work performed without the authorization of the City shall not be paid for under this bid item.
- e. At the completion of the project, funds not utilized under this item shall be removed from the contract agreement via a construction change order.

**8. Item M3 – Miscellaneous Improvement Allowance**

- a. This pay item shall be used at the direction of the City for unforeseen or missed items. This item will only pay for work performed at the direction of the City. Any work performed without the authorization of the City shall not be paid for under this bid item.
- b. The bidder shall include this amount within their bid and understand the intent is to not utilize this item. The fee associated with this item is not required to be a part of the required 5% bid surety.
- c. At the completion of the project, funds not utilized under this item shall be removed from the contract agreement via a construction change order.

**9. Item M4 – Miscellaneous Irrigation & Landscaping Allowance**

- a. This item shall include all items necessary for restoring the right-of-way and adjacent properties to original condition that are not provided as a bid item within these Specifications. This item includes all labor, equipment, materials, excavating, compacting, and incidentals required to complete the work in accordance with Plans and Specifications.
- b. This item shall include restoring the existing irrigation system(s) and existing landscaping as it was prior to construction.
- c. Measurement and payment for this bid item shall be full compensation for all materials, equipment, labor, and any other incidentals necessary to restore the right-of-way and adjacent properties and paid for at the Lump Sum (LS) price bid.

- d. This item shall be used at the discretion of the City. This item will only pay for worked performed at the direction of the City.
- e. Any work performed without the authorization of the City shall not be paid for under this bid item. The bidder shall include this amount within their bid and understand the intent is to not utilize this item.
- f. At the completion of the project, funds not utilized under this item shall be removed from the contract agreement via a construction change order.

**10. Item M5 – Private Water Service Reconnection**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal, Section 31 23 33 – Trenching and Backfilling, and Section 33 11 00 – Water Utility Distribution Piping.
- b. This item shall consist of the replacement and reconnection of up to five (5) linear feet of water service line on the private side of the meter, at the direction of the City. This item is intended for use when conditions are encountered outside of the scope of the standard water service line replacement (Items W1-W6). This item includes all labor, equipment, materials, and incidentals required to complete the work including replacement of water service line, all necessary reconnections (including water service lines, meters, irrigation, and backflow devices).
- c. Measurement and payment for this item shall be at the unit price bid for Each (EA) and shall be full compensation for all material, labor, and equipment necessary for furnishing and installing water service lines (open cut), and shall include, but is not limited to, all water service line pipe, reconnection to existing private service line and water meter, reconnection to irrigation and backflow device(s), special fittings, all necessary excavation, sheeting and bracing, shoring, draining, dewatering, laying, jointing, bedding, testing, disinfecting, embedment, backfill, flexible base, disposal of excess backfill and fill material (including backfill with special materials where specified), hauling and disposal of excess material, restoration, concrete pavement removal and replacement, curb and gutter removal and replacement, temporary backfill or steel plating, cleanup, restoration of any plantings, shrubs, planters, edging or any other landscaping items effected by the work, temporary/permanent relocation of mailboxes, effected by the work and all other items necessary to complete the job, whether specifically mentioned or implied.
- d. This item shall be used at the discretion of the City. This item will only pay for worked performed at the direction of the City.
- e. Any work performed without the authorization of the City shall not be paid for under this bid item. The bidder shall include this amount within their bid and understand the intent is to not utilize this item.
- f. At the completion of the project, funds not utilized under this item shall be removed from the contract agreement via a construction change order.

**B. Removal Items**

**1. Item R1 – Remove Existing Asphalt & Base/Subgrade (4”-6”)**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal.
- b. This pay item shall consist of excavating and removal of the roadway as shown on the Plans. The excavation and removal of roadway, including asphalt pavement, treated/untreated subgrade, base material and soil.
- c. Measurement and payment shall be by the contract unit price bid per square yard (SY) to the depth specified on the plans or a minimum of four (4) inches and shall be full compensation for authorized excavation; drying; undercutting subgrade and reworking or replacing the undercut material in rock cuts; hauling; disposal of material not used elsewhere on the project; scarification and compaction, equipment, labor, tools, and

incidentals necessary to complete the work. No payment will be made for thickness or width exceeding that shown on the Plans.

### **C. Paving Improvement Items**

#### **1. Items P1 & P2 – Asphalt Pavement (Type “D” HMAC)**

- a. Work shall be in accordance with Section 32 12 16 – Asphalt Paving.
- b. This item shall consist of the furnishing and placing of new asphaltic concrete pavement (HMAC) in place of the pavement removed, at the depth shown on the Plans. This item includes all other associated items and treatments such as prime coats, tack coats, compaction, testing, etc.
- c. Measurement and payment shall be by the contract unit price bid per Square Yard (SY) completed in place and shall be full compensation for materials, labor, equipment, tools, and incidentals necessary to complete the work. No payment will be made for thickness or width exceeding that shown on the Plans

#### **2. Items P3 & P4 – Asphalt Pavement (Type “B” HMAC)**

- a. Work shall be in accordance with Section 32 12 16 – Asphalt Paving.
- b. This item shall consist of the furnishing and placing of new asphaltic concrete pavement (HMAC) in place of the pavement removed, at the depth shown on the Plans. This item includes all other associated items and treatments such as prime coats, tack coats, compaction, testing, etc.
- c. Measurement and payment shall be by the contract unit price bid per Square Yard (SY) completed in place and shall be full compensation for materials, labor, equipment, tools, and incidentals necessary to complete the work. No payment will be made for thickness or width exceeding that shown on the Plans,

#### **3. Item P5 & P6 – Lime Stabilized Subgrade**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal, Section 31 23 13 – Subgrade Preparation, and Section 32 11 23 – Flexible Base.
- b. This item shall be to mix and compact lime, water, and subgrade or base as shown on the Plans. Subgrade stabilization shall be to the depth specified on the Plans.
- c. Measurement and Payment shall be by the contract unit price bid per Square Yard (SY) and shall be full compensation for materials, labor, equipment, tools, and incidentals necessary to complete the work. No payment will be made for thickness or width exceeding that shown on the Plans.

#### **4. Item P7 – Full-Depth Reclamation with Cement (8”)**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal, Section 31 23 13 – Subgrade Preparation, and Section 32 11 23 – Flexible Base.
- b. Full-Depth Reclamation (FDR) shall consist of pulverizing (reclaiming) the existing flexible asphalt pavement and underlying materials (base and/or subgrade materials) to the length and width as specified on the Plans (from gutter to gutter), blending with a cementitious stabilizing agent with cement, water, additives, or corrective aggregate as required by the mix design, to produce a cementitious stabilized base.
- c. Locations noted in the Plans are subject to field verification and approval by the City. The replacement limits can be adjusted as deemed necessary by the City. Contractor shall match existing grades and roadway width to ensure sufficient space for four (4) inch asphalt pavement unless directed otherwise by the City Engineer.
- d. Measurement and payment shall be by the contract unit price bid per Square Yard (SY) completed in place and shall be full compensation for shaping existing material,

loosening, mixing, pulverizing, spreading, applying cement, compacting, microcracking, finishing, curing, curing materials, blading, shaping and maintaining shape, replacing mixture, disposing of loosened materials, processing, hauling, preparing secondary subgrade, water, equipment, labor, tools, and incidentals necessary to complete the work. No payment will be made for thickness or width exceeding that shown on the Plans.

**5. Item P8 – Additional Subgrade Material (2” Min)**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal, Section 31 23 13 – Subgrade Preparation, and Section 32 11 23 – Flexible Base.
- b. This item shall be used at the direction of the City for additional subgrade needed to achieve eight (8) inches of thickness and subgrade widening, as shown on Plans.
- c. Measurement and payment shall be by the contract unit price (measured complete in place) bid per Ton (TON) completed in place and shall be full compensation for shaping existing material, loosening, mixing, pulverizing, spreading, applying cement, compacting, microcracking, finishing, curing, curing materials, blading, shaping and maintaining shape, replacing mixture, disposing of loosened materials, processing, hauling, preparing secondary subgrade, water, equipment, labor, tools, and incidentals necessary to complete the work. No payment will be made for thickness or width exceeding that shown on the Plans.

**6. Items P9 & P10 – Lime for Subgrade Stabilization**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal and Section 31 23 13 – Subgrade Preparation.
- b. This item shall be to furnish the lime slurry to construct a subgrade course. For bidding purposes and as directed by the Geotechnical Report, the rates of lime are shown in the Plans.
- c. Measurement and payment shall be by the contract unit price bid per Ton (TON) and shall be full compensation for materials, labor, equipment, tools, and incidentals necessary to complete the Work.

**7. Item P11 – Cement for Subgrade Stabilization (30 lb/sy)**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal, Section 31 23 13 – Subgrade Preparation, and Section 32 11 23 – Flexible Base.
- b. This item shall be to furnish the cement slurry to construct a subgrade course of Full-Depth Reclamation (FDR) material (existing subgrade material and existing asphalt pavement), additional new material, hydraulic cement slurry, and water.
- c. Measurement and payment shall be by the contract unit price bid per Ton (TON) and shall be full compensation for materials, labor, equipment, tools, and incidentals necessary to complete the Work.

**8. Item P12 – Root Barrier As Needed (Furnish & Install)**

- a. This item shall be used at the direction of the City for the furnishing and installing of root barrier and all materials, tools, equipment, labor, and any incidentals necessary to complete this work. The contractor shall comply with all tree protections notes and details in the plans.
- b. Root barriers should be installed vertically in a continuous length in a narrow trench dug on the tree side of the pavement (back of curb) with the top edge flush or slightly below the finished ground surface as shown in detail. If a ribbed root barrier material is used, then the root barrier should be positioned so that the ribs run vertically. The trench should be backfilled and tamped sufficiently to avoid later settling. The barrier should not be torn or pierced. Where root barriers are installed within the existing feeder zone

of the tree it involves severing of roots. A total of no more than 30 percent of feeder roots should be affected. All roots more than one (1) inch in diameter that have been exposed and damaged from the trenching activities shall be removed. Make a clean straight cut to expose damaged portion of root. Large, exposed roots should be covered in damp burlap to temporarily prevent drying and damage. Root barrier shall be a minimum of 18 inches deep shall be made of plastic panels, set ½ inch below finished grade, and center root barrier on trunk of tree.

- c. Locations noted in the Plans are subject to field verification and approval by the City. The replacement limits can be adjusted as deemed necessary by the City.
- d. All existing public utilities within the limits of replacement shown on the Plans with a surface feature including, but not limited to, water valve stacks and lids, manholes, water meters, vaults, etc. shall be located prior to construction, protected during construction, and adjusted to final grade, as necessary. All franchise utilities with a surface feature including, but not limited to, manholes, vaults, etc. shall be located prior to construction and protected during construction. Contractor shall contact franchise utility and City if adjustment to final grade is necessary. This work shall be considered incidental to this pay item.
- e. Measurement and payment shall be made on the basis of price bid per Linear Foot (LF) and shall be total compensation for furnishing all materials, tools, equipment, labor, and any other incidentals necessary to complete the work. This Item shall be used at the discretion of the City, except as noted on plans as "install XX LF of root barrier behind back of curb".
- f. Any work performed without the authorization of the City shall not be paid for under this bid item.
- g. At the completion of the project, funds not utilized under this item shall be removed from the contract agreement via a construction change order.

**9. Items P13 & P14 – Retroreflective Pavement Markings**

- a. Work shall be in accordance with Section 32 17 23 – Pavement Marking.
- b. These items shall consist of furnishing and installing pavement markings as prescribed in each bid item and as noted in the Plans.
- c. Measurement and payment shall be made on the basis of price bid per Linear Foot (LF) and shall be total compensation for furnishing all materials, tools, equipment, labor, cleaning and placement of pavement markings and any other incidentals necessary to complete the Work.

**10. Item P15 – Speed Cushion**

- a. Speed cushions shall meet the following requirements:
  - 1) All speed-reducing devices shall be installed as to allow emergency response vehicles to straddle the devices. The speed-reducing devices shall be made of rubber. The maximum height of any speed-reducing devices shall be three (3) inches per City of Keller Fire Code.
  - 2) Dimensions: three (3) inches by six (6) foot by seven (7) foot
  - 3) Entrance and Exit Gradient: 1:15
  - 4) Side Gradient: 1:3
  - 5) Material: Compression molded 100% recycled natural rubber and polyurethane
  - 6) Advance Notification: Some advance notification of the speed-reducing devices is required, i.e., reflective material and/or paint on the devices (see manufacturer of the devices for recommended method).

- 7) Spacing: Minimum spacing of 200 feet between speed cushions.
- 8) Traffic Logix model SC-070603-M or approved equal.
- b. A permit which includes documentation will be required for all speed reducing devices. Section 503.4 of the 2018 International Fire Code®, as amended, states the installation of speed bumps across fire lane shall require the approval of the Fire Chief. Contractor is responsible for coordination with the City and all permit is considered subsidiary to this item.
- c. Measurement and payment shall be made on the basis of price bid per Each (EA) and shall be total compensation for furnishing all materials, tools, equipment, labor, permitting, coordination, and any other incidentals necessary to complete the Work.

#### **D. Drainage Improvement Items**

##### **1. Items D1 & D2 – Remove Existing CMP**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal, Section 31 23 33 – Trenching and Backfilling, and Section 33 41 00 – Storm Utility Drainage Piping.
- b. The work under this item shall be for the removal and disposal of the corrugated metal pipe (CMP).
- c. Measurement and payment shall be made on the basis of price bid per Linear Foot (LF) of pipe and shall be total compensation for demolition, removal, and haul-off of the existing CMP, as well as furnishing all materials, tools, equipment, labor, and any other incidentals necessary to complete this Work.

##### **2. Item D3 – Remove Miscellaneous Concrete (Headwall)**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal, Section 31 23 33 – Trenching and Backfilling, and Section 33 41 00 – Storm Utility Drainage Piping.
- b. The Work under this item shall be for the removal and disposal of the concrete headwall and safety end treatment.
- c. Measurement and payment shall be made on the basis of price bid per square yard (SY) of concrete removed and shall be total compensation for demolition, removal, and haul-off of the existing headwalls and safety end treatment, as well as furnishing all materials, tools, equipment, labor, and any other incidentals necessary to complete this work.

##### **3. Item D4 – Remove Miscellaneous Concrete (6" Thick Concrete Apron)**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal and Section 33 41 00 – Storm Utility Drainage Piping.
- b. The Work under this item shall be for the removal and disposal of the six (6) inch thick concrete drainage apron.
- c. Measurement and payment shall be made on the basis of price bid per square yard (SY) of concrete removed and shall be total compensation for demolition, removal, and haul-off of the existing concrete apron, as well as furnishing all materials, tools, equipment, labor, and any other incidentals necessary to complete this work.

##### **4. Item D5 – Clean Existing RCP**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal and Section 33 41 00 – Storm Utility Drainage Piping.
- b. Measurement and payment shall be made based price bid per Linear Foot (LF) and shall be total compensation for furnishing all materials, tools, equipment, labor, and any other incidentals necessary to complete the Work.

**5. Items D6 & D7 – RCP (Class III)**

- a. Work shall be in accordance with Section 31 23 33 – Trenching and Backfilling, and Section 33 41 00 – Storm Utility Drainage Piping.
- b. Measurement and payment shall be made on the basis of price bid per Linear Foot (LF) of pipe and shall be total compensation for furnishing and installing all materials, tools, equipment, labor, bedding, backfill, and any other incidentals necessary to complete this Work.

**6. Items D8 & D9 – Cast-in-Place Safety End Treatment**

- a. Work shall be in accordance with Section 31 23 33 – Trenching and Backfilling, and Section 33 41 00 – Storm Utility Drainage Piping.
- b. Measurement and payment shall be made on the basis of price bid per Each (EA) and shall be total compensation for furnishing all materials, tools, equipment, labor, trimming edge of pipe, cross pipe, pipe runner, bottom anchor pipe, concrete riprap, and any other incidentals necessary to complete this Work.

**7. Item D10 – Storm Drain Vault (5'x5')**

- a. Work shall be in accordance with Section 31 23 33 – Trenching and Backfilling, and Section 33 41 00 – Storm Utility Drainage Piping.
- b. The item shall consist of constructing a manhole, complete in place, including furnishing and installing concrete boxouts, frames and covers.
- c. Measurement and payment shall be made based price bid per Each (EA) and shall be total compensation for furnishing all materials, tools, equipment, labor, and any other incidentals necessary to complete the Work.

**8. Item D11 – Trench Safety & Excavation Protection**

- a. Work shall be in accordance with Section 31 23 33 – Trenching and Backfilling and TxDOT Item 402, "Trench Excavation Protection", shall apply except as modified or clarified below:
  - 1) In addition to personnel safety, the "Trench Safety Plan", developed by the Contractor, must provide for sheeting and shoring procedures capable of providing support of the trenches or boring pits, giving due consideration to the proximity of existing structures and other facilities along the proposed utility lines.
- b. The cost of trench dewatering, if required, shall be subsidiary to this Bid Item.
- c. Measurement and payment for trench protection shall be made by the Linear Foot (LF) of trench exceeding a depth of five (5) feet and shall be full compensation for all labor, materials, equipment, tools, watering and incidentals necessary to install item complete in place.

**E. Water Improvement Items**

**1. Items W1 - W4 – Water Service Replacement**

- a. Work shall be in accordance with Section 31 23 33 – Trenching and Backfilling, and Section 33 11 00 – Water Utility Distribution Piping.
- b. This item shall consist of removal and disposal of existing water service boxes, assemblies, and lines, furnishing, placing, cleaning, and testing of water service boxes, assemblies, and lines. Install all water meter boxes, assemblies and service lines as shown on the Plans.
- c. Measurement and payment for this item shall be at the unit price bid for Each (EA) and shall be full compensation for all material, labor, and equipment necessary for furnishing and installing water service lines (open cut), meter boxes, assemblies,

fittings, tapping saddle, corporation stop, curb stop and/or angle stop, casing pipe (for long service only) and shall include, but is not limited to, all water service line pipe, special fittings, all necessary excavation, sheeting and bracing, shoring, draining, dewatering, laying, jointing, bedding, testing, disinfecting, embedment, backfill, flexible base, disposal of excess backfill and fill material (including backfill with special materials where specified), connection to water main (including service clamps where specified); hauling and disposal of excess material, restoration, concrete or asphalt pavement removal and replacement, curb and gutter removal and replacement (unless otherwise shown in the Plans), temporary backfill or steel plating, cleanup, restoration of any plantings, shrubs, planters, edging or any other landscaping items effected by the Work, temporary/permanent relocation of mailboxes, effected by the Work and all other items necessary to complete the Work, whether specifically mentioned or implied.

**2. Item W5 – Remove Existing 6” Water Line**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal, Section 31 23 33 – Trenching and Backfilling, and Section 33 11 00 – Water Utility Distribution Piping.
- b. This item will be paid for at the Contract Unit Price per Linear Foot (LF). Measurement and payment shall be for all for labor, material, and equipment necessary for cutting and removing the existing water main, and shall include, but is not limited to, necessary excavation, sheeting, bracing, shoring, and dewatering, protection of existing improvements, cutting of existing water main, furnishing and installing caps, backfilling, flowable fill, disposal of excess excavated material, barricading, restoration, cleanup, and other items necessary to complete the job, whether specifically mentioned or implied.

**3. Item W6 – Remove Fire Hydrant Assembly**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal, Section 31 23 33 – Trenching and Backfilling, and Section 33 11 00 – Water Utility Distribution Piping.
- b. Measurement and payment for this item shall be at the unit price bid for Each (EA) and shall be full compensation for labor, material, and equipment necessary for removing fire hydrant, and shall include, but is not limited to, necessary excavation, sheeting, bracing, shoring, and dewatering, protection of existing improvements, removal of fire hydrant, valve, valve boxes, connecting piping, disconnection from existing water main, capping of existing water main, backfill, backfilling, disposal of excess excavated material, restoration, delivering hydrant, gate valve and valve box to Owner, cleanup, restoration, and other items necessary to complete the Work, whether specifically mentioned or implied.
- c. If requested by the Owner, fire hydrant assembly and parts shall be salvaged and returned to the City.

**4. Item W7 – Remove 6” Gate Valve & Box**

- a. Work shall be in accordance with Section 02 41 13 – Selective Removal, Section 31 23 33 – Trenching and Backfilling, and Section 33 11 00 – Water Utility Distribution Piping.
- b. Measurement and payment for this item shall be at the unit price bid for Each (EA) and shall be full compensation for labor, materials, and equipment required for removing existing gate valve and box, and shall include, but is not limited to, excavation, removing the structure, removing and salvaging gate valve, salvaging box and cover, capping water main (if necessary), backfilling with specified materials, cleanup, restoration, and other items necessary to complete the job, whether specifically mentioned or implied.
- c. If requested by the Owner, gate valve and parts shall be salvaged and returned to the City.

**5. Item W8 – 6” PVC, C900, DR-18, Water Line Pipe (Open Cut)**

- a. Work shall be in accordance with Section 31 23 33 – Trenching and Backfilling, and Section 33 11 00 – Water Utility Distribution Piping.
- b. Water Line, type, diameter and class is specified in Plans This item shall include all labor, material, and equipment necessary for furnishing and installing water line and shall include, but is not limited to, specials and fittings, excavation, sheeting and bracing, shoring, draining, dewatering, laying, jointing, bedding, testing, disinfecting, backfilling (including backfill with special materials where specified), flowable fill, disposal of excess excavated material, temporary blow-offs, thrust blocks, encasement, barricading, restoration, final cleanup, connections to existing lines and other items necessary to complete the job, whether specifically mentioned or implied.
- c. Measurement and payment for water line will be in Linear Foot (LF) along the centerline of the pipe taken from end-to-end with no reduction for fittings and valves except for special structures, sections, or connections for which either lump sum or unit prices have been taken will be deducted from the total length of water line and will be paid for at the prices bid, therefore.

**6. Item W9 – Fire Hydrant Assembly**

- a. Work shall be in accordance with Section 31 23 33 – Trenching and Backfilling, and Section 33 11 00 – Water Utility Distribution Piping.
- b. Measurement and payment for this item shall be at the unit price bid for Each (EA) and shall be full compensation for labor, material, and equipment necessary for furnishing and installing fire hydrant assemblies, and shall include, but is not limited to, valves, valve boxes, connecting piping and fittings, necessary excavation, sheeting and bracing, shoring, dewatering, backfilling, disposal of excess excavated material, miscellaneous pipe connecting hydrant to water main, valves and fittings, thrust blocks, restoration, cleanup, and all other items necessary to complete the job, whether specifically mentioned or implied.

**7. Item W10 – 6” Gate Valve & Box**

- a. Work shall be in accordance with Section 31 23 33 – Trenching and Backfilling, and Section 33 11 00 – Water Utility Distribution Piping.
- b. Measurement and payment for this item shall be at the unit price bid for Each (EA) and shall be full compensation for labor, material, and equipment necessary for furnishing and installing valve and box, and shall include, but is not limited to, concrete boxout steel reinforcing, adjusting rings, box frame and cover, necessary excavation, sheeting and bracing, shoring, dewatering, connection to water main, backfilling, restraints, disposal of excess excavated material, thrust blocks, restoration, cleanup, and other items necessary to complete the Work, whether specifically mentioned or implied.
- c. Concrete boxout shall be considered subsidiary to this item.

**8. Item W11 – 6” Cut-In Sleeve**

- a. Work shall be in accordance with Section 31 23 33 – Trenching and Backfilling, and Section 33 11 00 – Water Utility Distribution Piping.
- b. Measurement and payment for this item shall be at the unit price bud for Each (EA) and shall be full compensation for labor, material, and equipment necessary for furnishing and cut-in sleeve, and shall include, but is not limited to, necessary excavation, sheeting and bracing, shoring, dewatering, connection to water main, backfilling, restraints, disposal of excess excavated material, thrust blocks, restoration, cleanup, and other items necessary to complete the Work, whether specifically mentioned or implied.

**9. Item W12 – Connect Proposed 6” Fire Hydrant Lead to Existing 6” Water Line (Tee or Cross)**

- a. Work shall be in accordance with Section 31 23 33 – Trenching and Backfilling, and Section 33 11 00 – Water Utility Distribution Piping.
- b. Measurement and payment for this item shall be at the unit price bid for Each (EA). Price paid shall be payment in full for labor, material, and equipment necessary for connecting new water main to existing water main and shall include, but is not limited to, water line pipe, fittings, adapters, necessary excavation, sheeting and bracing, shoring, draining, dewatering, laying, jointing, bedding, testing, disinfecting, filling, backfilling (including backfill with special materials where specified), disposal of excess backfill and fill material, connection to new water line, capping old water main, thrust blocks, restoration, cleanup, and other items necessary to complete the job, whether specifically mentioned or implied.

**10. Item w13 – Trench Safety & Excavation Protection**

- a. Work shall be in accordance with Section 31 23 33 – Trenching and Backfilling and TxDOT Item 402, “Trench Excavation Protection”, shall apply except as modified or clarified below:
  - 1) In addition to personnel safety, the “Trench Safety Plan”, developed by the Contractor, must provide for sheeting and shoring procedures capable of providing support of the trenches or boring pits, giving due consideration to the proximity of existing structures and other facilities along the proposed utility lines.
- b. The cost of trench dewatering, if required, shall be subsidiary to this Bid Item.
- c. Measurement and payment for trench protection shall be made by the Linear Foot (LF) of trench exceeding a depth of five (5) feet and shall be full compensation for all labor, materials, equipment, tools, watering and incidentals necessary to install item complete in place.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

## **SECTION 01 31 19 PROJECT MEETINGS**

### **PART 1 GENERAL**

#### **1.01 PRECONSTRUCTION MEETING**

- A. Prior to the delivery of materials or the start of any construction, the Contractor shall request a Preconstruction Meeting from the Owner. A minimum three (3) working days' notification to meeting participants shall be required.
- B. Schedule:
  - 1. Engineer and Owner will establish the meeting place, time and date, distribute agenda, notify participants, and administer the meeting. Contractor shall notify major Subcontractors.
- C. Attendance:
  - 1. Owner
  - 2. Engineer
  - 3. Contractor
    - a. Major Subcontractors
  - 4. Utility Companies
  - 5. Safety Representatives
  - 6. Governmental Agencies
- D. Agenda:
  - 1. Distribution by the Contractor and discussion, review and acceptance of:
    - a. List of names and telephone numbers for superintendent, foreman and other key personnel.
    - b. List of major Subcontractors and Suppliers.
    - c. Projected construction preliminary progress schedules.
    - d. Preliminary schedule of Shop Drawings and Sample submittals.
    - e. Estimated monthly payment schedule and schedule of values
  - 2. Critical Work sequencing.
  - 3. Major equipment deliveries and priorities.
  - 4. Project coordination.
  - 5. Responsibilities of Owner, Engineer, Contractor and other agencies.
  - 6. Procedures and processing of:
    - a. Field decisions.
    - b. Proposal requests.
    - c. Submittals.
    - d. Change Orders.
    - e. Applications for Payment.
  - 7. Adequacy of distribution of Contract Documents.

8. Procedures for maintaining Record Documents.
  9. Use of premises.
  10. Construction facilities, controls and construction aids.
  11. Temporary utilities.
  12. Safety and first aid procedures.
  13. Security procedures.
  14. Housekeeping procedures.
  15. Testing
- E. Minutes:
1. Engineer will prepare and distribute copies to participants within seven (7) days of meeting. Participants shall report corrections and comments within ten (10) days of receipt of minutes.

## **1.02 PROGRESS MEETINGS**

- A. Periodic Progress Meetings will be held as necessary.
- B. Schedule:
1. Engineer and will establish the meeting place, time and date, distribute agenda, notify participants and administer the meeting. Contractor shall notify major Subcontractors.
- C. Attendance:
1. Owner
  2. Engineer
  3. Contractor
  4. Subcontractor as appropriate to the agenda.
  5. Suppliers as appropriate to the agenda.
  6. Others
- D. Minutes:
1. Engineer will prepare and distribute copies to participants and the Owner within seven (7) days of meeting for review at the next meeting.

## **1.03 COMMUNICATION DURING THE PROJECT**

- A. Rick Hardcopf, PE, City of Keller will be the Owner's Representative and shall be the first point of contact for all parties on matters concerning this project.
- B. The Owner's Representative will coordinate correspondence concerning:
1. Submittals including requests for payment (First submitted to Rick Hardcopf, PE for approval)
  2. Clarification and interpretation of the Contract Documents
  3. Contract modifications
  4. Observation of work and testing
  5. Claims
- C. The Owner's Representative will normally communicate only with the Contractor. Any required communication with suppliers or subcontractors will only be with the direct involvement of the Contractor.

- D. Written communications are to be directed to the Owner's Representative at the address indicated at the Pre-construction Conference. Communications should include as a minimum:
  - 1. Name of the Owner – City of Keller
  - 2. Project Name – 2024 Annual Street Maintenance
  - 3. Project Number – 502408
  - 4. Date
  - 5. A Reference Statement

#### **1.04 REQUEST FOR INFORMATION**

- A. Submit Request for Information (RFI) to the Owner's Representative to obtain additional information or clarification of the Contract Documents.
  - 1. Submit a separate RFI for each item
  - 2. Attach adequate information to permit a written response without further clarification. Owner's Representative will return requests that do not have adequate information to the Contractor for additional information. Contractor is responsible for all delays resulting from multiple submittals due to inadequate information.
  - 3. A response will be made when adequate information is provided.
- B. Response to an RFI is given to provide additional information, interpretation, or clarification of the requirements of the Contract Documents, and does not modify the Contract Documents.
- C. If the RFI indicates that a contract modification is required, the Owner's Representative will take appropriate action.

#### **1.05 ADDITIONAL**

- A. Payment Schedule
  - 1. Submit via e-mail to Rick Hardcopf, PE for initial approval.
  - 2. Once per month (week of 25th)
  - 3. Utilize excel spreadsheet provided
- B. Soil Erosion Control
  - 1. Contractor's responsibility to provide a design, implement and maintain
  - 2. Less than 5 acres
  - 3. Establish prior to construction
  - 4. Plan must be submitted at Preconstruction Meeting
- C. Traffic Control
  - 1. Contractor's responsibility to provide a design, implement and maintain
  - 2. Establish prior to construction
  - 3. Plan must be submitted at Preconstruction Meeting
- D. Testing
  - 1. Contractor shall coordinate all testing for concrete, asphalt, and soils.
  - 2. Contractor is responsible for cost of all material testing.
  - 3. Concrete and asphalt design needs to be submitted two (2) weeks in advance.
  - 4. Owner will handle the water sampling and testing/contractor handles Hydrostatic testing.

E. Hours of Operation

1. No working on Sundays
2. Monday – Thursday (Weekdays) work hours are – 6:00 AM – 7:00 PM
3. Friday & Saturday (Weekends) work hours are – 8:00 AM – 6:00PM
4. Owner's official work hours (including inspection) are Monday – Thursday 7:30 AM – 5:30 PM.
5. Two (2) day notice is required if inspector is needed on Friday 7:30 AM – 5:30 PM or Saturday 9:00 AM – 5:00 PM. Contractor is responsible for paying overtime for Friday and Saturday inspection.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

## **SECTION 01 32 16 CONSTRUCTION PROJECT SCHEDULE**

### **PART 1 GENERAL**

#### **1.01 SCOPE**

- A. Contractor shall be responsible for the Project construction schedule for the full Contract Time, including without limitation the following:
  - 1. Contractor's construction schedule updates shall be submitted on a monthly basis, or as requested by Owner.
  - 2. Contractor's short-term look-ahead schedule submitted at each progress meeting and as required by the Owner.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 33 00 - Submittal Procedures

#### **1.03 DEFINITIONS**

- A. Activity: A discrete part of a project that is identified in the Contractor's planning, scheduling, executing, monitoring, and controlling of the construction Project. Activities included in a construction schedule consume time and resources.
- B. Critical Activity: An activity on the critical path of the construction schedule.
- C. Predecessor Activity: An activity that precedes another activity in the network.
- D. Successor Activity: An activity that follows another activity in the network.
- E. Cost Loading: The allocation to each activity within the CPM Schedule of the portion of the Contract Price reflecting the Contractor's anticipated costs to perform that portion of the Work, including a proportional share of overheads and profit. The sum of costs for all activities must equal the total Contract Sum. The Cost loaded CPM Schedule shall be referenced to the contract, purchase order line item, and bid breakdown item.
- F. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path to complete the Work of the Project within the specified Contract Times and interim completion milestones.
- G. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- H. Event: The starting or ending point of an activity.
- I. Free Float: is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
- J. Total Float: is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
- K. Contract Float: is the measure, in calendar days, of leeway between the Contractor's anticipated date for completion of all or any part of the Work and the corresponding specified Contract Time regardless of the float values calculated by the software used to produce the CPM Schedule.
- L. Resource Loading: The allocation of labor and equipment necessary for completing an activity as scheduled.

- M. Work Breakdown Structure (WBS): A deliverable-oriented breakdown of a project into smaller components. A work breakdown structure is a key project deliverable that organizes the team's work into manageable sections.
- N. Detailed Cost Breakdown (DCB): An itemized breakdown of the Work and Contract Amount detailing quantities and dollar amounts for each pay item, developed by summarizing the cost-loaded CPM schedule to a level of detail appropriate for use in progress payment estimates. The sum of all pay items shall equal the Contract Price.
- O. Milestone: The date of a significant event, used to monitor schedule performance and define Contract deadlines.
- P. Data Date: The reporting cut-off date through which progress is incorporated into a schedule.
- Q. The term "day" as used in these Contract Documents shall mean calendar day unless otherwise specifically designated. Contract Time computations shall be made in Days. Total Float and Contract Float values computed in Working Days shall be converted to Days when such computations are made for the purpose of calculating changes in Contract Time.

#### **1.04 CPM SCHEDULE**

- A. CPM Schedule Submittals are intended to show:
  - 1. the priority and sequencing by which the Contractor intends to execute the Work (or Work remaining) to comply with the Contract Times, those sequences of Work indicated in or required by the Contract Documents and any other requirements of the Contract Documents;
  - 2. how the Contractor anticipates foreseeable events, site conditions and all other general, local and prevailing conditions that may in any manner affect cost, progress, schedule, performance and furnishing of the Work;
  - 3. how the Means and Methods chosen by the Contractor translate into Activities and sequencing;
  - 4. the actual timing and sequencing of completed Work; and
  - 5. the allocation of the Contract Price and construction craft labor hours to the Activities.
- B. The CPM Schedule shall detail CPM Activities and logic ties as required to demonstrate the Contractor's approach to all the Work. CPM Activity durations shall equate to the days required to complete the associated Work. Activities shall not combine:
  - 1. separate items of Unit Price or lump sum Work;
  - 2. distinct classes of Work (e.g., CSI Divisions or equivalent);
  - 3. Work in separate areas, structures or facilities and, if requested by Engineer, Work in separate locations or elevations within an area, structure or facility; or
  - 4. rough-in and finish Work.
- C. Start-to-finish relationships and negative lags shall not be utilized unless approved in advance by the Engineer. Activities shall be cost and resource loaded.
- D. The activities shall form a complete network wherein all activities (except for the start and completion milestones) shall have at least one predecessor and one successor. Each activity shall have as many predecessor or successor activities as is necessary to accurately reflect the requirements to complete the work. The number of activities and level of detail in the schedule will be subject to the Engineer's review.
- E. Schedule calendars must be developed to accurately reflect the working times for each activity based on the specific requirements of the project. If not specified, assume 5 calendar days and 40 hours per week. Observed federal, state and non-work holidays should be included, as appropriate.

- F. Contractor shall refrain from constraining activity dates in the schedule other than Contract milestones. If the Contractor feels constraints are necessary, the Contractor will detail the reasons for the constraints to the Engineer and in the schedule narrative and will require approval of their use.
- G. Early Dates in the CPM Schedule shall be based on proceeding with all or part of the Work exactly on the date when the corresponding Contract Time commences to run. Late Dates shall be based on completing all or part of the Work exactly on the corresponding Contract Time, regardless of whether the Contractor anticipates early completion or not. If sequences of Work are indicated in or required by the Contract Documents, the CPM Schedule shall show in detail the Contractor's approach to conforming with those sequences.
- H. A narrative shall accompany all CPM Schedule Submittals which shall:
  - 1. Discuss the Contractor's planning and approach to the Project and any changes therein;
  - 2. Identify planned staffing, resources, and work hours;
  - 3. Identify the basis for any constraints incorporated into the CPM schedule;
  - 4. Itemize shifts, non-Working Days and any multiple calendars applied to the CPM Activities;
  - 5. Compare current activity dates and the Contract Times;
  - 6. Recap progress and days gained or lost vs. the As-Planned Schedule;
  - 7. Describe all changes in resources to be used on remaining Work;
  - 8. Identify delays and causes and any actions taken to mitigate impact;
  - 9. Explain the basis for any logic ties other than finish-to-start (FS), and for each lag incorporated into the schedule;
  - 10. Define abbreviations used in the schedule;
  - 11. Itemize any revisions made in the activities or Work sequences, and
  - 12. Identify all approved logic changes.
- I. CPM Schedule Submittals shall include:
  - 1. Activity report/Gantt charts including CPM Activity code, description, duration, calendar, Early and Late Dates (calendar dates), Total Float, labor man-hours, cost, and sort codes. The Late Finish Date (or the Early Start Date) of any CPM Activity highlighting a Contract Time (or commencement of all or any part of the Work) shall equal the corresponding Contract Time (or Contract date). Provide PDF file (11-inch x 17-inch printable, with headers and footers).
  - 2. Schedule update reports shall include the prior update baseline.
- J. Owner's review of CPM Schedule Submittals may result in comments relating to conformance with
  - 1. the Contract Times,
  - 2. those sequences of Work indicated in or required by the Contract Documents
  - 3. any other Contract Document requirements that may have a significant bearing on the use of CPM Schedule Submittals to resolve issues affecting Contract Price and/or Contract Time. The review of CPM Schedule Updates may, in addition result in comments as to whether the Contractor's scheduling of Work remaining continues to conform with the Contract Times and those sequences of Work indicated in or required by the Contract Documents. Review comments may also respond to Contractor's proposed schedule recovery plans, when and as appropriate, and to Contractor requests for extensions in Contract Time. CPM Schedule review comments may also result in the selection of Targets and recording of Target Times.

- K. No CPM Schedule review by the Engineer shall relieve the Contractor from the responsibility to:
1. comply with the Contract Times and any sequences of Work indicated in or required by the Contract Documents
  2. complete omitted Work within the Contract Times.

Nor will any such CPM Schedule review by the Engineer lead to approval of, or consent to, any variation from the Contract Documents.

- L. CPM Schedule reviews shall not impose on the Owner any responsibility for:
1. the means, methods, sequences or techniques by which the Contractor plans and executes the Work;
  2. verifying whether Work is omitted;
  3. Activity durations are reasonable;
  4. the adequacy of the level of labor, materials and construction equipment;
  5. the reasonableness of the Contractor's chosen Means and Methods; or
  6. whether Work sequences and Activity timing are practicable.

Even if any comments or objections are noted from the reviews of CPM Schedule Submittals, no such reviews or objections noted shall be effective or construed to create or impose on the Owner or Engineer any responsibility for the timing, planning, scheduling or execution of the Work or for the correctness of any such CPM Schedule details. The correctness of the CPM Schedule shall remain the sole responsibility of the Contractor.

## **PART 2 PRODUCTS (NOT USED)**

## **PART 3 EXECUTION**

### **3.01 PROGRESS AND COMPLETION**

- A. All time limits stated in the Contract Documents are of the essence of the Agreement. The Contractor shall begin the Work on the date of commencement indicated in the Notice to Proceed. It shall carry the Work forward expeditiously with adequate resources, shall at all times adhere to the CPM Schedule, and shall achieve Substantial Completion and Final Completion within the time limits set forth in Project Calendar stated in the Contract Documents, as extended by change orders.
- B. The Contractor shall carry on the Work with due diligence during all disputes or disagreements with the Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements. The Contractor shall exercise reasonable precautions, efforts and measures to avoid or mitigate situations that would cause Delays.

### **3.02 SUSPENSIONS AND DELAYS**

- A. In accordance with the General Conditions the Owner may order the Contractor in writing to suspend, defer, stop, delay, interrupt, slow down, or extend all or any part of the Work for such period as it may determine to be appropriate for the convenience of Owner.
- B. Contractor shall provide Owner the opportunity to prevent or mitigate delays by Contractor's promptly furnishing of written notice of potential delay to Owner before Contractor incurs actual delay or additional costs, and in any case not later than three (3) days after the occurrence of any of the following that Contractor believes: (a) to be within the responsibility of the Owner, and (b) may result in critical path delay to any of the Contract Times required by the Project Calendar included in the Contract Documents:
1. (i) Construction Change Directives or Change Orders issued by Owner; (ii) the Contractor receives a notice of a change in the Agreement or extra work to be performed; (iii) the Engineer provides a clarification or notice of a no-cost change or minor change as provided

- in the General Conditions; or (iv) Owner or Engineer directs a change in the Work in accordance with the changes provisions of the General Conditions that Contractor believes will result in critical path delay to any Contract Time;
2. Contractor encounters concealed conditions in accordance with the provisions of the General Conditions that it believes will result in critical path delay to any Contract Time;
  3. Contractor believes that any act or failure to act by Owner or Engineer or any of Owner's other contractors or consultants, or any variation in quantities for unit price work, will cause performance of all or any part of the Work to be delayed, deferred, stopped, slowed down, suspended or interrupted beyond the reasonable time for such actions as allowed under the Contract Documents and the CPM schedule, resulting in potential critical path delay to any Contract Time.
- C. Contractor shall promptly provide written notice to Owner before Contractor incurs actual delay or additional costs, and in any case not later than three (3) days after the occurrence of any event that (a) is not within the responsibility of either the Owner or the Contractor, and (b) may result in critical path delay to any Contract Time including without limitation:
1. Uncontrollable Circumstance as provided in the General Conditions
  2. Adverse weather within a calendar month that causes the loss of more work-days than specified herein.
  3. Conditions affecting Owner's facilities, that result in constraints to Contractor's work or impede shutdowns of Owner's systems at the times requested by Contractor, including without limitation operational effects of weather, plant conditions, ongoing maintenance, other work affecting available facilities, equipment failures or outages, requirements to maintain sufficient processing capacity, or other regulatory or operational issues affecting Owner's facilities, provided that such conditions are outside the reasonable control and reasonable advance planning of both Owner and Contractor.
  4. Delays caused by regulatory authorities, governmental agencies, public utilities, and other third parties.
- D. Contractor shall promptly provide written notice to Owner, in any case not later than three (3) days, after the start of any delay that is within the responsibility of the Contractor and shall immediately take such action as is necessary to mitigate and recover the delay.
1. If schedule recovery is required, the Contractor shall enclose with the next Schedule Update Submittal a schedule recovery plan consisting of (a) a narrative describing the cause of schedule slippage and the actions taken to recover schedule within the shortest reasonable time, and (b) a Recovery Schedule with the corresponding revisions in Activities and logic ties and other adjustments intended to recover the schedule. Appropriate schedule recovery actions may include: assignment of additional labor, Subcontractors or construction equipment; Work during other than normal working hours; resequencing of the Work; increasing the concurrency of sequential Work activities; expediting of Submittals and deliveries; and any combination of any of these or other similar actions. Activity shortening and overlapping shall be explained as to their basis (and be supported by increases in resources).
  2. The Contractor's failure, refusal or neglect to take appropriate schedule recovery action or, in the alternative, give written notice of a delay with a timely and properly supported Time extension request, and, in either case, to follow up with a timely CPM Schedule shall be reasonable evidence that the Contractor is not prosecuting the Work with due diligence. Any such Contractor failure, refusal or neglect shall give sufficient basis to the Owner, to elect any of the following:
    - a. demand adequate, written assurance of due performance, as provided in the General Conditions,
    - b. withhold liquidated damages, and

c. in the Owner's sole discretion, direct alternate schedule recovery actions.

E. Each Subcontractor shall be bound by the foregoing provisions.

### **3.03 DELAYS AND EXTENSIONS OF TIME**

- A. Extensions of the Contract Time shall not be granted except as expressly provided for in the General Conditions and this Specification Section.
- B. Minor Delays: No adjustment in any of the Contract Times will be justified as a result of (a) any delay of less than twenty-four (24) hours duration, or (b) delays to activities that are not on the critical path controlling the calculated date for achievement of any of the Contract Times, or (c) Contractor's failure to allow sufficient time in schedules in accordance with contract requirements.

**END OF SECTION**

## **SECTION 01 33 00 SUBMITTAL PROCEDURES**

### **PART 1 GENERAL**

#### **1.01 GENERAL REQUIREMENTS**

- A. Contractor shall submit Shop Drawings, product data, and Samples, as required by the individual Specification sections, to the Owner for review in accordance with the provisions of Section 00 72 00 - General Conditions.

#### **1.02 PROGRESS SCHEDULES**

- A. Contractor shall submit one (1) electronic copy in PDF format of Progress Schedules indicating the starting and completion dates of the various stages of the Work and estimated payments to the Owner.
  - 1. Proposed Progress Schedules shall be submitted to the Owner prior to the pre-construction meeting.
  - 2. Contractor shall distribute hard copies of the Progress Schedules during the pre-construction meeting for discussion.
  - 3. Progress Schedules shall be updated by the Contractor and submitted electronically (in PDF format) to the Owner, as a part of applications for progress payments, through completion of the Work. Failure to update Progress Schedule may be the basis for rejection of Applications for Progress Payments.

#### **1.03 SHOP DRAWING SCHEDULE**

- A. Contractor shall submit one (1) electronic copy in PDF format of the Shop Drawing Schedule indicating the individual items and submission dates to the Owner.
  - 1. A preliminary Shop Drawing Schedule in accordance with the requirements in Section 00 72 00 shall be submitted by the Contractor prior to the pre-construction meeting.
  - 2. Contractor shall distribute hard copies of the Shop Drawing Schedule during the pre-construction meeting for discussion.
  - 3. A final electronic copy of the Shop Drawing Schedule (in PDF format) shall be submitted by the Contractor at least ten (10) days prior to submitting the first Application for a Payment.

#### **1.04 APPLICATIONS FOR PAYMENT**

- A. Contractor shall submit one (1) electronic copy in PDF format Applications for Payment to the Owner in accordance with the provisions of Article 14 of Section 00 72 00.
- B. Applications for Payment shall be made on forms provided by or approved by the Owner.
  - 1. Samples of the Contractor's Application for Payment, Payment Schedule and Owner's Certificate for Payment forms are included in the Contract Documents and can be obtained in digital format from the Owner.
- C. Copies of these forms, with Project specific information completed by the Owner, will be given to the Contractor at the preconstruction meeting or, if applicable, after approval of the final Schedule of Values.
- D. Contractor shall submit a completed Payment Schedule with an executed Contractor's Application for Payment and Contractor's Declaration to the Owner not more often than once per month.

### **1.05 SHOP DRAWINGS**

- A. Shop Drawings shall be presented in a clear and thorough manner. Details shall be identified by reference to plan sheet number, detail number if applicable, and Specification Section number, and article number.

### **1.06 PRODUCT DATA**

- A. Product Data shall be presented in a clear and thorough manner identified the same as the Shop Drawings. Included with the information shall be performance characteristics and capacities depicting dimensions and clearances required.
- B. Manufacturer's standard schematic drawings and diagrams shall be modified to delete information which is not applicable to the Work. Manufacturer's standard information shall be supplemented to provide information specifically applicable to the Work.

### **1.07 SAMPLES**

- A. Samples shall be of sufficient size and quantity to clearly illustrate functional characteristics of the product with integrally related parts and attachment devices depicting full range of color, texture and pattern.

### **1.08 SUBMISSION REQUIREMENTS**

- A. Contractor shall make Submittals in accordance with the approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other Contractor. No damages will be awarded, or extension of time granted, due to the Shop Drawing and product data review process.
- B. Contractor shall submit an entire package of Shop Drawings and Product Data information for major items of Work so that the Engineer and Owner can review the package as a unit.
- C. Contractor shall submit one (1) electronic copy in PDF format of Shop Drawings and Product Data information containing the following information at a minimum:
  - 1. Field dimensions clearly identified as such.
  - 2. Relation to adjacent or critical features of the Work or materials.
  - 3. Applicable standards, such as ASTM or Federal Specification Numbers.
  - 4. Identification of deviations from Contract Documents.
  - 5. Identification of revisions on resubmittals.
  - 6. Project Title, Date of Submission, Date of Previous Submission, and Specification Section number.
- D. Contractor shall initial or sign Shop Drawings and Product Data submittals, certifying the Contractor's review and approval of Submittal per Section 00 72 00; verification of products, field measurements, field construction criteria, and coordination of the information within the submittal with requirements of the Work and of Contract Documents.
- E. Engineer shall initial or sign Shop Drawings and Product Data submittal and shall indicate the status of the Submittal, or requirements for resubmittal. Owner shall return to the Contractor one (1) electronic copy of the Shop Drawing and/or Product Data submittal (in PDF format) for distribution or for resubmission.

### **1.09 ENGINEER'S REVIEW**

- A. Upon receipt of any Submittal defined above, the Engineer will:
  - 1. Check each for completeness, clarity, correctness, cohesiveness, legibility, and reproducibility.

2. Review each only for general conformity with the Contract Documents as specified in Section 00 72 00.
- B. After review of any Submittal, the Engineer will appropriately affix a stamp, electronic notation box or other means, signifying the Submittal as having received full consideration and review.
- C. The "status" of any such Submittal or portion thereof, as appropriate, will be evidenced by any one or more of the following notations clearly signified by a "X" or other similar mark placed in the box adjacent to the notation:
1. Notations for Engineer's Review:
    - a. Approved (A)
    - b. Approved as Noted (AN)
    - c. Revise and Resubmit (RR)
    - d. Not Approved - See Remarks (NA)
    - e. For Information Only (I)
  2. Notations for Response Required by Contractor:
    - a. None
    - b. Confirm
    - c. Resubmit
- D. Notation Meanings:
1. Elements marked "Approve" indicate that the Contractor may commence with construction, fabrication or purchase of such items.
  2. Elements marked "Approved as Noted" indicate that the Contractor may commence with construction, fabrication or purchase of such items.
    - a. Proceeds in strict accordance with the Engineer's notes and/or required corrections/deletions/additions indicated thereon;
    - b. Pending appropriate response by the Contractor as further noted.
  3. Elements marked "Revise and Resubmit" indicate that further comments or explanations have been affixed to the Submittal, which requires action(s) by the Contractor as further noted.
  4. Elements marked "Not Approved" indicate that the Contractor must make the required corrections as shown or noted and resubmit such items to the Engineer for further review.
  5. Elements marked "None" indicate that the Submittal requires no further action by the Contractor.
  6. Elements marked "Confirm" requires the Contractor to provide affirmation to the Engineer regarding comments, notes, markings, etc. made by the Engineer, and to affirm that the Contractor will comply with the comments, notes, markings, etc.
  7. Elements marked "Resubmit" indicate that the Contractor may not commence with construction, fabrication or purchase of such items, and that the Contractor must resubmit items for review that comply with the Contract Documents in the event that those originally submitted do not, or with any comments, notes, markings, etc. made by the Engineer.

#### **1.10 RESUBMISSION REQUIREMENTS**

- A. Contractor shall make all corrections or changes in the Submittals required by Owner and resubmit. Contractor shall indicate any changes which have been made other than those requested by the Owner.

### 1.11 AUDIO/VIDEO ROUTE SURVEY

- A. When required in Section 00 42 43 - Proposal or Section 01 11 00 - Summary of Work, the Contractor shall furnish the Owner with an "Audio/Video Route Survey" record of the existing conditions prior to the start of construction. Contractor must enlist the services of a firm having a minimum of one (1) year experience in audio/video recording of construction projects.
- B. Prior to beginning the audio/video recording, the Contractor shall review with Owner the Project requirements to ensure that the audio/video is adequate for its intended purpose. Owner shall have the authority to designate areas for which coverage may be added or omitted. The audio/video recording shall be done prior to placement of materials or equipment on the construction area and furnished one (1) week prior to the pre-construction meeting.
- C. Format:
  - 1. Audio/Video route survey shall be submitted in the format(s) as specified in Section 01 11 00.
    - a. Audio/video route survey submission shall be on USB media
    - b. Format: USB – Video
    - c. Video Encoding: Highest available bit rate (6-9 Megabit), 60 fields per second interlaced video
    - d. Audio Encoding: Uncompressed stereo wave or stereo Dolby Digital (256 kilobit or better)
    - e. Aspect Ratio: 4x3 (720x480 pixels)
    - f. No Macrovision or other copy protection encoding. No region code or region code 1.
- D. Complete coverage shall include all surface features located within the public right-of-way, easement areas and adjacent private properties up to building line when such properties lie within the zone of influence of construction and will be supported by appropriate audio description made simultaneously with video coverage. Such coverage shall include, but not be limited to, all existing driveways, sidewalks, curbs, ditches, roadways, landscaping, trees, culvert, headwalls, retaining walls, and buildings located within such zone of influence. Video coverage shall be clear enough to identify cracks, depressions, holes and other defects in existing surfaces.
- E. Houses and buildings shall be identified visually by house number, when visible, in such a manner that structures of the proposed system can be located by reference. In all instances, however, location shall be identified by audio or visual means at intervals not-to-exceed 100 linear feet (30 m) in the general direction of travel.
- F. When conventional wheeled vehicles are used, the distance from the camera lens to the ground shall be not less than 12 feet (3.5 m) to ensure proper perspective. The rate of speed in the general direction of travel of the conveyance used during recording shall not exceed 30 feet/minute (10 m/min). Panning rates and zoom-in, zoom-out rates shall be controlled sufficiently such that stop action during play-back will produce clarity of detail of the object viewed.
- G. Video recordings must, by electronic means, display continuously and simultaneously generated transparent digital information in the upper left hand third of the screen to include the date and time of recording, as well as the corresponding engineering stationing numbers as shown on the Contract Drawings.
  - 1. The date information will contain the month, day, and year. For example, mm/dd/yy, and be placed directly below the time information.
  - 2. The time information shall consist of hours, minutes, and seconds, separated by colons. For example, hh:mm:ss.

3. The engineering stationing numbers must be continuous, accurate and correspond to the Project stationing and must include the standard engineering symbols. For example, 14+84.
- H. Engineering stationing numbers must be continuous, accurate and correspond to the Project stationing and must include the standard engineering symbols. For example, Station 14+84.
- I. Recording shall be done during times of good visibility. No recording shall be done during periods of visible precipitation, or when more than ten (10) percent of the ground area is covered with snow or standing water, unless otherwise authorized by the Owner.
- J. In some instances, audio/video coverage may not be suitable for recording necessary details. In such instances, the Owner may specify still photographs to provide coverage. One (1) color photograph shall be provided in accordance with this Section with a suitable description of the photograph's location.
- K. Any portion of the Audio/Video Route Survey of insufficient quality as determined by the Owner shall be redone by the Contractor at no additional cost to the Owner.
- L. Each USB shall be properly identified with the Project Title, location, time, and date in a manner acceptable to the Owner.

#### **1.12 PHOTOGRAPHS**

- A. When required in Section 00 42 43 or Section 01 11 00, the Contractor shall furnish the Engineer with a total of 6 to 10 digital color photographs each month during construction of the Project, unless some other number and times is specified in Section 01 11 00 - Summary of Work.
- B. Photos shall be in digital format (i.e., JPEG, TIFF, GIF, PNG or PDF) and shall have a minimum resolution of 300 dpi.
- C. The following information shall be placed on the photo itself or embedded in the digital file:
  1. Project Title
  2. Contract Number
  3. Description of photo's content
  4. Date and Time of photo
- D. Contractor shall submit photographs monthly along with the Application for Payment as described in Article 14 of Section 00 72 00.

#### **PART 2 PRODUCTS (NOT USED)**

#### **PART 3 EXECUTION (NOT USED)**

#### **END OF SECTION**

## **SECTION 01 45 00 QUALITY CONTROL**

### **PART 1 GENERAL**

#### **1.01 GENERAL REQUIREMENTS**

- A. Sampling of materials will be made by the Testing Laboratory in accordance with the methods designated by the Specifications. Contractor shall furnish such facilities as the Engineer may require for collecting, storing, and forwarding samples to the Laboratory. Contractor in all cases shall furnish the required samples to the Owner without charge. All costs shall be paid for by the Contractor and considered subsidiary to the item being tested.

#### **1.02 TESTS OF MATERIALS**

- A. Materials in the Work shall meet the requirements of the Contract Documents.
- B. Tests of materials will be made as specified herein. Owner shall at all times have access to all materials intended for use in the Work as well as to the plants where such materials are produced. Plant inspection may be made if the quantities are sufficient to warrant such inspection and if it is to the best interest of the Owner. In any case materials may be either inspected or tested when received on the Project.
- C. Materials shall not be used until approval has been received from the Engineer. Approval of materials at the producing plant does not constitute a waiver of the Owner's or Engineer's right for re-examination at the Project site.
- D. The standards for testing materials unless otherwise specified, shall be as established by the American Society for Testing and Materials (ASTM). Tests of materials will be made in accordance with the methods described or designated in the Specifications.
- E. The sampling and testing of all materials not specifically mentioned shall be done by generally accepted methods, unless otherwise specified by the Engineer or Owner.

#### **1.03 SELECTION AND PAYMENT**

- A. The Contractor shall employ and pay for the services of an independent testing laboratory, or laboratories, to perform product and material quality control, perform in-place quality control and verification identified in individual Specification sections.
- B. Employment of a testing laboratory by the Contractor shall not relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.
- C. Remedial work and re-testing costs, resulting from deficiencies in materials and/or workmanship, shall be borne by the Contractor. All costs shall be paid for by the contractor and considered subsidiary to the item being tested.

#### **1.04 QUALIFICATIONS OF LABORATORY**

- A. Meet laboratory requirements of ASTM E 329 and applicable requirements of ASTM C 1077, ASTM D 3666, and ASTM D 3740.
- B. Where a laboratory subcontracts any part of the testing services, such work shall be placed with a laboratory complying with the requirements of this Section.

#### **1.05 LABORATORY REPORTS**

- A. The testing laboratory shall provide and distribute copies of laboratory reports to the Engineer.
- B. One copy of each laboratory report distributed or faxed to the Contractor shall be kept at the site field office for the duration of the project.

- C. Before close of business on the working day following test completion and review, reports which indicate failing test results shall be transmitted immediately from the testing laboratory to the material supplier, Contractor, Engineer and Resident Project Representative.

#### **1.06 LIMITS OF TESTING LABORATORY AUTHORITY**

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of the Contractor.
- D. Laboratory has no authority to stop the Work.

#### **1.07 CONTRACTOR RESPONSIBILITIES**

- A. Provide safe access to the Work and to manufacturer's facilities for the Engineer, Resident Project Representative and for testing laboratory personnel.
- B. Provide to the testing laboratory a copy of the construction schedule and a copy of each update to the construction schedule.
- C. Notify the Resident Project Representative and the testing laboratory during normal working hours of the day previous to the expected time for operations requiring inspection and testing services. If the Contractor fails to make timely prior notification, then the Contractor shall not proceed with the operations requiring inspection and testing services.
- D. Notify the Resident Project Representative 24 hours in advance if the Specification requires the presence of the Resident Project Representative or testing laboratory for sampling or testing.
- E. Request and monitor testing as required to provide timely results and to avoid delay to the Work. Provide samples to the laboratory in sufficient time to allow the required test to be performed in accordance with specified test methods before the intended use of the material.
- F. Cooperate with laboratory personnel in collecting samples on site. Provide incidental labor and facilities for safe access to the Work to be tested; to obtain and handle samples at the site or at source of products to be tested; and to facilitate tests and inspections including storage and curing of test samples.

#### **1.08 CERTIFICATION OF MATERIALS**

- A. At the request of the Engineer, the Contractor shall provide the Engineer with certification that the various materials to be used conform to the standards referred to in the Contract Documents.

#### **1.09 SOURCE QUALITY CONTROL**

- A. Testing identified in these specifications as Quality Control, which is required to establish quality of materials, equipment or fabricated items, shall be paid for by the Contractor.

#### **PART 2 PRODUCTS (NOT USED)**

#### **PART 3 EXECUTION (NOT USED)**

### **END OF SECTION**

## **SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS**

### **PART 1 GENERAL**

#### **1.01 SITE ACCESS AND PARKING**

- A. Contractor shall locate roads, drives, walks and parking facilities to provide uninterrupted access to mobilization, Work, storage areas, and other areas required for execution of the Contract. Access drives and parking areas shall be hard surfaced unless otherwise approved by the Owner.
- B. Contractor shall maintain driveways a minimum of 15 feet (5 meters) wide between and around materials in storage and mobilization areas.
- C. Contractor shall maintain traffic areas as free as possible of excavated materials, construction equipment, products, and debris.

#### **1.02 TRUCKING ROUTE AND PUBLIC ROAD MAINTENANCE**

- A. Prior to the start of construction, the Contractor shall submit for review a schedule and list indicating the streets and roads within the municipality that his equipment will use off the Project site.
- B. Contractor shall comply with all safety requirements, weight restrictions and speed limits.
- C. Gravel and dirt roads or streets used shall be maintained by grading, placing dust palliatives and maintenance gravel in sufficient quantities to eliminate dust and maintain traffic.
- D. Paved streets shall be maintained in a reasonable state of cleanliness and the Contractor shall remove accumulations of debris, dirt or mud caused by his operations. Removal shall be done in such a manner as to prevent the release of dust. This shall be done at least every day at the close of each day's operation or additionally when requested by the Owner.
- E. Any roads or streets damaged by the Contractor's operations, shall be repaired or removed and replaced to satisfactions of the agency having jurisdiction at no additional cost to the Project.
- F. Contractor shall not store any equipment, supplies, construction material or excess excavated material on any roads or streets unless otherwise approved by the Owner.

#### **1.03 EMERGENCY ACCESS**

- A. Contractor shall at all times provide emergency access to property in the vicinity of the construction for police vehicles, fire equipment, ambulances or other emergency vehicles to protect life, health and property. Areas damaged by emergency vehicles shall be restored by the Contractor at no additional cost to the Owner.

#### **1.04 PRIVATE OR PUBLIC ROADS, SIDEWALKS, AND PARKING AREAS**

- A. Where public roads, driveways, parking areas and sidewalks are encountered throughout the community, the Contractor shall maintain those portions affected by the construction operations in a passable condition until such time as final restoration of these improvements can be made as specified.

#### **1.05 ROAD CLOSING**

- A. No street, road or section thereof shall be closed to through traffic unless otherwise provided for on the Plans, Specifications, or authorized by the agency with jurisdiction over the roads. Prior to closing a street, road, or section thereof, the Contractor shall provide the Owner with a copy of a detour plan approved by the agency having jurisdiction over the roads.
- B. In the event roads or streets are to be closed, the Contractor shall notify the local fire department, police department, local road authority, ambulance and emergency services, Department of Public Works, and public school system daily as to what streets will be partly

blocked or closed, the length of time the streets will be blocked or closed and when the streets will be reopened to traffic. Contractor shall designate one responsible employee to carry out the requirements of this condition.

#### **1.06 MAINTAINING TRAFFIC**

- A. Contractor shall provide access for local traffic to property along the Project by means of temporary roads, drives, culverts or other means approved by the Owner. Contractor shall grade, add surfacing materials, and dust palliatives to such temporary roads and drives as necessary for the proper maintenance of traffic.
- B. If the construction work is suspended due to weather conditions, winter shut down or for any other reason, sufficient labor, materials and equipment shall be ready for immediate use at all times for the proper maintenance of traffic. Surfacing materials and dust palliatives shall be applied at such times and locations and in such amounts as necessary to safely maintain traffic and as determined by the Owner.
- C. Contractor shall furnish, erect and maintain all signs, barricades, lights, and traffic regulators, in accordance with the requirements of the current Texas Manual on Uniform Traffic Control Devices.

#### **1.07 EXISTING SIGNS**

- A. No stop sign, traffic control or warning device or sign shall be taken down until the agency having jurisdiction over the roads has been notified and arrangements for the immediate reinstallation has been made. Contractor shall provide temporary signs, traffic control devices, warning devices, or watchmen continuously from the time the item is removed until it is reinstalled. Signs removed shall be replaced with signs meeting requirements of the agency having jurisdiction over the roads.

#### **1.08 USE OF WATER**

- A. Contractor shall acquire any and all permits, post any bonds and pay all fees required by the local agency having jurisdiction prior to using any hydrant or any other source of water. Contractor shall reimburse the local community for all water consumed during course of the Project at the current rate as set by the agency having jurisdiction.

#### **1.09 MEDICAL SERVICES AND FIRST AID**

- A. Contractor shall furnish first aid supplies and a person trained in first aid with a valid first aid certificate, per OSHA requirements, available for use of construction personnel including the Owner. Contractor shall also furnish a communication system for contacting emergency services. The telephone numbers of the physician, hospital, or emergency services shall be conspicuously posted at the job site.

#### **1.10 POSTAL SERVICE**

- A. Several or all residents of this Project area may receive their mail at roadside mailboxes. Since the postal service will not deliver mail to a resident without a mailbox or a mailbox that is not in its proper position, the Contractor shall relocate, replace and repair all mailboxes and posts in a condition and height acceptable to the post office within 24 hours of the removal.
- B. If required, the Contractor shall furnish new posts for the mailboxes if the existing posts are broken or rotted to the extent that they cannot be reused.
- C. Any mailbox damaged by the Contractor while carrying out his operations or by anyone else while the box is down due to the Contractor's operation, shall be replaced by the Contractor with a new mailbox meeting the postal officials' specifications and other acceptable means to the satisfaction of the resident and postal authorities.
- D. The cost for relocating mailboxes shall be incidental to the Project unless otherwise specified in Section 00 42 43 - Proposal.

## **PART 2 PRODUCTS**

### **2.01 BARRICADES, ARROW BOARDS, TEMPORARY PAVEMENT MARKINGS, AND TEMPORARY SIGNS**

- A. Barricades, Arrow Boards, Temporary Pavement Markings, Temporary Signs, and other traffic control devices shall be in accordance with the current edition of the TxDOT Standard Specification for Construction and Maintenance for Highways, Streets, and Bridges, and the current edition of the Texas Manual on Uniform Traffic Control Devices.

## **PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

## **SECTION 01 57 13**

### **TEMPORARY EROSION AND SEDIMENT CONTROL**

#### **PART 1 GENERAL**

##### **1.01 SCOPE OF WORK**

- A. This Section includes furnishing, installing, maintaining, and removing at project completion, Soil Erosion and Sedimentation Control devices. Devices include silt fence, straw bales, turbidity barriers, temporary gravel construction entrance/exits, inlet filters, ditch sediment traps, etc.

##### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 22 00 - Unit Prices
- B. Section 01 89 00 - Site Construction Performance Requirements
- C. Section 31 23 13 - Subgrade Preparation
- D. Section 31 23 33 - Trenching and Backfilling
- E. Section 32 92 23 - Sodding

##### **1.03 REFERENCE STANDARDS**

- A. TxDOT Standard Specifications for Const

##### **1.04 REQUIREMENTS OF REGULATORY AGENCIES**

- A. The Contractor shall be considered the operator with day-to-day operational control of the construction site and SWPPP per Texas Pollutant Discharge Elimination System (TPDES) General Permit.
  - 1. The Contractor will be responsible for preparing a SWPPP for all construction site areas in accordance with TPDES General Permit requirements. A statement within the SWPPP will identify the Contractor as the day-to-day operator responsible for the installation, inspection and maintenance of all erosion and sediment control best management practices (BMPs), devices and controls. An additional statement within the SWPPP will identify the Owner as the operator with control over construction plans and specifications. A hard copy and digital PDF copy of the SWPPP will be provided to the Owner two (2) weeks prior to the start of construction. A copy of the SWPPP will be kept on site.
  - 2. Projects exceeding five (5) acres, the Contractor shall submit a completed notice of intent (NOI) to the State and the City at least 48 hours prior to any construction activity beginning. A construction site notice (CSN), signed in accordance with 30 TAC § 305.44, shall be posted at the site and a copy submitted to the Owner at least 48 hours prior to any construction activity beginning. The Contractor will be the operator of the Erosion Control Plan (ECP) and SWPPP and can revise, update, amend or modify as necessary to remain in compliance with the TPDES permit. This item includes the installation, inspection and maintenance of BMP's, devices and controls, or other necessary controls as may be required to remain in compliance with the TPDES General Permit.
- B. Contractor shall secure all permits, and post all bonds or deposits required to comply with the "Soil Erosion and Sedimentation Control," requirements, being Part 91 of PA 451 of 1994 as amended and the National Pollution Discharge Elimination System (NPDES) Rules for storm water discharges from construction activity.
- C. Comply with requirements of the agency having jurisdiction. Owner may withhold payment to Contractor equivalent to any fines resulting from non-compliance with applicable regulations.

##### **1.05 PERFORMANCE REQUIREMENTS**

- A. Employ Best Management Practices as defined by standard EPA 832-R-92-005.

- B. Put preventative measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.
- C. Control increased storm water runoff due to disturbance of surface cover due to construction activities for this Project.
  - 1. The Contractor shall take all precautions required to prevent soil erosion during the construction. If excessive erosion occurs, the Contractor shall take immediate measures to prevent further erosion and correct the damages. The Contractor shall comply with the requirements of the SWPPP and the final TPDES Construction General Permits Regulations.
- D. Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this Project.
- E. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall event that might occur in 10 years.
- F. Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this Project. Prevent windblown soil from leaving the project site. Comply with fugitive dust ordinances of agencies having jurisdiction. Prevent tracking or flowing of mud and sediment onto public or private roads, sidewalks or pavements outside of the site.
- G. Prevent sedimentation of waterways on or off the project site, including rivers, streams, lakes, ponds, open drainage ditches, storm sewers, and sanitary sewers. If sedimentation occurs, install or correct preventative measures immediately at no cost to Owner. Comply with requirements of agencies having jurisdiction.
- H. Maintain temporary preventative measures until permanent measures have been established. Remove temporary measures when permanent measures have been established.
- I. If erosion or sedimentation occurs due to non-compliance with these requirements, remove deposited sediment or restore eroded areas at no cost to Owner.

## **1.06 SUBMITTALS**

- A. Contractor shall develop and submit a Erosion Control Plan to review and approval by the Owner.
- B. Submit schedule of Soil Erosion and Sedimentation Control activities to agency having jurisdiction. Include events (with days and/or dates of the various activities) for review and approval prior to obtaining a permit.

## **PART 2 PRODUCTS**

### **2.01 SILT FENCE**

- A. Polypropylene geotextile fabric, resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; meeting the following requirements:

### **2.02 EROSION CONTROL LOG**

- A. Biodegradable Erosion Control Logs (ECLs) are long flexible logs comprised of a core material that is biodegradable, or recyclable, wrapped in a biodegradable containment mesh. ECLs intercept sediment from sheet flow adjacent to various structures, can act as velocity

### **2.03 INLET FILTER FABRIC**

- A. Filter fabric shall be constructed of 100% continuous polyester needle-punched non-woven engineering fabric. Filter fabric shall be fabricated to provide a direct fit with the drainage structure cover. Filter fabric shall have the following minimum physical properties.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to the greatest extent possible.
- B. Except in areas to be cleared, do not remove, cut, deface, injure or destroy trees or shrubs without Owner's approval. Protect existing trees or shrubs that are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations, with suitable fences or other means as approved by Owner.

### **3.02 GENERAL**

- A. Do not discharge excavation ground water to the sanitary sewer, storm sewer, or to rivers, streams, etc. without authorization from the agency having jurisdiction. Construction site runoff will be prevented from entering any storm drain, river, stream, etc. directly by the use of silt fences or other suitable methods. Contractor shall provide erosion protection of surrounding soils.
- B. Sedimentation control devices shall be installed prior to Contractor beginning Work. Soil erosion and sedimentation control devices shall be maintained in an effective functioning condition at all times during the course of the Work.

### **3.03 INSTALLATION - GENERAL**

- A. Install soil erosion control devices in accordance with the site conditions in order to maintain the intent of the specifications.
- B. Owner has authority to limit surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations and to direct Contractor to provide immediate permanent or temporary pollution control measures.
- C. Remove temporary control devices after permanent measure are established. Remove and replace temporary control devices if they become ineffective at no additional cost to Owner.
- D. Contractor shall incorporate permanent erosion control features, paving, permanent slope stabilization, and vegetation into project at earliest practical time to minimize need for temporary controls.

### **3.04 DUST CONTROL**

- A. Keep dust down at all times, including during non-working periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming is not permitted.

### **3.05 MAINTENANCE**

- A. Maintain temporary erosion and sedimentation control systems as dictated by site conditions, indicated in the construction documents, or as directed by governing authorities or Owner to control sediment until final stabilization.
- B. Contractor shall respond to maintenance or additional work ordered by Owner or governing authorities immediately, but in no case, within not more than 48 hours if required at no additional cost to Owner.

### **3.06 INSPECTION**

- A. General:
  - 1. Inspections shall be performed by a person familiar with the site, the nature of the major construction activities, and qualified to evaluate both overall system performance and individual component performance.

2. Inspector must either be someone empowered to implement BMPs in order to increase effectiveness to an acceptable level or someone with the authority to cause such things to happen.

### **3.07 PROJECT COMPLETION**

- A. Remove temporary soil erosion and sedimentation control devices as soon as permanent measures have been established.
- B. The Contractor shall be responsible for the removal of all temporary BMPs, devices and controls used during the construction process to prevent erosion or sedimentation. All temporary BMPs, devices and controls shall be removed, and any disturbed areas stabilized, prior to a notice of termination (NOT) being submitted to the State for the construction project. A copy of the Contractor's NOT shall be submitted to the Owner 48 hours prior to submittal of the NOT to the State.

**END OF SECTION**

## **SECTION 01 60 00 PRODUCT REQUIREMENTS**

### **PART 1 GENERAL**

#### **1.01 TRANSPORTATION AND HANDLING**

- A. Contractor shall provide for expeditious transportation and delivery of materials and equipment to the Project site in an undamaged condition and on a schedule to avoid delay of the Work.
- B. Contractor shall provide equipment and personnel at the site to unload and handle materials and equipment in a manner to avoid damage.

#### **1.02 STORAGE AND PROTECTION**

- A. Contractor shall store materials and equipment immediately on delivery, and protect it until installed in the Work.
- B. Products subject to damage by elements shall be stored in weather-tight enclosures with temperature and humidity ranges as required by manufacturer's instructions.
- C. Loose granular materials shall be stored on solid surfaces to prevent mixing with foreign matter.
- D. The place of storage shall be located so as to minimize interference with traffic and to provide easy access for inspection.
- E. Materials that have been stored shall be subject to retest and shall meet the requirements of their respective specifications at the time they are to be used in the Work.

#### **1.03 PRODUCTS LIST**

- A. Within four (4) days of request, the Contractor shall submit a complete list of major products proposed to be used, with the name of the manufacturer and the installing subcontractor, if applicable, to the Owner.

#### **1.04 CONTRACTOR'S PRODUCT OPTIONS**

- A. For products specified only by reference standard, the Contractor shall select any product meeting that standard.
- B. For products specified by naming several products or manufacturer's the Contractor shall select any one of the products or manufacturers named, which complies with the specifications.
- C. For products specified by naming one or more products or manufacturers and "or equal," the Contractor must submit a Substitution Request Form for any product or manufacturer not specifically named, in accordance with Section 00 72 00 - General Conditions.
- D. For products specified by naming only one product and manufacturer, there is no option.

### **PART 2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION (NOT USED)**

## **END OF SECTION**

## **SECTION 01 71 23 CONSTRUCTION LAYOUT**

### **PART 1 GENERAL**

#### **1.01 RESPONSIBILITY FOR STAKING & REMOVAL LIMITS**

- A. Construction staking will not be required for this Project.
- B. Contractor will mark showing the locations on the surface of various parts of the Work as outlined herein. All markings shall be provided at the expense of the Contractor.
  - 1. After all removal limits are marked by the Contractor, the Owner shall verify limits prior to the removal.
  - 2. Any items removed without verification shall be replaced at no expense to the Owner.
- C. In the event the Contractor presumes site inconsistency, the Contractor shall notify the Owner immediately to assist in resolving the concern.

#### **1.02 LINE AND GRADE**

- A. The Contractor shall match existing back of curb lines.
- B. Where ponding is present in the gutter line or driveway gutter, the Contractor shall re-establish positive drainage. The Contractor can work with the Owner's inspector to adjust limits of removal to ensure positive drainage is achieved.

### **PART 2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

## **SECTION 01 77 00 CLOSEOUT PROCEDURES**

### **PART 1 GENERAL**

#### **1.01 CLEANING**

- A. Contractor shall perform periodic cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, rubbish and wind-blown debris, resulting from construction operations.
- B. Waste material, debris and rubbish shall be removed daily from the site and disposed of at legal disposal areas away from the site.
- C. Contractor shall broom clean exterior paved surfaces and rake clean other exterior surfaces of the site.

#### **1.02 PROJECT RECORD DOCUMENTS**

- A. Contractor shall deliver one (1) copy of all Specifications, Plans, Addenda, Shop Drawings and Samples, annotated to show all changes made during the construction process, to Owner upon completion of the Work. Submittal of the record documents shall be made with a transmittal letter 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
- B. Record Documents
  - 1. Shall be a complete set based upon the fully conformed Project Manual. annotations shall include all changes during the execution of the work resulting from Requests of Information, Field Orders, Construction Change Directives, and the as-built conditions which differ from the proposed plans.
  - 2. The record plans shall be in Portable Document Format (pdf).
  - 3. Annotations:
    - a. dimension changes with strike through and as built dimension.
    - b. changes clouded.
    - c. sketches, photos, etc. as appropriate.
- C. Documents shall be submitted in good order and in a legible condition.

#### **1.03 SUBSTANTIAL COMPLETION**

- A. Certification that the Work is substantially complete shall be in accordance with the General Conditions.

#### **1.04 FINAL PAYMENT AND ACCEPTANCE**

- A. The final inspection, final application for payment and acceptance shall be in accordance with the General Conditions.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

## **SECTION 01 89 00 SITE CONSTRUCTION PERFORMANCE REQUIREMENTS**

### **PART 1 GENERAL**

#### **1.01 SCOPE**

- A. This Section includes general performance requirements for earthwork complete with, removal and disposal of structures and obstructions, protection of existing improvements, protection of trees and other types of vegetation, protection of utility lines, requirements for pavement replacement, restoration of driveways, restoration of sidewalks, restoration of lawns and disturbed areas, and disposal of excess excavation.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 57 13 - Temporary Erosion and Sediment Control
- B. Section 31 23 13 - Subgrade Preparation
- C. Section 31 23 33 - Trenching and Backfilling
- D. Section 32 12 16 - Asphalt Paving
- E. Section 32 13 13 - Concrete Paving
- F. Section 32 92 23 - Sodding

#### **1.03 REFERENCE STANDARDS**

- A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:
  - 1. TxDOT Standards Specifications for Construction and Maintenance of Highways, Streets, and Bridges, latest edition.

#### **1.04 REQUIREMENTS OF REGULATORY AGENCIES**

- A. Contractor shall comply with Section 01 57 13 - Temporary Erosion and Sediment Control . Contractor, at Contractor's expense, shall secure all permits, and post all bonds or deposits required.

#### **1.05 SUBMITTALS**

- A. Written permission for the use of all disposal and borrow sites shall be obtained and copies shall be furnished to the Owner.

#### **1.06 PROTECTION OF PLANT LIFE**

- A. All trees, shrubs, and other types of vegetation not within the limits of the Work or not designated on the Plans or by the Owner to be removed, shall be carefully protected from damage or injury during the various construction operations.
- B. Any tree, shrub or other type of vegetation not designated to be removed but which is damaged by the Contractor's operation shall be repaired or replaced by the Contractor, at Contractor's expense, as determined by the Owner.

#### **1.07 PROTECTION OF EXISTING STRUCTURES AND IMPROVEMENTS**

- A. Existing culverts, sewers, drainage structures, manholes, water valves, hydrants, water mains, utility poles, overhead lines, underground conduits, underground cables, pavement, or other types of improvements within the construction limits, not designated on the Plans to be removed, shall be carefully protected from damage during the construction operations.
- B. Existing structure or improvement not designated to be removed, but which is damaged by the Contractor's operations shall be repaired or replaced by the Contractor, to the satisfaction of the owner, at Contractor's expense.

- C. Deposits of dirt or debris in sewers, culverts, drainage structures, manholes, etc. caused by the Contractor shall be cleaned out at the Contractor's expense.

#### **1.08 MAINTAINING DRAINAGE**

- A. Existing open drains, field and roadway ditches, storm sewers, enclosed drains, natural and artificial watercourses, surface drainage or any other types of drainage within the limits of the Work shall be maintained and free to discharge during construction.
- B. Drainage facility not designated to be abandoned, but which is damaged, or any drainage interrupted by the Contractor's operation shall be immediately repaired, replaced, or cleared by the Contractor.
- C. Costs incurred shall be incidental to various items.

### **PART 2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION**

#### **3.01 GENERAL**

- A. The various construction operations shall be restricted to the existing right-of-way or the areas indicated on the Plans. If the Contractor requires additional area, the Contractor shall furnish the Owner with written permission obtained from the property owner for any part of the operations he conducts outside of the right-of-way or limits indicated.

#### **3.02 EXISTING UTILITIES**

- A. When existing utilities are shown on the Plans, their locations are approximate only, as secured in the field investigation and/or from available public records. Contractor, prior to the start of construction, shall contact Texas811 and the public agency or utility having jurisdiction to request the verification of all utilities within the construction area.
- B. When existing utility lines, structures or utility poles are encountered during the performance of the Work, the Contractor, at Contractor's expense, shall perform construction operations in such a manner that the service will be uninterrupted.
- C. Contractor shall expose all existing utility lines prior to any excavation operation, to determine any conflict with the proposed improvement. Contractor shall be responsible for any relocation required as a result of any conflict of existing utilities shown on the plans, with the proposed improvement.

#### **3.03 UTILITY POLES**

- A. When required by the Work, Contractor shall temporarily support poles in the vicinity of the Work at no additional cost to the Owner. Support shall be in accordance with and to the satisfaction of the utility company.

#### **3.04 EXISTING STORM SEWER, WATER AND SEWERS LINES**

- A. Existing sanitary sewers, storm sewers, water lines or building services, that are encountered during the performance of the Work that require relocation or are damaged, shall be restored with new materials equal in quality and type to the materials encountered.
- B. The new material shall be installed as specified in the Contract Documents and per the requirements of the local agencies. The bedding and backfill material, unless otherwise specified, shall be in accordance with Section 31 23 33 - Trenching and Backfilling.
- C. The relocation or protection of existing storm sewer, sewers, water lines or building services shall be at the Contractor's expense, unless otherwise indicated in the Contract Documents.

### **3.05 EXISTING STRUCTURES**

- A. Existing surface and subsurface structures may be shown on the Plans, in locations considered most probable from information secured in the field investigation or from available public records.
- B. Neither the correctness nor completeness of such information is guaranteed or implied.
- C. Structures shall be protected, preserved or restored by the Contractor, to the satisfaction of the structure owner, at no additional cost to the Project.

### **3.06 REMOVAL OF STORM SEWERS AND CULVERTS**

- A. Unless otherwise specified in the Contract Documents, the Contractor, at Contractor's expense, shall remove any abandoned culvert, pipe, storm sewer, structure or part of a structure which is to be replaced or rendered useless by the new construction.
- B. Removal of a culvert or storm sewer also includes the removal and disposal of any end treatments or headwalls.

### **3.07 SALVAGED MATERIAL**

- A. Salvaged materials shall become the property of the Contractor unless otherwise specified in the Contract Documents, and shall be disposed of by the Contractor, at Contractor's expense.

### **3.08 RESTORATION IN RIGHT-OF-WAY AND YARD AREAS**

- A. The right-of-way and yard areas not paved shall be restored in accordance with the type and location specified herein unless indicated otherwise on the Plans.
- B. Excess material from the restoration operation shall be disposed of by the Contractor at Contractor's expense.
- C. Disturbed areas shall be graded to receive topsoil and sod. The topsoil and sod shall conform to the requirements specified on the Plans and in Section 32 92 23 - Sodding.
- D. Contractor, at Contractor's expense, shall furnish, place, and compact any additional fill, meeting the approval of the Owner, needed to restore the disturbed areas to the cross sections called for on the Plans or as determined by the Owner.

### **3.09 EXCESS EXCAVATION**

- A. Excess excavation shall be defined as all surplus earth material realized from the construction that is free of brush, roots, stumps, broken concrete, pipe, debris, and other extraneous material.
- B. When the excess excavation has not been requested by the Owner, the Contractor shall remove and properly dispose of the material at no additional cost to the Owner.
- C. Proper disposal of all excess excavation, including transportation, grading, and protection of adjacent properties shall be considered as a final cleanup item. No additional payment will be made for this item.
- D. Brush, roots, stumps, broken concrete, pipe, debris, and other extraneous material from the construction shall become the property of the Contractor, and shall be disposed of per all applicable laws, rules or regulations. Removal and disposal of this material shall be considered as part of final cleanup. No additional payment will be made for this item.
- E. Owner approval of the final site(s) condition in writing will be required prior to final payment authorization.

**END OF SECTION**

## **SECTION 02 41 13 SELECTIVE REMOVAL**

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

- A. Contractor shall furnish labor, materials and equipment necessary for the removal and subsequent disposal of the area(s) slated for demolition, including but not limited to storm sewer pipe, water service pipe and material, excess material, treated and untreated subgrade material, concrete paving, and asphalt paving, as shown on the Contract Drawings and specified herein. In addition, various utilities shall be completely removed.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 33 00 - Submittal Procedures
- B. Section 01 31 19 - Project Meetings
- C. Section 31 11 00 - Right of Way Preparation
- D. Section 31 23 13 - Subgrade Preparation
- E. Section 31 23 33 - Trenching and Backfilling
- F. Section 32 12 16 - Asphalt Paving
- G. Section 32 13 13 - Concrete Paving
- H. Section 33 11 00 - Water Utility Distribution Piping
- I. Section 33 41 00 - Storm Sewer Utility Drainage Piping

#### **1.03 DEFINITIONS**

- A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.
- B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to the Owner's designated storage area.
- C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.
- D. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Owner, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.
- E. Remove and Replace: Remove and legal dispose of items. Replace with new material.

#### **1.04 MATERIAL OWNERSHIP**

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition legally at Contractor's option.

#### **1.05 PROJECT/SITE CONDITIONS**

- A. Occupancy: Owner may continuously occupy the right-of-way. Conduct demolition work in manner that will minimize need for disruption of the Owner's normal operations.

- B. Protections: Provide temporary barricades and other forms of protection to protect the public from injury due to selective demolition work.
  - 1. Provide protective measures as required to provide free and safe passage of the Owner, vehicles, and general public to areas directly affected by construction activities and those adjacent to such activities.
- C. Damages: Promptly repair damages caused to adjacent areas by demolition work.
- D. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
  - 1. Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without approval from the Owner and providing alternate routes around closed or obstructed traffic ways.
- E. Explosives: Use of explosives is not permitted.
- F. Utility Services: Maintain existing utilities in service and protect them against damage during construction operations.
  - 1. General:
    - a. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by the Owner.
    - b. Maintain fire protection services during construction operations.
    - c. If relocation of any utility is necessary, the Contractor shall be responsible for associated fees or expenses, unless indicated otherwise.

## **PART 2 PRODUCTS**

### **2.01 REPAIR MATERIALS**

- A. Use repair materials identical to existing materials.
  - 1. Contractor shall use materials whose installed performance equals or surpasses that of existing materials.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Prior to any removal operations, the Contractor shall mark all the limits of removal and verify with the Owner's Inspector if limits are correct.
- B. Locate existing utilities within project limits prior to any demolition.

### **3.02 PREPARATION**

- A. Conduct demolition operations and remove debris in manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
- B. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities designated to remain.
  - 1. Provide temporary barricades and other forms of protection as required for safety and security.
  - 2. Provide barriers and appropriate to restrict pedestrians from wandering into construction areas.

### **3.03 DISPOSAL OF DEMOLISHED MATERIALS**

- A. Contractor shall remove and legally dispose of demolished materials, site debris, rubbish, and other materials resulting from demolition operations shall be promptly removed.

1. Demolition and removal of debris shall be conducted to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities which shall not be closed or obstructed without permission from the Owner.
  2. If the Contractor encounters material during removal that is suspected to be potential hazard, stop work immediately and notify the Owner.
  3. Disposal shall conform to Federal, State and Local requirements.
- B. Burning of removed materials shall not be permitted on site.

#### **3.04 RECYCLING**

- A. Owner encourages the recycling of demolition debris where appropriate. Contractor has the option to recycle any material demolished on site in order to reduce costs or project duration.

#### **3.05 CLEANING**

- A. During and upon completion of work, the Contractor shall promptly remove unused tools and equipment, surplus materials, rubbish, debris, and dust and shall leave areas affected by work in a clean condition.

**END OF SECTION**

## **SECTION 31 10 00 RIGHT OF WAY PREPARATION**

### **GENERAL**

#### **1.01 SCOPE OF WORK**

- A. Section includes:
  - 1. It will include the area between the right-of-way limits, additional areas beyond the right-of-way such as temporary construction, slope, and drainage easements, and any other easements shown on the Plans.
  - 2. Protection of existing fences, infrastructure, and associated improvements, streets and utilities within and near construction areas from damage.
  - 3. Labor, equipment, and materials necessary for existing tree relocation, protection and trimming.
  - 4. All clearing and grubbing work indicated on the Drawings and as required, complete with cutting and removal of trees, shrubs, vegetation, stumps, logs, brush, roots and undergrowth, and disposal of materials.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 57 13 - Temporary Erosion and Sediment Control
- B. Section 01 89 00 - Site Construction Performance Requirements
- C. Section 02 41 13 - Selective Removal

#### **1.03 REFERENCE STANDARDS**

- A. North Central Texas Council of Governments (NCTCOG) Specification
  - 1. Item 203 - Site Preparation
  - 2. Item 203.1 - General Site Preparation

### **PRODUCTS (NOT USED)**

### **EXECUTION**

#### **3.01 GENERAL**

- A. Work shall be in accordance with NCTCOG Item 203.1 - General Site Preparation and Section 01 89 00 - Site Construction Performance Requirements and shall include, but not be limited to: all obstructions above ground or below such as concrete, curb & gutter, pavement, driveways, driveway culverts, trees, shrubs, stumps, brush, roots, vegetation, logs, fences, structures, foundations, lumber, scrap metal, abandoned appliances, sprinkler systems, abandoned utility pipes or conduits and any other items not included as pay items elsewhere in the contract documents, or identified in NCTCOG Section 203.1 -General Site Preparation, but necessary for the preparation of the rights-of-way and/or permanent or temporary easements for construction.
- B. This item shall also include the protection of any trees, shrubs, fences, structures, signs, or other items unless called out otherwise on the plans.
  - 1. All trees adjacent to construction shall be protected by fencing to the limits of the canopy and no parking, driving, or moving of equipment in this area will be permitted.
- C. If pruning of trees is required, they shall be trimmed as directed by the City Engineer and any cuts of two inches or more in diameter shall be treated as directed by the City Engineer.

- D. All material and debris removed as described above shall become the property of the Contractor and shall be disposed of at contractor's expense in a manner satisfactory to the Owner and other items identified in NCTCOG Section 203 - Site Preparation.
- E. All items relocated or replaced shall be in a condition equal to or better than the original condition.

### **3.02 INSTALLATION**

- A. Cleaning:
  - 1. Clean Site of rubbish, excess material, structures, and equipment. Restore damaged property.
- B. Soil Erosion and Sedimentation Control:
  - 1. Comply with requirements of Section 01 57 13 - Temporary Erosion and Sediment Control.
- C. Clearing:
  - 1. Trees, stumps, brush, hedges, and other vegetation occurring within the Contract limits, as defined on the Drawings or as directed by Owner, shall be cut off flush with the ground and shall be completely removed.
  - 2. Use every precaution to prevent damage to and provide protection as necessary of existing plant material. Repair or replace to original condition, as acceptable to the Owner and at no additional cost to the Owner, any material or Work damaged or destroyed while performing Work.
  - 3. Vegetation protection fencing shown on Drawings are minimum required for Work. Contractor shall be responsible for providing additional temporary fencing during the Work as necessary to protect vegetation.
- D. Flagging of Existing Trees: Flag trees to remain and to be removed with a bright and different colored ribbon. Notify the Owner at least 48 hours prior to commencing of Work to verify all trees that are flagged.
  - 1. Do not park any vehicles or equipment, nor store any materials or stockpiled soil, nor dispose of building materials, chemicals, petroleum products or other detrimental substances within drip line of tree. Protect trees from flame, smoke and heat. Construction access to Site shall not occur beneath drip line of trees.
- E. Depth of Removal in Excavation Area:
  - 1. For excavation areas within roadways, parking lots, and other paved areas, the trees, stumps, and roots shall be removed to a depth of not less than 12 inches (300 mm) below the subgrade elevation.
  - 2. In all other excavation areas, the trees, stumps, and roots shall be removed to a depth of not less than 12 inches (300 mm) below the finish surface elevation, or as indicated on the Drawings or as designated by Owner.
- F. Holes and Trenches:
  - 1. Holes and trenches remaining after the clearing or grubbing operations in embankment areas, shall have the sides broken down or leveled, and shall be refilled with acceptable material.
    - a. The material shall be moistened and properly compacted in layers by tampers or rollers to the density required under roadways, parking areas, and other special areas, as determined by Owner.
    - b. The same construction procedure shall be applied to all holes and trenches remaining in excavation areas where the depth of holes exceeds the depth of proposed excavation.

G. Existing Trees to Remain:

1. General:

- a. Protect root systems from smothering and restrict foot traffic to prevent excessive compaction of soil over root systems.
- b. Individual trees and areas shown to remain shall be protected by six (6) foot high chain link fence. Install fencing before site preparation, grading, and clearing and grubbing operations.
- c. Under no circumstances shall the Contractor remove existing trees designated to remain for his/her convenience or ease of construction.
- d. Trees which are not to be removed and become damaged or die shall be replaced with trees of the same species and equal size.

2. Excavation Around Trees:

- a. Protect root systems from smothering and restrict foot traffic to prevent excessive compaction of soil over root systems. Excavate within drip line of trees only where shown on the Drawings.
- b. Where trenching for utilities is required within drip line, tunnel under or around roots by hand digging. Do not cut main lateral roots or tap roots. Contractor shall notify the Owner prior to cutting roots over 6 inches in diameter. Roots up to and including 3/4-inch diameter shall be cut by hand saws. Do not leave roots exposed to sun or drying for more than 24 hours. Protect all exposed roots with moist organic mulch or burlap and backfill as soon as possible.
- c. Where excavating for new construction is required within drip line of tree, excavate by hand to minimize damage to roots and perform as follows:
  - 1) Use narrow tine spading forks and comb soil to expose roots.
  - 2) If main lateral roots are immediately adjacent to location of new construction, cut roots three (3) inches from new construction.
  - 3) Do not allow exposed roots to dry out before permanent backfill is placed.
  - 4) Provide temporary earth cover, or pack with peat moss and wrap with burlap.
  - 5) Water and maintain in moist conditions until covered with backfill.

H. Trimming of Existing Trees:

1. General:

- a. Tree pruning, tree repair, and tree removal shall be performed by competent workers, under the supervision of an arborist holding certification from the International Society of Arboriculture (ISA) or equivalent education and experience. No pruning shall be performed, unless approved by the Owner.
- b. Coordinate with Owner when trimming or removing within public right of way to obtain approval.
- c. Contractor shall be responsible for all tree trimming and pruning operations as well as arborist fees.

2. Pruning:

- a. Cut branches with sharp pruning instruments and do not break or chop.
- b. Prune flush with trunk surface.
- c. Minimum of fifteen (15) feet above the pavement and curb

- d. Minimum of three (3) feet from edge of pavement or back of curb
- 3. Trimming:
  - a. Symmetry of the tree shall be preserved; no stubs or splits or torn branches left; clean cuts shall be made close to the trunk or large branch.
  - b. Spikes shall not be used for climbing live trees.

**END OF SECTION**

## **SECTION 31 23 13 SUBGRADE PREPARATION**

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

- A. This Section includes preparing subgrade for pavement construction complete with excavation, embankments, proof rolling, subgrade undercut and backfill, subgrade stabilization, subgrade, and geogrid.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 22 00 - Unit Prices
- B. Section 01 57 13 - Temporary Erosion and Sediment Control
- C. Section 01 89 00 - Site Construction Performance Requirements
- D. Section 02 41 13 - Selective Removal
- E. Section 31 23 33 - Trenching and Backfilling
- F. Section 32 11 23 - Flexible Base
- G. Section 32 12 16 - Asphalt Paving
- H. Geotechnical Report

#### **1.03 REFERENCE STANDARDS**

- A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:
  - 1. TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, latest edition.
    - a. Item 105 - Removing Treated and Untreated Base and Asphalt Pavement
    - b. Item 110 - Excavation
    - c. Item 210 - Rolling
    - d. Item 216 - Proof Rolling
    - e. Item 240 - Sprinkling
    - f. Item 247 - Flexible Base
    - g. Item 251 - Rework Base Course
    - h. Item 260 - Lime Treatment (Road-Mixed)
    - i. Item 275 - Cement Treatment (Road-Mixed)
    - j. Item 300 - Asphalt, Oil and Emulsion
    - k. Item 310 - Prime Coat

#### **1.04 ALLOWABLE TOLERANCES**

- A. Finish subgrade surface shall be shaped to conform to existing grade and cross section.

#### **1.05 SUBMITTALS**

- A. Test Reports:
  - 1. Testing of the materials and the certification of the test results shall be performed by a testing laboratory approved by the Owner.

## **1.06 SOIL EROSION AND SEDIMENTATION CONTROL**

- A. Comply with requirements of Section 01 57 13 - Temporary Erosion and Sediment Control.

## **PART 2 PRODUCTS**

### **2.01 FLEXIBLE BASE**

- A. Comply with requirements of Section 32 11 23 - Flexible Base.

### **2.02 LIME SLURRY**

- A. Type 1 Lime only.
- B. Mix and compact lime, water, and subgrade (without asphaltic concrete pavement) in the roadway.
- C. All lime application are in slurry form only, dry lime is strictly prohibited.
- D. Furnish uncontaminated materials of uniform quality that meet the requirements TxDOT Item 260 - Lime Treatment (Road-Mix). Obtain verification from the Owner that the specification requirements are met before using the sources. The Owner may sample and test project materials at any time before compaction.
  - 1. Use Tex-100-E for material definitions.
- E. The target lime content and optimum moisture content in accordance with Tex-121-E or prior experience with the project materials during construction.
  - 1. An estimate rate (pounds per square yard) has been included in the Plans. This rate is for bidding purposed and in accordance with the Geotechnical Report Recommendation.
  - 2. Final hydrated lime shall be placed at the rate determined by field test and verified by the Owner after the area to be treated is cut to grade.
- F. The Contractor may propose a mix design developed in accordance with Tex-121-E. The Owner will use Tex-121-E to verify the Contractor's proposed mix design before acceptance.

### **2.03 CEMENT SLURRY**

- A. Type 1 Cement only.
- B. Mix and compact cement, water, and subgrade (with or without asphalt concrete pavement) in the roadway.
- C. All cement application are in slurry form only, dry cement is strictly prohibited.
- D. Furnish uncontaminated materials of uniform quality that meet the requirements TxDOT Item 275 - Cement Treatment (Road-Mix). Obtain verification from the that the specification requirements are met before using the sources. The Owner may sample and test project materials at any time before compaction.
- E. Use Tex-100-E for material definitions.
- F. Furnish hydraulic cement that meets the requirements of DMS-4600, "Hydraulic Cement," and the TxDOT's Hydraulic Cement Quality Monitoring Program (HCQMP).
- G. The target cement content and optimum moisture content in accordance with Tex-120-E or prior experience with the project materials during construction.
  - 1. An estimate rate (pounds per square yard) has been included in the Plans. This rate is for bidding purposed and in accordance with the Geotechnical Report Recommendation.
  - 2. Final hydrated cement shall be placed at the rate determined by field test and verified by the Owner after the area to be treated is cut to grade.
- H. The Contractor may propose a mix design developed in accordance with Tex-120-E. The Owner will use Tex-120-E to verify the Contractor's proposed mix design before acceptance.

- I. If recycled materials are used in the subgrade, Limit the amount of recycled asphalt pavement (RAP) to no more than 50% of the mix unless otherwise or directed by the Owner.

## 2.04 WATER

- A. Furnish water free of industrial wastes and other objectionable material.

## 2.05 GEOGRID

### A. General

1. A synthetic planar structure formed by a regular network of integrally connected polymeric tensile elements with apertures designed to interlock with the surrounding fill material. Geogrid is used for the reinforcement of roadway base materials. Furnish and install geogrid in accordance with the lines and grades shown on the Plans.

### B. Manufacturer/Supplier

1. Tensar, TX120, or approved equal.

### C. Material Requirements

#### 1. General

- a. The structure should be capable of maintaining dimensional stability during placement and under normal construction traffic.
- b. The geogrid must be resistant to damage during construction, including ultraviolet degradation, and it must have long-term resistance to chemical and biological degradation caused by the materials being reinforced.

#### 2. Physical

- a. The geogrid must meet the requirements listed in the Table below when tested in accordance with Tex-621-J.

| Geogrid Requirements                                                                                                                                                                                                                                                                                                                   |                       |                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|
| Property                                                                                                                                                                                                                                                                                                                               | Type 2                |                        |
| Aperture Size, in.                                                                                                                                                                                                                                                                                                                     | 1.0 - 2.0             |                        |
| Percent Open Area, %                                                                                                                                                                                                                                                                                                                   | 70 Min.               |                        |
| Thickness, in.                                                                                                                                                                                                                                                                                                                         |                       |                        |
| MD ribs                                                                                                                                                                                                                                                                                                                                | 0.05 Min.             |                        |
| CMD ribs                                                                                                                                                                                                                                                                                                                               | 1.15 Min.             |                        |
| Junctions                                                                                                                                                                                                                                                                                                                              | 2.54 Min.             |                        |
| Junction Efficiency, % of rib ultimate tensile strength                                                                                                                                                                                                                                                                                |                       |                        |
| MD & CMD                                                                                                                                                                                                                                                                                                                               | 90 Min                |                        |
| Aperture Shape                                                                                                                                                                                                                                                                                                                         | Square or Rectangular | Equilateral Triangular |
| Ribs per Node                                                                                                                                                                                                                                                                                                                          | 4                     | 6                      |
| Tensile Modulus @ 2% elongation <sup>1</sup> , lb/ft                                                                                                                                                                                                                                                                                   |                       |                        |
| MD & CMD                                                                                                                                                                                                                                                                                                                               | 20,000 Min.           | 175,080 Min.           |
| <sup>1</sup> Determined as a secant modulus without offset allowance.<br>Note: MD and CMD do not necessarily refer to the machine (warp) and cross machine (fill) directions in the manufacturing process. They refer, for drawn products, to the more (CMD) or less (MD) highly drawn ribs where the aperture dimensions are unequal. |                       |                        |

## **PART 3 EXECUTION**

### **3.01 GENERAL**

- A. Construct each layer uniformly, free of loose or segregated areas, and with the required density and moisture content. Provide a smooth surface that conforms to the typical sections, and matches the existing lines and grades, and maintains positive drainage.
- B. All existing public utilities within the limits of replacement shown on the Plans with a surface feature including, but not limited to, water valve stacks and lids, manholes, water meters, vaults, etc. shall be located prior to construction, protected during construction, and adjusted to final grade, as necessary. All franchise utilities with a surface feature including, but not limited to, manholes, vaults, etc. shall be located prior to construction and protected during construction. Contractor shall contact franchise utility and Owner if adjustment to final grade is necessary. This work shall be considered incidental to this pay item.

### **3.02 HOLES**

- A. Material shall be compacted to 95% of its maximum unit weight.
- B. The furnishing, placing and compacting of the backfill material shall be at the Contractor's expense.

### **3.03 REMOVE EXISTING ASPHALT & BASE/SUBGRADE**

- A. This item shall consist of excavating the roadway as shown on the plans and typical sections. For the excavation and removal of roadway, including asphalt pavement, treated/untreated subgrade, base material and soil, the provision of TxDOT Item 110 - Excavation, shall apply. This item shall include all work done within the Project Area as denoted on the plans and typical section(s).
- B. The removal of the excavated material is considered incidental to this item. TxDOT Item 110 is modified as follows:
  - 1. Remove, haul, and dispose of existing asphalt concrete pavement in accordance with TxDOT Item 105 - Removing Treated and Untreated Base and Asphalt Pavement.
  - 2. The removal of excavated material is considered incidental to this pay item.
  - 3. The Contractor shall accept ownership of unsuitable or excess material and dispose of material in accordance with Local, State, and Federal regulations at locations outside the right of way.
  - 4. The Contractor shall maintain drainage in the excavated area to avoid damage to the roadway section. Correct any damage to the subgrade caused by weather at no additional cost to the Owner.
  - 5. This surplus material shall become property of the Contractor and shall be properly disposed of at an off-site location by the Contractor.
  - 6. The Contractor shall ensure emergency access is maintained at all times to within excavated area. The contractor shall coordinate with the Owner to inform Fire, Police, and other emergency services of construction activities.
  - 7. Contractor is responsible for coordinating with postal office for mailbox access.
  - 8. Contractor is responsible for coordinating with the Owner to inform trash pickup services are maintained during the construction activities.
  - 9. Any residential access removed or inhibited in anyway must be provided with an alternate access (i.e., temporary driveway ramps) the same day by the Contractor and shall be considered incidental to this item.

- C. Unless shown on Plans, all manholes, water valve and cleanout concrete boxouts shall be maintained and protected during the paving operation. The Contractor will be responsible for replacing any boxout that is damaged, at no additional cost to the Owner.

### **3.04 PREPARATION OF SUBGRADE FOR TREATMENT**

- A. Before treating, remove existing asphalt pavement in accordance with TxDOT Item 105 - Removing Treated and Untreated Base and Asphalt Pavement, when shown on the Plans or as directed by the Owner. Shape existing material in accordance with applicable bid items to conform to typical sections shown on the Plans and as directed by the Owner.
- B. Unless otherwise approved, proof roll the roadbed in accordance with TxDOT Item 216 - Proof Rolling, before pulverizing or scarifying existing material. Correct soft spots as directed by the Owner.
- C. When material is imported from a borrow source, notify the Owner of the location of the borrow source well in advance to allow time for testing and approval to avoid delay to the project. The Contractor will be responsible for testing cost on all imported or borrowed sources. The borrowed source will be tested to sulfate and organic contents. When the borrow source has a sulfate content greater than 3,000 ppm or an organic content greater than 1.0%, the source will not be approved for use.
- D. When new base material is required to be mixed with existing base, deliver, place, and spread the new material in the required amount per square yard. Manipulate and thoroughly mix new base with existing material to provide a uniform mixture to the specified depth before shaping.
- E. Pulverization
  - 1. Pulverize or scarify existing material after shaping so that 100% passes a 2-1/2 in. sieve. If the material cannot be uniformly processed to the required depth in a single pass, excavate and windrow the material to expose a secondary grade to achieve processing to plan depth.

### **3.05 APPLICATION OF LIME**

- A. General
  - 1. Uniformly apply lime using slurry placement as shown on the Plans or as directed by the Owner. Add lime at the percentage determined. Apply lime only on an area where mixing can be completed during the same working day.
  - 2. Start lime application only when the air temperature is at least 35°F and rising or is at least 40°F. The temperature will be taken in the shade and away from artificial heat. Suspend application when the Owner determines that weather conditions are unsuitable.
- B. Slurry Placement
  - 1. Provide slurry free of objectionable materials, at or above the minimum dry solids content, and with a uniform consistency that will allow ease of handling and uniform application. Deliver commercial lime slurry or carbide lime slurry to the Site, or use hydrated lime or quicklime to prepare lime slurry at the jobsite or other approved location, as specified. When dry quicklime is applied as slurry, use 80% of the amount shown on the Plans.
  - 2. Distribute slurry uniformly by making successive passes over a measured section of roadway until the specified lime content is reached. Uniformly spread the residue from quicklime slurry over the length of the roadway being processed, unless otherwise directed by the Owner.
- C. Mixing
  - 1. Begin mixing within 6 hours of application of lime. Hydrated lime exposed to the open air for 6 hours or more between application and mixing, or that experiences excessive loss due to washing or blowing, will not be accepted for payment.

2. Thoroughly mix the material and lime using approved equipment. When treating subgrade, bring the moisture content above the optimum moisture content to insure adequate chemical reaction of the lime and subgrade materials. Allow the mixture to mellow for 1 to 4 days, as directed by the Owner. Sprinkle the treated materials during the mixing and mellowing operation, as directed by the Owner, to achieve adequate hydration and proper moisture content. When the material to be treated has a sulfate content greater than 3,000 ppm but less than or equal to 7,000 ppm, mellow for a minimum of 7 days. Maintain in a continuously moist condition by sprinkling in accordance with TxDOT Item 204 - Sprinkling. After mellowing, resume mixing until a homogeneous, friable mixture is obtained. After mixing, the Owner may sample the mixture at roadway moisture and test in accordance with Tex-101-E, Part III, to determine compliance with the gradation requirements in Table below.

| Gradation Requirements (Minimum % Passing) |          |
|--------------------------------------------|----------|
| Sieve Size                                 | Subgrade |
| 1-3/4"                                     | 100      |
| 3/4"                                       | 85       |
| #4                                         | 60       |

D. Compaction

1. General

- a. Compact the mixture using density control, unless otherwise shown on the Plans. Multiple lifts are permitted when shown on the plans or approved. Bring each layer to the moisture content directed by the Owner. Sprinkle the treated material in accordance with TxDOT Item 204 - Sprinkling or aerate the treated material to adjust the moisture content during compaction so that it is no more than 1.0 percentage points below optimum and 2.0 percentage points above optimum as determined by Tex-121-E. Measure the moisture content of the material in accordance with Tex-115-E or Tex-103-E during compaction daily and report the results the same day, unless otherwise shown on the Plans or directed by the Owner.
- b. Begin rolling longitudinally at the sides and proceed toward the center, overlapping on successive trips by at least 1/2 the width of the roller unit. Offset alternate trips of the roller. Operate rollers at a speed between 2 and 6 mph as directed by the Owner.
- c. Before final acceptance, the Owner will select the locations of tests in each unit and measure the treated depth in accordance with Tex-140-E. Correct areas deficient by more than 1/2 inch in thickness or more than 0.5% in target lime content by adding lime as required, reshaping, re-compacting, and refinishing at the Contractor's expense.
- d. Rework, recompact, and refinish material that fails to meet or that loses required moisture, density, stability, or finish before the next course is placed or the project is accepted. Continue work until this Specification requirements are met. Rework in accordance with this Section. Perform the work at no additional expense to the Owner.

2. Ordinary Compaction

- a. Roll with approved compaction equipment, as directed. Correct irregularities, depressions, and weak spots immediately by scarifying the areas affected, adding or removing treated material as required, reshaping, and re-compacting.

3. Density Control

- a. The Geotechnical Engineer will determine roadway density and moisture content of completed sections in accordance with Tex-115-E. The Owner may accept the section if no more than 1 of the 5 most recent density tests is below the specified density and the failing test is no more than 3 pcf below the specified density.

E. Subgrade

1. Compact to at least 95% of the maximum density determined in accordance with Tex-121-E, unless otherwise shown on the plans.

**F. Reworking a Section**

1. When a section is reworked within 72 hours after completion of compaction, rework the section to provide the required density. When a section is reworked more than 72 hours after completion of compaction, add additional lime at 25% of the percentage determined in this Section. Reworking includes loosening, adding material or removing unacceptable material if necessary, mixing as directed by the Owner, compacting, and finishing. When density control is specified, determine a new maximum density of the reworked material in accordance with Tex-121-E, and compact to at least 95% of this density.

**G. Finishing**

1. Immediately after completing compaction of the final course, clip, skin, or tight-blade the surface of the lime-treated material with a maintainer or subgrade trimmer to a depth of approximately 1/4 inch. Remove loosened material and dispose of at an approved location. Roll the clipped surface immediately with a pneumatic tire roller until a smooth surface is attained. Add small amounts of water as needed during rolling. Shape and maintain the course and surface in conformity with the typical sections, lines, and grades shown on the Plans or as directed by the Owner.
2. Correct grade deviations of constructed base greater than 1/4 inch in 16 feet measured longitudinally or greater than 1/4 inch over the entire width of the cross-section in areas where surfacing is to be placed. Remove excess material, reshape, and roll with a pneumatic-tire roller. Correct as directed by the Owner if material is more than 1/4 inch low. Do not surface patch. The 72-hours time limit required for completion of placement, compaction, and finishing does not apply to finishing required just before applying the surface course.

**H. Curing**

1. Cure for the minimum number of days shown in the Table below by sprinkling in accordance with TxDOT Item 204 - Sprinkling, or by applying an asphalt material at a rate of 0.20 gallons per square yard as directed by the Owner. Maintain moisture during curing. Upon completion of curing, maintain the moisture content in accordance with this Section for subgrade before placing subsequent courses. Do not allow equipment on the finished course during curing except as required for sprinkling, unless otherwise approved. Apply seals or additional courses within 14 calendar days of final compaction.

| <b>Minimum Curing Requirements before Placing Subsequent Courses <sup>1</sup></b>                                    |                      |
|----------------------------------------------------------------------------------------------------------------------|----------------------|
| <b>Untreated Material</b>                                                                                            | <b>Curing (Days)</b> |
| PI ≤ 35                                                                                                              | 2                    |
| PI > 35                                                                                                              | 5                    |
| <sup>1</sup> Subject to the approval of the Owner. Proof rolling may be required as an indicator of adequate curing. |                      |

### **3.06 FULL DEPTH RECLAMATION WITH CEMENT**

- A. Full-Depth Reclamation (FDR) shall consist of pulverizing (reclaiming) the existing flexible asphalt pavement (approximately 2"-3") and underlying materials (base and/or subgrade materials) (approximately 3"-6") to the length and width as specified on the Plans (from gutter to gutter), blending with a cementitious stabilizing agent with cement, water, additives, or corrective aggregate as required by the mix design, to produce a cementitious stabilized base.
- B. Final hydrated cement shall be placed at the rate determined for subgrade stabilization based upon samples obtained onsite (field tested) and verified by the Owner after the area to be treated is cut to grade.

- C. Subgrade stabilization, pulverization, and mixing shall be to the depth of eight (8) inches, unless otherwise specified on the Plans. Additionally, all mailbox turnouts, and asphalt driveways shall be included in this item. Work shall be in accordance with TxDOT Item 251 - Rework Base Course, (Type C) (scarifying and reshaping) and TxDOT Item 275 - Cement Treatment (Road-Mixed).
- D. The existing flexible pavement, base and/or subgrade material shall be pulverized to a total depth of one (1) to twelve (12) inches. The pulverized section shall then be re-graded, with excess material removed and hauled away as necessary, to allow for the net placement of four (4) inches of new pavement material, meet existing grades and elevations.
- E. A cementitious stabilizing agent, water, additives, and/or corrective aggregate shall be added and blended to a total depth of eight (8) inches in accordance with the plans and specifications. Cement will be added at the determined pounds per square yard rate and mixed until a homogeneous mixture is obtained. The mixture shall not consist of more than 50% pulverized asphalt pavement. Additionally milling and removal of existing milled asphalted need to achieve the appropriate mixed shall be subsidiary to this item.
- F. New material incorporation and additional mixing needed to obtain eight (8) inches of stabilized subgrade and 25% new material shall be considered subsidiary to Item Additional Subgrade Material (2").
- G. Before the stabilization process begins, the area to be stabilized shall be pre-pulverized, graded, and/or shaped to the existing lines and grades. During this process, any unsuitable soil or material shall be removed and replaced with materials meeting project plan and specification requirements.
  - 1. The subgrade shall be firm and able to support, without yielding or subsequent settlement, the construction equipment and compaction of the FDR stabilized base.
  - 2. Soft or yielding subgrade shall be made stable before construction proceeds.
  - 3. Any manholes, valve covers, or other buried structures/utilities shall be protected from damage prior to processing.
  - 4. FDR shall be constructed in a series of parallel lanes such that longitudinal and transverse joints are minimized.
- H. Rubberized crack filler, pavement markers, loop wires, thermoplastic markers and other similar materials shall be removed from the roadway as observed during the reclaiming process. Residual materials that cannot be completely removed from the processed materials may be incorporated into the reclaimed materials if the Contractor can demonstrate that those added materials will not adversely affect the performance of the FDR stabilized base. Any such materials retained in the mixture shall be appropriately sized and blended so as not to adversely affect the appearance or strength of the FDR stabilized base.
- I. Locations noted in the Plans are subject to field verification and approval by the Owner. The replacement limits can be adjusted as deemed necessary by the Owner. Contractor shall match existing grades and roadway width to ensure sufficient space for four (4) inch asphalt pavement unless directed otherwise by the Owner.
- J. Unless shown on Plans, all manhole, water valve and cleanout concrete boxouts shall be maintained and protected during the paving operation. The Contractor will be responsible for replacing any boxout that is damaged, at no additional cost to the Owner.

### **3.07 APPLICATION OF CEMENT**

- A. General
  - 1. Uniformly apply cement using slurry placement as shown on the Plans or as directed by the Owner. Add lime at the percentage determined. Apply cement only on an area where mixing can be completed during the same working day.

2. Start cement application only when the air temperature is at least 35°F and rising or is at least 40°F. The temperature will be taken in the shade and away from artificial heat. Suspend application when the Owner determines that weather conditions are unsuitable.

**B. Slurry Placement**

1. Mix the required quantity of cement with water, as approved by the Owner. Provide slurry free of objectionable materials and with a uniform consistency that can be easily applied. Agitate the slurry continuously. Apply slurry within 2 hours of adding water and when the roadway is at a moisture content drier than optimum. Distribute slurry uniformly by making successive passes over a measured section of the roadway until the specified cement content is reached.

**C. Mixing**

1. Thoroughly mix the material and cement using approved equipment. Mix until a homogeneous mixture is obtained. Sprinkle the treated materials during the mixing operation, as directed by the Owner, to maintain optimum mixing moisture. Spread and shape the completed mixture in a uniform layer.
2. After mixing, the Owner may sample the mixture at roadway moisture and test in accordance with Tex-101-E, Part III, to determine compliance with the gradation requirements in the Table below. When strength requirements are shown on the Plans, the Owner may sample the mixture to verify strength in accordance with Tex-120-E and adjust cement content to achieve the target strength for work going forward.

| <b>Gradation Requirements (Minimum % Passing)</b> |                 |
|---------------------------------------------------|-----------------|
| <b>Sieve Size</b>                                 | <b>Subgrade</b> |
| 1-3/4"                                            | 100             |
| 3/4"                                              | 85              |
| #4                                                | 60              |

**D. Compaction**

1. Compact the mixture in one lift using density control unless otherwise shown on the Plans. Complete compaction within 2 hours after the application of water to the mixture of material and cement.
2. Sprinkle the treated material in accordance with TxDOT Item 204 - Sprinkling, or aerate the treated material to adjust the moisture content during compaction so that it is within 2.0 percentage points of optimum as determined by Tex-120-E. Measure the moisture content of the material in accordance with Tex-115-E or Tex-103-E during compaction daily and report the results the same day to the Owner, unless otherwise shown on the Plans or directed by the Owner. Adjust operations as required.
3. Begin rolling longitudinally at the sides and proceed towards the center, overlapping on successive trips by at least one-half the width of the roller unit. Offset alternate trips of the roller. Operate rollers at a speed between 2 and 6 mph, as directed.
4. Before final acceptance, the Owner will select the locations of tests in each unit and measure the treated depth in accordance with Tex-140-E. Correct areas deficient by more than 1/2 inch in thickness or more than 0.5% in target cement content by adding cement as required, reshaping, re-compacting, and refinishing at the Contractor's expense.
5. Remove or rework areas that lose required stability, compaction, or finish, as directed. When a section is reworked more than 4 hours after completion of compaction, add additional cement as directed by the Owner. Provide additional work and material at no additional cost to the Owner.
6. Ordinary Compaction

- a. Roll with approved compaction equipment, as directed by the Owner. Correct irregularities, depressions, and weak spots immediately by scarifying the areas affected, adding or removing treated material as required, reshaping, and re-compacting.

7. Density Control

- a. Achieve at least 95% of the maximum density determined in accordance with Tex-120-E when compaction is complete. The Geotechnical Engineer will determine roadway density and moisture content in accordance with Tex-115-E. The Owner may verify strength in accordance with Tex-120-E and adjust cement content to achieve the target strength for work going forward. Remove material that does not meet density requirements or rework by adding the target cement content, reshaping, re-compacting, and refinishing at the Contractor's expense.
- b. The Owner may accept the section if no more than 1 of the 5 most recent density tests is below the specified density and the failing test is no more than 3 pcf below the specified density

E. Finishing

1. Immediately after completing compaction, clip, skin, or tight-blade the surface of the cement treated material with a maintainer or subgrade trimmer to a depth of approximately 1/4 inch. Remove loosened material and dispose of it at an approved location. Roll the clipped surface immediately with a pneumatic-tire roller until a smooth surface is attained. Add small increments of water as needed during rolling. Shape and maintain the course and surface in conformity with the typical sections, lines and grades shown on the plans or as directed.
2. Correct grade deviations of constructed base greater than 1/4 inch in 16 feet measured longitudinally or greater than 1/4 inch over the entire width of the cross-section in areas where surfacing is to be placed. Remove excess material, reshape, and roll with a pneumatic-tire roller. Correct as directed if material is more than 1/4 inch low. Do not surface patch.

F. Microcracking

1. When shown on the plans, maintain moisture content of the finished cement treated base for a period of 24 to 48 hours. During this time, but not sooner than 24 hours, roll the finished course with a vibratory roller to induce microcracking. The vibratory roller must be in accordance with TxDOT Item 210 - Rolling, with a static weight equal to or more than 12 tons and the vibratory drum must be not less than 20 inch wide. The roller must travel at a speed of 2 mph, vibrating at maximum amplitude, and make 2 to 4 passes with 100% coverage exclusive of the outside 1 foot of the surface crown, unless otherwise directed by the Owner. Additional passes may be required to achieve the desired crack pattern as directed by the Owner. Notify the Owner 24 hours before the microcracking begins.

G. Curing

1. Cure for at least 3 days by sprinkling in accordance with TxDOT Item 204 - Sprinkling, or by applying an asphalt material at the rate of 0.20 gallons per square yard, as shown on the plans or directed by the Owner. When a section is microcracked, cure section for an additional 2 days after microcracking. Maintain the moisture content during curing at no lower than 2 percentage points below optimum. Continue curing until placing another course.

- H. This item shall be to furnish the cement slurry, and mix, compact and construct a subgrade course of Full-Depth Reclamation (FDR) material (existing subgrade material and existing asphalt pavement), additional new material, hydraulic cement slurry, and water, in accordance with TxDOT Item 275 - Cement Treatment (Road-Mixed).

1. For cement treatment, the following TxDOT requirements are required:

- a. Proof roll the roadbed in accordance with TxDOT Item 216 - Proof Rolling, before pulverizing existing material. Correct soft spots as directed.
- b. When new base is required to be mixed with existing base, deliver, place, and spread the new material in the required amount per station. Manipulate and thoroughly mix new base with existing material to provide a uniform mixture to the specified depth before shaping.
- c. Uniformly apply cement and add cement at the percentage determined in Section 275.2.6., "Mix Design." Apply cement only on an area where mixing, compacting, and finishing can be completed during the same working day.
- d. Microcracking - This procedure (TxDOT 275.4.7) shall apply to this project if cement stabilization is required.
- e. Cement shall be sealed with an approved TxDOT Item 300 - Asphalt, Oil and Emulsion and TxDOT Item 310 - Prime Coat at a rate of 0.20 gal/sy. This shall be considered subsidiary to this item.

### **3.08 GEOGRID**

- A. Installation shall be per Manufacturer recommendations.
- B. Geogrid shall be considered subsidiary to the governing bid item in the Contract.

### **3.09 MAINTENANCE AGGREGATE**

- A. Contractor shall furnish and install Flexible Base to be used for maintenance aggregate to maintain pedestrian and traffic access. Aggregate shall be placed and compacted to maintain access in areas as determined by the Owner.
- B. Maintenance aggregate will be incidental to the Project unless otherwise specified in the Contract Documents.

### **3.10 TESTING**

- A. The Contractor is responsible for all cost associate with material testing.
- B. The Owner shall determine the location and number of samples to be made. The testing laboratory shall furnish the Engineer and the Owner with two (2) certified copies of the results of all tests.
- C. Testing procedures shall conform to current TxDOT Standard Specifications for Construction Maintenance of Highways, Streets, and Bridges.
- D. A lime series test shall be conducted at 400 feet intervals for each street section to determine final rates.

### **3.11 DEFECTIVE WORK**

- A. Any portion of the backfill, subbase or subgrade which is deficient in the specified density shall be corrected by methods meeting the approval of the Owner.
  - 1. Any extra testing or sampling required by the Owner, because of deficiencies, shall be at the Contractor's expense.

## **END OF SECTION**

## **SECTION 31 23 33 TRENCHING AND BACKFILLING**

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

- A. This Section includes open trench construction for utility installation, complete with trenching, sheeting, bracing, bedding, bedding materials, backfilling, backfill materials, and compaction.
- B. All trenching sheeting, bracing, bedding, bedding materials, backfilling, backfill materials, and compaction shall be subsidiary to the respective utility installation.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 57 13 - Temporary Erosion and Sediment Control
- B. Section 01 89 00 - Site Construction Performance Requirements
- C. Section 32 11 23 - Flexible Base
- D. Section 32 92 23 - Sodding
- E. Section 33 11 00 - Water Utility Distribution Piping
- F. Section 33 41 00 - Storm Utility Drainage Piping

#### **1.03 REFERENCE STANDARDS**

- A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:
  - 1. ASTM C94/C94M: Standard Specification for Ready-Mixed Concrete
  - 2. ASTM C150/C150M: Standard Specification for Portland Cement
  - 3. ASTM C595/C595M: Standard Specification for Blended Hydraulic Cements
  - 4. ASTM C618: Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
  - 5. TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, latest edition
  - 6. NCTCOG Public Works Construction Standard Specifications, latest edition
    - a. Item 504.2.2.1 - Crushed Stone Embedment
    - b. Item 504.2.2.6 - Sand
    - c. Item 504.5.2.8 - Class "B-4" Embedment

#### **1.04 TEST REPORTS**

- A. Testing laboratory shall provide the Engineer and the Owner with two (2) certified copies of the test results of the compaction of the backfill.
- B. Testing for compaction and the certification of the test results shall be performed by a testing laboratory approved by the Owner.

#### **1.05 SOIL EROSION AND SEDIMENTATION CONTROL**

- A. Comply with requirements of Section 01 57 13 - Temporary Erosion and Sediment Control.

### **PART 2 PRODUCTS**

#### **2.01 FLEXIBLE BASE FOR BACKFILLING**

- A. Comply with requirements of Section 32 11 23 - Flexible Base.

- B. No native material will be allowed for backfilling within the right of way.

## **2.02 FLOWABLE FILL FOR BACKFILLING**

### **A. General**

- 1. Furnish and place flowable backfill for trench, hole, or other void.

### **B. Materials**

- 1. Fly Ash shall have a maximum loss on ignition of 12% and meet the other requirements of ASTM C618 (Class F).
- 2. Water shall meet the requirements of ASTM C94/C94M.
- 3. ASTM C150/C150M or ASTM C595/C595M, Type I or Type IA.

### **C. Mixture (Strength 100 to 120 psi)**

- 1. Fly Ash: 2,000 lbs per cyd min
- 2. Cement: 70 lbs per cyd min
- 3. Water: Sufficient water to produce desired flowability 700 lbs per cyd

- D. The temperature of the flowable fill mix as manufactured and delivered shall be at least 50 degrees Fahrenheit.

- E. The flowable fill can be mixed by pugmill, central concrete mixer, ready mix truck, turbine mixer, or other acceptable equipment or method.

## **2.03 CRUSHED STONE ROCK AGGREGATE FOR STORM SEWER PIPE EMBEDMENT**

- A. Comply with requirements of NCTCOG Item 504.2.2.1 - Crushed Stone Embedment and Plans.

- B. Standard crushed stone rock aggregate shall be Grade 4, unless otherwise directed by the Owner.

## **2.04 CLASS "B-4" AND SAND FOR WATER SERVICE PIPE EMBEDMENT**

- A. Class "B-4" embedment shall comply with requirements of NCTCOG Item 504.5.2.8 - Class "B-4" Embedment and Plans.

- B. Sand shall comply with requirements of NCTCOG Item 504.2.2.6 - Sand and Plans.

## **PART 3 EXECUTION**

### **3.01 TRENCH EXCAVATION**

- A. Open cut trench excavation shall include the site clearing and grubbing, the excavating of all materials encountered, the supporting and protecting of all structures and/or utilities encountered above and below the ground surface, and the removal of water from the construction site.
- B. The trench shall be excavated in reasonably close conformity with the lines and grades specified on the Plans or as established by the Owner.
- C. The excavated materials shall be temporarily stored along the trench in a manner that will not cause damage to trees, shrubs, fences, improvements, utilities, private property, public property or traffic. The excavated materials shall not be placed at such locations that will endanger the trench banks by imposing loads thereon.
  - 1. All excavated materials shall be removed from the site. No native material will be allowed for backfilling within the right of way.
- D. The trench shall be of sufficient width to provide adequate working space to permit the installation of the pipe and the compaction of the bedding material under and around the pipe.

- E. When, through the Contractor's construction procedure or because of unsuitable existing ground conditions, it becomes impossible to maintain alignment and grade properly, the Contractor, at Contractor's expense, shall excavate below the normal trench bottom grade and shall fill the void with a large size aggregate or 3,000 psi concrete as approved by the Owner to ensure that the pipe when laid in the proper bedding will maintain correct alignment and proper grade.
- F. Trench excavations, including those for structures, shall be adequately braced and/or sheeted where necessary to prevent caving or squeezing of the soil.

### **3.02 CLEANUP**

- A. Immediately following the placing and compacting of the backfill, the excess material shall be removed and disposed of by the Contractor, at Contractor's expense, as specified in Section 01 89 00 - Site Construction Performance Requirements. The construction area shall be leveled and left in a neat condition.
- B. At a seasonally correct time, approved by the Owner, the unpaved disturbed area shall be raked, having topsoil placed thereon and restored.
  - 1. Restoration with sod shall be in accordance with Section 32 92 23 - Sodding.

### **3.03 FIELD TESTING**

- A. The Contractor is responsible for all cost associate with material testing.
- B. During the course of the Work, the Owner will require testing for compaction or density of the backfill.
- C. Testing procedures shall conform to current TxDOT Standard Specifications for Construction Maintenance of Highways, Streets, and Bridges.

### **3.04 DEFECTIVE WORK**

- A. Any portion of the trench backfill which is deficient in the specified density shall be corrected by methods meeting the approval of the Owner.
- B. Any extra testing or sampling required because of deficiencies shall be at the Contractor's expense.

## **END OF SECTION**

## **SECTION 32 11 23 FLEXIBLE BASE**

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

- A. This Section includes furnishing and installing flexible base for items including, utility backfilling as well as subgrade material for roadway, curb and gutter, driveway, and concrete valley gutter, etc.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 89 00 - Site Construction Performance Requirements
- B. Section 31 23 13 - Subgrade Preparation
- C. Section 32 12 16 - Asphalt Paving
- D. Section 32 13 13 - Concrete Paving

#### **1.03 REFERENCE STANDARDS**

- A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:
  - 1. TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, latest edition
    - a. Item 104 - Removing Concrete
    - b. Item 105 - Removing Treated and Untreated Base and Asphalt Pavement
    - c. Item 204 - Sprinkling
    - d. Item 216 - Proof Rolling
    - e. Item 247 - Flexible Base

#### **1.04 TEST REPORTS**

- A. The testing lab shall provide the Owner with two (2) certified copies of the test results of the thickness of the compacted aggregate. The core drilling, testing for thickness and the certification of the test results shall be performed by a testing laboratory approved by the Owner.

### **PART 2 PRODUCTS**

#### **2.01 AGGREGATE**

- A. General
  - 1. Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications. The Owner may sample and test project materials at any time before compaction throughout the duration of the project to assure specification compliance. Use Tex-100-E material definitions.
- B. Aggregate
  - 1. Furnish aggregate of the type and grade shown on the Plans and meeting the requirements of the Table below. Each source must meet the requirements in the Table below for liquid limit, plasticity index, and wet ball mill for the grade specified. Do not use additives, such as but not limited to lime, cement, or fly ash to modify aggregates to meet the requirements, unless directed by the Owner.

| <b>Material Requirements</b> |
|------------------------------|
|------------------------------|

| Material Requirements                                                                                                                           |             |             |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|
| Property                                                                                                                                        | Test Method | Grade 1 - 2 |
| Sampling                                                                                                                                        | Tex-400-A   | ---         |
| Master gradation sieve size<br>(cumulative % retained)                                                                                          | Tex-110-E   | ---         |
| 2-1/2"                                                                                                                                          |             | 0           |
| 1-3/4"                                                                                                                                          |             | 0 - 10      |
| 7/8"                                                                                                                                            |             | 10 - 35     |
| 3/8"                                                                                                                                            |             | 30 -65      |
| #4                                                                                                                                              |             | 45 - 75     |
| #40                                                                                                                                             |             | 65 - 90     |
| Liquid Limit, % Max                                                                                                                             |             | Tex-104-E   |
| Plasticity Index, Max <sup>1</sup>                                                                                                              | Tex-106-E   | 10          |
| Plasticity Index, Min <sup>1</sup>                                                                                                              |             | ---         |
| Wet ball mill, % Max                                                                                                                            | Tex-116-E   | 40          |
| Wet ball mill, % Max increase<br>passing the #40 sieve                                                                                          |             | 20          |
| Min compressive strength, psi                                                                                                                   | Tex-117-E   | ---         |
| lateral pressure 0 psi                                                                                                                          |             | 35          |
| lateral pressure 3 psi                                                                                                                          |             | ---         |
| lateral pressure 15 psi                                                                                                                         |             | 175         |
| <sup>1</sup> Determine plastic index in accordance with Tex-107-E (linear shrinkage) when liquid limit is unattainable as defined in Tex-104-E. |             |             |

2. Material Tolerances

- a. The Owner may accept material if no more than 1 of the 5 most recent gradation tests has an individual sieve outside the specified limits of the gradation.
- b. When target grading is required by the plans, no single failing test may exceed the master grading by more than 5 percentage points on sieves #4 and larger or 3 percentage points on sieves smaller than #4.
- c. The Owner may accept material if no more than 1 of the 5 most recent plasticity index tests is outside the specified limit. No single failing test may exceed the allowable limit by more than 2 points.

C. Material Type

1. Type A

- a. Crushed stone produced and graded from oversize quarried aggregate that originates from a single, naturally occurring source. Do not use gravel or multiple sources.

2. Type D

- a. Type A material or crushed concrete. Crushed concrete containing gravel will be considered Type D material. Crushed concrete must meet the requirements in Section this Section and be managed in a way to provide for uniform quality. The Owner may require separate dedicated stockpiles in order to verify compliance.

D. Recycled Material (Including Crushed Concrete) Requirements

1. Provide recycled materials, other than RAP, that have a maximum sulfate content of 3,000 ppm when tested in accordance with Tex-145-E. When the Contractor furnishes the recycled materials, including crushed concrete, the final product will be subject to the

requirements of the Table above for the grade specified. Certify compliance with DMS-11000, for Contractor furnished recycled materials. In addition, recycled materials must be free from reinforcing steel and other objectionable material and have at most 1.5% deleterious material when tested in accordance with Tex-413-A.

2. RAP will not be allowed in flexible base mixture.

## **2.02 WATER**

- A. Furnish water free of industrial wastes and other objectionable matter

## **PART 3 EXECUTION**

### **3.01 EXISTING IMPROVEMENTS**

- A. Investigate and verify locations of existing utilities, to which the new Work will be in contact. Necessary adjustments in line and grade, to align the new Work with the existing improvements must be approved by the Owner, prior to any changes.

### **3.02 INSTALLATION - GENERAL**

- A. Width, thickness, and type of aggregate materials shall be indicated on the Plans or as directed by the Owner.
- B. Construct each layer uniformly, free of loose or segregated areas, and with the required density and moisture content. Provide a smooth surface that conforms to the typical sections, lines, and grades shown on the Plans or as directed by the Owner.
- C. Stockpile base material temporarily at an approved location before delivery to the roadway. Build stockpiles in layers no greater than 2 feet thick. Stockpiles must have a total height between 10 and 16 feet unless otherwise approved by the Owner.

### **3.03 PREPARATION**

- A. Remove or scarify existing asphalt concrete pavement in accordance with TxDOT Item 105 - Removing Treated and Untreated Base and Asphalt Pavement and TxDOT Item 104 - Removing Concrete, when shown on the plans or as directed. Shape the subgrade or existing base to conform to the typical sections shown on the Plans or as directed by the Owner.
- B. When new base is required to be mixed with existing base, deliver, place, and spread the new flexible base in the required amount per station. Manipulate and thoroughly mix the new base with existing material to provide a uniform mixture to the specified depth before shaping.
- C. Proof roll the roadbed in accordance with TxDOT Item 216 - Proof Rolling, before pulverizing or scarifying when shown on the Plans or directed by the Owner. Correct soft spots as directed by the Owner.
- D. Placing
  1. Spread and shape flexible base into a uniform layer with an approved spreader the same day as delivered unless otherwise approved. Construct layers to the thickness shown on the Plans. Maintain the shape of the course. Control dust by sprinkling, as directed by the Owner. Correct or replace segregated areas as directed, at no additional expense to the Owner.
  2. Place successive base courses and finish courses using the same construction methods required for the first course.
- E. Compaction
  1. Compact using density control unless otherwise shown on the plans. Multiple lifts are permitted when shown on the Plans or approved by the Owner. Bring each layer to the moisture content directed. When necessary, sprinkle the material in accordance with TxDOT Item 204 - Sprinkling.

2. Begin rolling longitudinally at the sides and proceed towards the center, overlapping on successive trips by at least 1/2 the width of the roller unit. Offset alternate trips of the roller. Operate rollers at a speed between 2 and 6 mph as directed.
3. Rework, recompact, and refinish material that fails to meet or that loses required moisture, density, stability, or finish requirements before the next course is placed or the project is accepted. Continue work until specification requirements are met. Perform the work at no additional expense to the Owner.
4. Before final acceptance, the Owner will select the locations of tests and measure the flexible base depth in accordance with Tex-140-E. Correct areas deficient by more than 1/2 in. in thickness by scarifying, adding material as required, reshaping, re-compacting, and refinishing at the Contractor's expense.
5. Ordinary Compaction
  - a. Roll with approved compaction equipment as directed. Correct irregularities, depressions, and weak spots immediately by scarifying the areas affected, adding or removing approved material as required, reshaping, and re-compacting.
6. Density Control
  - a. Compact to at least 100% of the maximum dry density determined by Tex-113-E. Maintain moisture during compaction within  $\pm 2$  percentage points of the optimum moisture content as determined by Tex-113-E. Measure the moisture content of the material in accordance with Tex-115-E or Tex-103-E during compaction daily and report the results the same day to the Owner, unless otherwise directed by the Owner. Do not achieve density by drying the material after compaction. The Geotechnical Lab will determine roadway density and moisture content of completed sections in accordance with Tex-115-E.
  - b. The Owner may accept the section if no more than 1 of the 5 most recent density tests is below the specified density and the failing test is no more than 3 pcf below the specified density.

**F. Finishing**

1. After completing compaction, clip, skin, or tight-blade the surface with a maintainer or subgrade trimmer to a depth of approximately 1/4 inch. Remove loosened material and dispose of it at an approved location. Seal the clipped surface immediately by rolling with a pneumatic tire roller until a smooth surface is attained. Add small increments of water as needed during rolling. Shape and maintain the course and surface in conformity with the typical sections, lines, and grades as shown on the plans or as directed.
2. Correct grade deviations greater than 1/4 inch in 16 feet measured longitudinally or greater than 1/4 inch over the entire width of the cross-section in areas where surfacing is to be placed. Correct by loosening and adding, or removing material. Reshape and re-compact in accordance with this Section.

**G. Curing**

1. Cure the finished section until the moisture content is at least 2 percentage points below optimum or as directed before applying the next successive course or prime coat.

**3.04 MAINTENANCE DURING CONSTRUCTION**

- A. Aggregate base course and aggregate surface shall be continuously maintained in a smooth and firm condition during all phases of the construction operation.
- B. Contractor, at Contractor's expense, shall provide additional materials needed to fill depressions or bind the aggregate.

### **3.05 TESTING**

- A. During the course of the Work, the Owner may require testing for compaction or density and for thickness of material. Testing and coring required shall be performed by a testing laboratory approved by the . The cost for testing and coring shall be at the expense of the Contractor.
- B. When thickness tests are done, a minimum of one depth (thickness) measurement will be made every 400 feet per traffic lane. The lane width shall be as indicated on the Plans or as determined by the Owner.
  - 1. If two (2) lanes are constructed simultaneously, only one test is necessary to represent both lanes.
  - 2. For areas such as intersections, entrances, cross-overs, ramps, widening strips, acceleration and deceleration lane, at least one depth measurement will be taken for each 1200 square yards of such areas or fraction thereof.
- C. Location of the depth measurement will be at the discretion of the Owner.

**END OF SECTION**

## **SECTION 32 12 16 ASPHALT PAVING**

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

- A. This Section includes asphalt paving complete with asphalt materials; asphalt mixtures; installation of base course, and surface course; construction of asphalt pavement, drive approaches; cold milling; and pulverizing existing pavements.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 22 00 - Unit Prices
- B. Section 01 33 00 - Submittal Procedures
- C. Section 01 89 00 - Site Construction Performance Requirements
- D. Section 02 41 13 - Selective Removal
- E. Section 31 23 13 - Subgrade Preparation
- F. Section 32 11 23 - Flexible Base
- G. Section 332 17 23 - Pavement Markings

#### **1.03 REFERENCE STANDARDS**

- A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:
  - 1. 1. TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, latest edition
    - a. Item 105 - Removing Treated and Untreated Base and Asphalt Pavement
    - b. Item 300 - Asphalt, Oils, and Emulsions
    - c. Item 301 - Asphalt Antistripping Agents
    - d. Item 310 - Prime Coat
    - e. Item 320 - Equipment for Asphalt Concrete Pavement
    - f. Item 341 - Dense-Graded Hot-Mix Asphalt

#### **1.04 MATERIAL REPORTS**

- A. At the request of the Owner, the Contractor shall provide the Engineer with certification that the various materials to be used conform to the Standards referred to in the Specifications.
- B. Contractor shall provide the Owner, or his authorized representative, with the certified batch plant delivery tickets prior to the placing of the materials.
- C. Contractor shall supply the Owner with a certified job mix design for each type of bituminous mixture proposed for use on this Project.

#### **1.05 TEST REPORTS**

- A. xxx
- B. The testing lab shall provide the Owner with two (2) certified copies of the test results of the mix design and the thickness of the asphalt paving material.
- C. The core drilling, testing for mix design and thickness, density, and the certification of the test results shall be performed by a testing laboratory approved by the Owner.
- D. The Contractor is responsible for all cost associated with testing.

## **1.06 ENVIRONMENTAL REQUIREMENTS**

- A. Comply with the requirements for asphalt installation due to outside ambient air temperatures specified under TxDOT Item 341 - Dense-Graded Hot-Mix Asphalt.

## **PART 2 PRODUCTS**

### **2.01 GENERAL**

- A. Furnish uncontaminated materials of uniform quality that meet the requirements of the Plans and Specifications.
- B. Notify the Owner of all material sources and before changing any material source or formulation. The Owner will verify that the specification requirements are met when the Contractor makes a source or formulation change, and may require a new laboratory mixture design, trial batch, or both. The Owner may sample and test project materials at any time during the project to verify specification compliance.

### **2.02 AGGREGATE**

- A. Furnish aggregates from sources that conform to the requirements shown in the Table below and as specified in this Section. Additional aggregate requirements may be specified when shown on the Plans.
- B. Provide aggregate stockpiles that meet the definitions in this Section for coarse, intermediate, or fine aggregate.
- C. Aggregate from reclaimed asphalt pavement (RAP) is not required to meet requirements shown in the Table below unless otherwise shown on the Plans.
- D. Supply aggregates that meet the definitions in Tex-100-E for crushed gravel or crushed stone.
- E. The Contractor is to provide samples from materials produced for the Project. Perform all other aggregate quality tests listed in the Table below. Document all test results on the mixture design report.

### **2.03 COARSE AGGREGATE**

- A. Coarse aggregate stockpiles must have no more than 20% material passing the #8 sieve. Aggregates from sources listed in the TxDOT's Bituminous Rated Source Quality Catalog (BRSQC) are preapproved for use. Use only the rated values for hot-mix listed in the BRSQC. Rated values for surface treatment (ST) do not apply to coarse aggregate sources used in hot-mix asphalt.
- B. Provide coarse aggregate with at least the minimum SAC B. SAC requirements only apply to aggregates used on the surface of travel lanes. The SAC for sources on the TxDOT's Aggregate Quality Monitoring Program (AQMP) (Tex-499-A) is listed in the BRSQC.

### **2.04 INTERMEDIATE AGGREGATE**

- A. Aggregates not meeting the definition of coarse or fine aggregate will be defined as intermediate aggregate. Supply intermediate aggregates, when used that are free from organic impurities. The Owner may test the intermediate aggregate in accordance with Tex-408-A to verify the material is free from organic impurities. Supply intermediate aggregate from coarse aggregate sources, when used that meet the requirements shown in the Table below unless otherwise approved.
- B. Test the stockpile if 10% or more of the stockpile is retained on the #4 sieve, and verify that it meets the requirements in the Table below for crushed face count (Tex-460-A) and flat and elongated particles (Tex-280-F).

### **2.05 FINE AGGREGATE**

- A. Fine aggregates consist of manufactured sands, screenings, and field sands. Fine aggregate stockpiles must meet the gradation requirements in the Table below. Supply fine aggregates

that are free from organic impurities. The Owner may test the fine aggregate in accordance with Tex-408-A to verify the material is free from organic impurities. No more than 15% of the total aggregate may be field sand or other un-crushed fine aggregate. Use fine aggregate, with the exception of field sand, from coarse aggregate sources that meet the requirements shown in the Table below unless otherwise approved.

- B. Test the stockpile if 10% or more of the stockpile is retained on the #4 sieve, and verify that it meets the requirements in the Table below for crushed face count (Tex-460-A) and flat and elongated particles (Tex-280-F).

| <b>Aggregate Quality Requirements</b>                                                                                                            |                                      |                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------------|
| <b>Property</b>                                                                                                                                  | <b>Test Method</b>                   | <b>Requirement</b> |
| <b>Coarse Aggregate</b>                                                                                                                          |                                      |                    |
| SAC                                                                                                                                              | Tex-499-A (AQMP)                     | B                  |
| Deleterious material, % Max                                                                                                                      | Tex-217-F, Part I                    | 1.5                |
| Decantation, % Max                                                                                                                               | Tex-217-F, Part II                   | 1.5                |
| Micro-Deval abrasion, %                                                                                                                          | Tex-461-A                            | Note 1             |
| Los Angeles Abrasion, % Max                                                                                                                      | Tex-410-A                            | 40                 |
| Magnesium sulfate soundness, 5 cycles, % Max                                                                                                     | Tex-411-A                            | 30                 |
| Crushed face count <sup>2</sup> , % Max                                                                                                          | Tex-460-A, Part I                    | 85                 |
| Flat and elongated particles @ 5:1, % Max                                                                                                        | Tex-280-F                            | 10                 |
| <b>Fine Aggregate</b>                                                                                                                            |                                      |                    |
| Linear shrinkage, % Max                                                                                                                          | Tex-107-E                            | 3                  |
| <b>Combined Aggregate<sup>3</sup></b>                                                                                                            |                                      |                    |
| Sand Equivalent, % Max                                                                                                                           | Tex-203-F                            | 45                 |
| <sup>1</sup> Not used for acceptance purposes. Optional test used by the Geotechnical Lab as an indicator of the need for further investigation. |                                      |                    |
| <sup>2</sup> Only applies to crushed gravel                                                                                                      |                                      |                    |
| <sup>3</sup> Aggregates, without mineral filler, RAP, RAS, or additives, combined as used in the job-mix formula (JMF).                          |                                      |                    |
| <b>Gradation Requirements for Fine Aggregate</b>                                                                                                 |                                      |                    |
| <b>Sieve Size</b>                                                                                                                                | <b>% Passing by Weight or Volume</b> |                    |
| 3/8"                                                                                                                                             | 100                                  |                    |
| #8                                                                                                                                               | 70 - 100                             |                    |
| #40                                                                                                                                              | 0 - 30                               |                    |

## 2.06 MINERAL FILLER

- A. Mineral filler consists of finely divided mineral matter such as agricultural lime, crusher fines, hydrated lime, or fly ash. Mineral filler is allowed unless otherwise shown on the Plans. Use no more than 2% hydrated lime or fly ash. Use no more than 1% hydrated lime if a substitute binder is used unless otherwise allowed by the Owner. Test all mineral fillers except hydrated lime and fly ash in accordance with Tex-107-E to ensure specification compliance. The Plans may require or disallow specific mineral fillers. Provide mineral filler, when used, that:
1. is sufficiently dry, free-flowing, and free from clumps and foreign matter as determined by the Owner;
  2. does not exceed 3% linear shrinkage when tested in accordance with Tex-107-E; and
  3. meets the gradation requirements in the Table below

| Gradation Requirements for Mineral Filler |                               |
|-------------------------------------------|-------------------------------|
| Sieve Size                                | % Passing by Weight or Volume |
| #8                                        | 100                           |
| #40                                       | 55 - 100                      |

## 2.07 BAGHOUSE FINES

- A. Fines collected by the baghouse or other dust-collecting equipment may be reintroduced into the mixing drum.

## 2.08 ASPHALT BINDER

- A. Furnish the type and grade of performance-graded (PG) asphalt specified below:
  - 1. PG 64-22 shall be used, unless otherwise specified by the Owner.
- B. Asphalt binder in accordance with TxDOT Item 300 - Asphalts, Oils, and Emulsions.

## 2.09 PRIME COAT

- A. MC-30, AE-P, EAP&T or PCE shall be used unless otherwise specified by the Owner.
- B. Prime coat in accordance with TxDOT Item 300 - Asphalts, Oils, and Emulsions and Item 310 - Prime Coat.

## 2.10 TACK COAT

- A. Furnish CSS-1H, SS-1H, or a PG binder with a minimum high-temperature grade of PG 58 for tack coat binder in accordance with TxDOT Item 300 - Asphalts, Oils, and Emulsions. Specialized or preferred tack coat materials may be allowed or required when shown on the Plans. Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.

## 2.11 ADDITIVES

- A. Use the type and rate of additive specified when shown on the Plans. Additives that facilitate mixing, compaction, or improve the quality of the mixture are allowed when approved by the Owner. Provide the Owner with documentation, such as the bill of lading, showing the quantity of additives used in the project unless otherwise directed by the Owner.
- B. Lime and Liquid Anti-stripping Agent
  - 1. When lime or a liquid anti stripping agent is used, add in accordance with TxDOT Item 301 - Asphalt Antistripping Agents." Do not add lime directly into the mixing drum of any plant where lime is removed through the exhaust stream unless the plant has a baghouse or dust collection system that reintroduces the lime into the drum.

## 2.12 RECYCLED MATERIALS

- A. General
  - 1. RAP and RAS shall not be used in Type D HMA mixes.
  - 2. Use of RAP and RAS is permitted unless otherwise shown on the Plans. Do not exceed the maximum allowable percentages of RAP and RAS shown in the Table below. The allowable percentages shown in the Table below may be decreased or increased when shown on the Plans. Determine asphalt binder content and gradation of the RAP and RAS stockpiles for mixture design purposes in accordance with Tex-236-F. The Owner may verify the asphalt binder content of the stockpiles at any time during production. Perform other tests on RAP and RAS when shown on the Plans. Asphalt binder from RAP and RAS is designated as recycled asphalt binder. Calculate and ensure that the ratio of the recycled asphalt binder to total binder does not exceed the percentages shown in the Allowable Substitute Binder and Maximum Recycled Binder Ration Table during mixture design and HMA production when

RAP or RAS is used. Use a separate cold feed bin for each stockpile of RAP and RAS during HMA production.

3. Surface, intermediate, and base mixes referenced in the Tables are defined as follows:
  - a. Surface. The final HMA lift placed at or near the top of the pavement structure;
  - b. Intermediate. Mixtures placed below an HMA surface mix and less than or equal to 8.0 inches from the riding surface; and
  - c. Base. Mixtures placed greater than 8.0 inches from the riding surface.

**B. RAP**

1. RAP shall be in compliance with the requirements shown in TxDOT Item 341 - Dense-Graded Hot-Mix Asphalt.

**C. RAS**

1. RAS shall be in compliance with the requirements shown in TxDOT Item 341 - Dense-Graded Hot-Mix Asphalt.

**2.13 SUBSTITUTE BINDERS**

- A. Unless otherwise shown on the Plans, the Contractor may use a substitute PG binder that are in compliance with the requirements shown in TxDOT Item 341 - Dense-Graded Hot-Mix Asphalt.

**2.14 MIX DESIGN**

- A. The Contractor shall provide a mix design in accordance with the requirements shown in TxDOT Item 341 - Dense-Graded Hot-Mix Asphalt.

**PART 3 EXECUTION**

**3.01 EXCAVATION**

- A. Prior to the installation of asphalt pavement, examine the excavation for the grades, lines, and levels required to receive the new Work. Ascertain that excavation and compacted subgrades are adequate to receive the asphalt pavement to be installed. Correct defects and deficiencies before proceeding with the Work.

**3.02 SUBGRADE AND BASE COURSE CONDITIONS**

- A. Prior to the installation of any asphalt pavement, examine the subgrade and base course to ascertain that it is adequate to receive the pavement to be installed. If the subgrade remains wet after all surface water has been removed, the Owner may require the installation of edge drain.
- B. Prior to the placing of prime coats or asphalt mixtures, density, grade and cross section of the aggregate base shall meet the approval of the Owner.
- C. Surfaces that have become too wet or too dry shall be reworked to provide the required density.

**3.03 EXISTING IMPROVEMENTS**

- A. Investigate and verify location of existing improvements, including utilities and structures, to which the new Work is to be connected. Adjustments in line and grade to align the new Work with the existing improvements must be approved by the Owner, prior to any changes.

**3.04 PRIME COAT**

- A. A prime coat shall be applied when the surface to be paved is base or subgrade.
- B. Rate of application shall be 0.20 gallons per square yard.
- C. Apply the mixture when the air temperature is at or above 60°F, or above 50°F and rising. Measure the air temperature in the shade away from artificial heat. The Owner will determine when weather conditions are suitable for application.

- D. Do not permit traffic, hauling, or placement of subsequent courses over freshly constructed prime coats. Maintain the primed surface until placement of subsequent courses or acceptance of the work. Surface Preparation. Prepare the surface by sweeping or other approved methods. Lightly sprinkle the surface with water before applying bituminous material, when directed, to control dust and ensure absorption
- E. Surface Preparation
  - 1. Prepare the surface by sweeping or other approved methods. Lightly sprinkle the surface with water before applying bituminous material, when directed, to control dust and ensure absorption
- F. Prime coat shall be considered subsidiary to asphalt pavement items.

### **3.05 TACK COAT**

- A. A tack coat shall be applied when the surface to be paved is Portland cement concrete, brick or asphaltic pavement.
- B. Rate of application shall be 0.10 gallons per square yard
- C. The surfaces of all curbs, gutters, vertical faces of existing pavement and all structures in actual contact with asphaltic mixes shall be painted with a thick, complete coating of tack coat to provide a closely bonded, water tight joint.
- D. Construction Joints
  - 1. If paving operations extend past a day's work, the next day, a clean joint shall be saw-cut and task coated before proceed with paving operations.
- E. Tack coat shall be considered subsidiary to asphalt pavement items.

### **3.06 ASPHALT PRODUCTION**

- A. Storage and Heating of Materials
  - 1. Do not heat the asphalt binder above the temperatures specified in TxDOT Item 300 - Asphalts, Oils, and Emulsions, or outside the manufacturer's recommended values. Provide the Owner with daily records of asphalt binder and hot-mix asphalt discharge temperatures (in legible and discernible increments) in accordance with TxDOT Item 320 - Equipment for Asphalt Concrete Pavement, unless otherwise directed by the Owner. Do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hours unless otherwise approved by the Owner.
- B. Mixing and Discharge of Materials
  - 1. Notify the Owner of the target discharge temperature and produce the mixture within 25°F of the target. Monitor the temperature of the material in the truck before shipping to ensure that it does not exceed 350°F and is not lower than 215°F. The Owner will not pay for or allow placement of any mixture produced above 350°F.
  - 2. Control the mixing time and temperature so that substantially all moisture is removed from the mixture before discharging from the plant. Determine the moisture content, if requested, by oven-drying in accordance with Tex-212-F, Part II, and verify that the mixture contains no more than 0.2% of moisture by weight. Obtain the sample immediately after discharging the mixture into the truck, and perform the test promptly.

### **3.07 HAULING OPERATIONS**

- A. Clean all truck beds before use to ensure that mixture is not contaminated.
- B. Use designated routes to enter and exit Project area to ensure new improvements are not damaged.

### 3.08 ASPHALT PLACEMENT OPERATIONS

- A. Collect haul tickets from each load of mixture delivered to the project and provide the to the Owner approximately every hour, or as directed by the Owner. Use a hand-held thermal camera or infrared thermometer, when a thermal imaging system is not used, to measure and record the internal temperature of the mixture as discharged from the truck or Material Transfer Device (MTD) before or as the mix enters the paver and an approximate station number or GPS coordinates on each ticket. Calculate the daily yield and cumulative yield for the specified lift and provide to the Owner at the end of paving operations for each day unless otherwise directed by the Owner. The Owner may suspend production if the Contractor fails to produce and provide haul tickets and yield calculations by the end of paving operations for each day.
- B. Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. Offset longitudinal joints of successive courses of hot-mix by at least 6 inches. Place mixture so that longitudinal joints on the surface course coincide with lane lines, or as directed. Ensure that all finished surfaces will drain properly. Place the mixture at the rate or thickness shown on the Plans. The Owner will use the guidelines in the Table below to determine the compacted lift thickness of each layer when multiple lifts are required. The thickness determined is based on the rate of 110 pounds/square yard for each inch of pavement unless otherwise shown on the Plans.

| Compacted Lift Thickness and Required Core Height |                                     |              |                                                         |
|---------------------------------------------------|-------------------------------------|--------------|---------------------------------------------------------|
| Mixture Type                                      | Compacted Lift Thickness Guidelines |              | Minimum Untrimmed Core Height (in) Eligible for Testing |
|                                                   | Minimum (in)                        | Maximum (in) |                                                         |
| B                                                 | 2.50                                | 5.00         | 1.75                                                    |
| D                                                 | 1.50                                | 3.00         | 1.25                                                    |

- C. During the placing and spreading of asphalt pavement material, care shall be taken to prevent spilling of material onto adjacent placement, gutter or structure.

### 3.09 ASPHALT COMPACTION

- A. Use the control strip method shown in Tex-207-F, Part IV, on the first day of production to establish the rolling pattern that will produce the desired in-place air voids unless otherwise directed.
- B. Compact the pavement uniformly to contain between 3.8% and 8.5% in-place air voids. Take immediate corrective action to bring the operation within 3.8% and 8.5% when the in-place air voids exceed the range of these tolerances. The Owner will allow paving to resume when the proposed corrective action is likely to yield between 3.8% and 8.5% in-place air voids.
- C. Obtain cores in areas, as directed, at locations determined by the Owner. The Owner may test these cores and suspend operations or require removal and replacement if the in place air voids are less than 2.7% or more than 9.9%.
- D. Furnish the type, size, and number of rollers required for compaction as approved. Use a pneumatic-tire roller to seal the surface unless excessive pickup of fines occurs. Use additional rollers as required to remove any roller marks. Use only water or an approved release agent on rollers, tamps, and other compaction equipment unless otherwise directed.
- E. Use tamps to thoroughly compact the edges of the pavement along curbs, headers, and similar structures and in locations that will not allow thorough compaction with rollers. The Owner may require rolling with a trench roller on widened areas, in trenches, and in other limited areas.

- F. Complete all compaction operations before the pavement temperature drops below 160°F unless otherwise allowed. The Owner may allow compaction with a light finish roller operated in static mode for pavement temperatures below 160°F.
- G. Allow the compacted pavement to cool to 160°F or lower before opening to traffic unless otherwise directed. Sprinkle the finished mat with water or limewater, when directed, to expedite opening the roadway to traffic.

### **3.10 FULL-DEPTH ASPHALT REPAIR**

- A. Repair localized sections of flexible pavement structure including subgrade, base, and surfacing as shown on the Plans.
- B. Full depth asphalt pavement repairs shall be completed following milling operations. After milling is completed, locations noted in the Plans are subject to field verification and approval by the Owner. The repair limits can be adjusted as deemed necessary by the Owner.
- C. Removing Pavement Structure
  - 1. The repair shall be done by cutting neat vertical faces around the perimeter of the work area when removing pavement structure layers.
  - 2. Remove unstable subgrade material to the depth directed and replace with an approved material where subgrade has failed.
  - 3. Removed materials are the property of the Contractor unless otherwise shown on the Plans. Dispose of removed material in accordance with Federal, State, and Local regulations. Provide a smooth line and grade conforming to the adjacent pavement.
- D. Preparing Subgrade
  - 1. Fill holes, ruts, and depressions with approved material. Wet, reshape, and compact the subgrade thoroughly as directed by the Owner.
  - 2. Placing Subgrade
    - a. Place, spread, and compact material in accordance with the applicable Item to the required or directed depth.
  - 3. Flexible Base
    - a. Add new flexible base as required in accordance with Section 32 11 23 - Flexible Base and details shown on the Plans to achieve required section
  - 4. Curing Base
    - a. Cure in accordance with the appropriate Item unless otherwise directed or approved. Maintain completed base sections until surfacing.
- E. Tack/Prime Coat
  - 1. Tack coat shall be added to full depth repair vertical edges.
  - 2. Prime coat shall be added to flexible base prior to the placement of asphalt.
  - 3. Rates and type shall be in accordance to this Section.
- F. Surfacing
  - 1. Apply surfacing with materials as shown on the Plans to the completed base section.

### **3.11 REMOVING ASPHALT SURFACING**

- A. When removing existing asphalt surface course, the edges of the area to be removed shall be cut along straight lines, either perpendicular to or parallel to the direction of travel, for the full depth of the full depth of the surface course; with the cut edge a minimum of 18 inches back from the disturbed edge of pavement.

- B. The cutting of the edges and the breaking up of the asphalt material within the removal area; and the removing and disposing of the unsuitable material are included in the Work of removing asphalt surfacing.

### **3.12 MILLING ASPHALT PAVEMENT**

- A. Where asphalt pavement is specified, the pavement shall be milled to the shape and cross section as shown on the Plans. Immediately after milling, the surface shall be cleaned.
- B. Contractor shall remove and dispose of any resulting debris.
- C. When allowed by the , milling materials may be used for temporary wedging.
  - 1. Prior to placing pavement, temporary wedging materials shall be removed and disposed of. Wedging with milled materials is incidental to the Project.
  - 2.
  - 3.
  - 4. The equipment for removing the pavement surface shall be a power operated milling machine or grinder with a minimum two (2) feet cutting width. For detail work and cutting widths less than two (2) feet, equipment with less than two (2) feet cutting width shall be allowed. The equipment shall be self-propelled with sufficient power, traction, and stability to maintain accurate depth of cut and slope. The equipment shall be capable of removing in one pass, asphaltic concrete pavement of a thickness of one (1) inch and any required thickness less than one (1) inch in a minimum three (3) foot width. Machines capable of removing, in one pass, a depth greater than one (1) inch will be permitted. The grade reference used by the Contractor may be of any type approved by the City Engineer or designated representative. Control points, if required by the plans, shall be set at intervals not to exceed fifty (50) feet. The Contractor shall set the grade reference from the control points. The grade reference shall have sufficient support so that the maximum deflection shall not exceed 1/16 inches between supports. The machine shall have a manual system providing for uniformly varying the depth of cut while the machine is in motion, thereby making it possible to cut flush to all inlets, manholes, or other obstructions within the paved area.
  - 5. The machine shall be equipped with an integral loading and reclaiming means to immediately remove material being cut from the surface of the roadway and discharge the cuttings into a truck, all in one operation. The machine shall be equipped with means to control dust created by the cutting action. Adequate backup equipment (mechanical street sweepers, loaders, water truck, sprayers, brooms etc.) and personnel will also be provided to keep flying dust to a minimum and to ensure that all cuttings are removed from the street surface daily. Stockpiling of milled material will not be permitted on the project site. Various machines may be required to make trial runs to demonstrate the capabilities of that machine and to determine the acceptability of that machine to the City Engineer or designated representative. Any machine that is incapable, in the opinion of the City Engineer or designated representative, of meeting these requirements will not be permitted.

**END OF SECTION**

## **SECTION 32 13 13 CONCRETE PAVING**

### **PART 1 GENERAL**

#### **1.01 SCOPE**

- A. This Section includes reinforced portland cement concrete paving complete with concrete material admixtures, joints, forms, equipment requirements, field quality control and appurtenances required to complete the portland cement concrete paving Work indicated on the Plans.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 22 00 - Unit Prices
- B. Section 01 50 00 - Temporary Facilities and Controls
- C. Section 31 23 13 - Subgrade Preparation
- D. Section 32 11 23 - Flexible Base
- E. Section 32 17 23 - Pavement Markings
- F. Section 32 92 23 - Sodding

#### **1.03 REFERENCE STANDARDS**

- A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications.
  - 1. ASTM C31: Standard Practice for Making and Curing Concrete Test Specimens in the Field
  - 2. ASTM C143/C143M: Standard Test Method for Slump of Hydraulic-Cement Concrete
  - 3. ASTM C172/C172M: Standard Practice for Sampling Freshly Mixed Concrete
  - 4. ASTM C260/C260M: Standard Specification for Air-Entraining Admixtures for Concrete
  - 5. ASTM C492: Standard Test Method for Hydration of Granular Dead-Burned Refractory Dolomite
  - 6. TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, latest edition
    - a. Item 104 - Removing Concrete
    - b. Item 300 - Asphalts, Oils, and Emulsions
    - c. Item 421 - Hydraulic Cement Concrete
    - d. Item 422 - Concrete Superstructures
    - e. Item 440 - Reinforcement for Concrete
    - f. Item 529 - Concrete Curb, Gutter and Combined Curb and Gutter
    - g. Item 530 - Intersections, Driveways, and Turnouts
    - h. Item 531 - Sidewalks
  - 7. Texas Accessibility Act Article 9102 of the Texas Civil Statute
  - 8. Texas Accessibility Standards (TAS), latest edition
  - 9. Americans with Disabilities Act (ADA) Standards for Accessible Design
  - 10. City of Keller Standard Construction Details

#### 1.04 MATERIAL REPORTS

- A. At the request of the Owner, the Contractor shall provide the Owner with certification that the various materials to be used conform to the Standards referred to in the Specifications.
- B. The Owner shall submit a list of his source of material supply to the for review prior to placing any order.
- C. The Contractor shall provide the Owner, prior to the actual delivery of the ready-mixed concrete, the mix design.

#### 1.05 THICKNESS AND COMPRESSIVE STRENGTH REPORTS

- A. The testing lab shall provide the Owner with two (2) certified copies of the test results of the thickness and compressive strength of the concrete. The core drilling, testing for thickness and compressive strength, and the certification of the test results shall be performed by a testing laboratory approved by the Owner.

#### 1.06 REQUEST FOR MATERIAL VARIANCE

- A. All requests for variances in the materials, as specified, shall be made in writing to the Owner.
- B. Two (2) copies of the request shall be submitted for the Owner's review and approval.

#### 1.07 STOCKPILE PLAN

- A. The Contractor shall submit a Stockpile Plan that designates locations for temporary storage of excavated pavement. The stockpile plan is subject to approval by the Owner. If stockpile(s) are located on private property, the Contractor must supply the Owner with a written letter of permission from the Property Owner to include the final state of the land to be used.
- B. This surplus material shall become property of the Contractor and shall be properly disposed of at an off-site location by the Contractor.

### PART 2 PRODUCTS

#### 2.01 GENERAL REQUIREMENTS

| Pavement Strength Requirements by Element |                                        |                 |                                        |
|-------------------------------------------|----------------------------------------|-----------------|----------------------------------------|
| Element                                   | Minimum Compressive Strength @ 28 days | Element         | Minimum Compressive Strength @ 28 days |
| Sidewalk                                  | 3,600 psi                              | Concrete Boxout | 4,500 psi                              |
| Barrier Free Ramp                         | 3,600 psi                              | Valley Gutter   | 4,500 psi                              |
| Curb & Gutter                             | 3,600 psi                              | Street Repair   | 4,000 psi                              |
| Driveway Approach                         | 4,500 psi                              |                 |                                        |

#### 2.02 HYDRAULIC CEMENT CONCRETE

- A. Provide hydraulic cement concrete in accordance with TxDOT Item 421 - Hydraulic Cement Concrete. Use compressive strength testing unless otherwise shown on the Plans and Specifications. Test in accordance with Tex-448-A or Tex-418-A. See Plans and Specification for minimum compressive strength for various elements.
- B. Use coarse aggregates for continuously reinforced concrete pavements to produce concrete with a coefficient of thermal expansion not more than  $5.5 \times 10^{-6}$  in./in./°F. Provide satisfactory Tex-428-A test data from an approved testing laboratory if the coarse aggregate coefficient of

thermal expansion listed on the Department's Concrete Rated Source Quality Catalog is not equal to or less than  $5.5 \times 10^{-6}$  in./in./°F.

- C. Provide Class HES concrete for very early opening of small pavement areas or leave-outs to traffic when shown on the plans or allowed.

### **2.03 REINFORCING STEEL**

- A. Provide Grade 60 or above, deformed steel for bar reinforcement in accordance with TxDOT Item 440 - Reinforcement for Concrete. Provide positioning and supporting devices (baskets and chairs) capable of securing and holding the reinforcing steel in proper position before and during paving. Provide corrosion protection when shown on the Plans.
- B. Dowels
  - 1. Provide smooth, straight dowels of the size shown on the Plans, free of burrs, and conforming to the requirements of TxDOT Item 440 - Reinforcement for Concrete. Coat dowels with a thin film of grease, wax, silicone or other approved de-bonding material. Provide dowel caps on the lubricated end of each dowel bar used in an expansion joint. Provide dowel caps filled with a soft compressible material with enough range of movement to allow complete closure of the expansion joint.
- C. Tie Bars
  - 1. Provide straight deformed steel tie bars. Provide either multiple-piece tie bars or single-piece tie bars as shown on the Plans.

### **2.04 ALTERNATIVE REINFORCING MATERIALS**

- A. Provide reinforcement materials of the dimensions and with the physical properties specified when allowed or required by the Plans. Provide manufacturer's certification of required material properties.
- B. Curing Materials
  - 1. Provide Type 2 membrane curing compound conforming to DMS-4650, "Hydraulic Cement Concrete Curing Materials and Evaporation Retardants." Provide SS-1 emulsified asphalt conforming to TxDOT Item 300 - Asphalts, Oils, and Emulsions, for concrete pavement to be overlaid with asphalt concrete under this Contract unless otherwise shown on the plans or approved. Provide materials for other methods of curing conforming to the requirements of TxDOT Item 422 - Concrete Superstructures. Provide insulating blankets for curing fast track concrete pavement with a minimum thermal resistance (R) rating of 0.5 hour-square foot F/BTU. Use insulating blankets that are free from tears and are in good condition.

### **2.05 EPOXY**

- A. Provide Type III, Class C epoxy in accordance with DMS-6100, "Epoxyes and Adhesives," for installing all drilled-in reinforcing steel. Submit a work plan and request approval for the use of epoxy types other than Type III, Class C.
- B. Evaporation Retardant
  - 1. Provide evaporation retardant conforming to DMS-4650, "Hydraulic Cement Concrete Curing Materials and Evaporation Retardants."

### **2.06 JOINT SEALANTS AND FILLERS**

- A. Provide Class 5 or Class 8 joint-sealant materials and fillers unless otherwise shown on the Plans or approved and other sealant materials of the size, shape, and type shown on the Plans in accordance with DMS-6310, "Joint Sealants and Fillers."

### **2.07 CONCRETE CURB & GUTTER**

- A. Furnishing and placing of six (6) inch reinforced concrete curb and gutter on asphalt streets at the locations shown on the Plans, as well as the demolition, removal, and haul-off of the existing

curb and/or gutter which is being replaced. Contractor shall match existing grades and curb and gutter width unless directed otherwise by the Owner. The Contractor shall be responsible to return the curb and gutter section to its original grade, free of defects, localized low spots or "bird baths," or deformities.

- B. For the removal of existing curb and gutter, the provision of TxDOT Item 104 - Removing Concrete shall apply. This item shall include all work done within the Project Area. The Contractor shall saw cut all concrete as shown on the Plans at existing joint, unless directed otherwise by the Owner. The removal of monolithic curb is considered incidental to this item unless the plans specifically callout "removal of curb and gutter". TxDOT Item 104 is modified as follows:
  - 1. The removal of existing pavement is considered incidental to this pay item.
- C. Locations noted in the Plans are subject to field verification and approval by the Owner. The replacement limits can be adjusted as deemed necessary by the Owner. Where indicated on plans as "curb and gutter replacement", the curb and gutter shall be constructed using the City of Keller's Paving Construction Details "Standard Curb & Gutter" Detail (P-06) or the "Modified Curb & Gutter Detail shown in the Plans.
- D. Flexible Base material used as a base for curb and gutter replacement shall be in compliance with Section 32 11 23 - Flexible Base. Flexible Base shall be considered subsidiary to the curb and gutter replacement item.
- E. For the furnishing and placing of the proposed curb and gutter, all concrete for construction shall be Class "C" concrete having a minimum of six (6) sacks of cement per cubic yard and a minimum compressive strength of 3,600 psi at 28 days. Concrete shall also conform to the following requirement: the total air entrainment shall be 5% +/- 1% and shall conform to ASTM C260, all concrete which includes a water reducing agent shall conform to ASTM C494 and be of Types A, D, F and G only. The cost for furnishing and placing reinforcement is subsidiary to the price bid. All concrete, except for Owner approved "leave-outs", shall be placed with a self-propelled paving machine capable of spreading, densifying, and shaping the concrete mix to the required lines and grades as shown on the approved plans.
- F. This provision of TxDOT Item 529 - Concrete Curb, Gutter and Combined Curb and Gutter, shall consist of the construction of concrete curb as shown on the plans including any required, dowels, saw joints and expansion joints in accordance with the Specifications. TxDOT Item 529 is modified as follows:
  - 1. Place combined curb and gutters in twenty (20) feet maximum sections unless otherwise approved.
  - 2. Class A concrete
  - 3. Construct saw joints every ten (10) feet according to City of Keller's Paving Construction Detail "Concrete Pavement Joints" (P-05)
  - 4. Construct expansion joints every twenty (20) feet according to City of Keller's Paving Construction Detail "Concrete Pavement Joints" (P-05)
  - 5. Where applicable, the contractor shall reconstruct yard drains through curb per "Yard Drain Through Curb Replacement Core Detail". shall construct yard drains through curb using curb cores, no other alternative method will be accepted. All labor, material, and equipment needed to complete the curb core and installation of yard drain including backfill is subsidiary to this item.

## **2.08 CONCRETE DRIVEWAY**

- A. This item shall consist of the construction of concrete driveways as shown on the plans as well as the demolition, removal, and haul-off of the existing driveway. The driveway shall be reinforced concrete pavement in accordance with the details provided in the Plans. Contractor shall match existing grades and driveway width unless directed otherwise by the Owner.

- B. For the removal of existing driveway, the provision of TxDOT Item 104 - Removing Concrete shall apply. This item shall include all work done within the Project Area. The Contractor shall saw cut all concrete as shown on the plans at existing joint, unless directed otherwise by the City Engineer. The removal of driveway is considered incidental to this item unless the plans specifically callout "removal of driveway". TxDOT Item 104 is modified as follows:
  - 1. The removal of existing driveway is considered incidental to this pay item.
- C. Locations noted in the plans are subject to field verification and approval by the Owner. The replacement limits can be adjusted as deemed necessary by the Owner. Contractor shall match existing grades and width unless directed otherwise by the Owner. The Contractor shall be responsible to return the driveway section to its original grade, free of defects, localized low spots or "bird baths," or deformities.
- D. Flexible Base material used as a base for driveway replacement shall be in compliance with Section 32 11 23 - Flexible Base. Flexible Base shall be considered subsidiary to the concrete driveway replacement item.
- E. For the furnishing and placing of the proposed driveway, all concrete for construction shall be Class "C" concrete having a minimum of five (5) sacks of cement per cubic yard and a minimum compressive strength of 3,600 psi at 28 days. The cost for furnishing and placing reinforcement is subsidiary to the price bid. All driveway construction shall be in compliance with the Texas Accessibility Act Article 9102 of the Texas Civil Statute as administered by the Texas Department of Licensing and Regulations. Concrete shall also conform to the following requirement: the total air entrainment shall be 5% +/- 1% and shall conform to ASTM C-260, all concrete which includes a water reducing agent shall conform to ASTM C494 and be of Types A, D, F and G only.
- F. Any driveway found to be in non-compliance shall be removed and brought to compliance at the Contractor's expense.
- G. Work shall be in compliance with TxDOT Item 530 - Intersections, Driveways, and Turnouts, unless otherwise specified in Plans or Specifications.
- H. The Contractor shall provide uninterrupted access to adjacent property unless otherwise directed. All driveways shall be accessible overnight. Property owners shall be notified in advance of construct activity per process layout in the General Notes.

## **2.09 CONCRETE VALLEY GUTTER**

- A. This item shall consist of the furnishing and placing of reinforced concrete pavement valley gutters as indicated on the plans, as well as the demolition, removal, and haul-off of the existing valley gutter material, base material, and/or subbase indicated to be replaced. The Contractor shall take care not to damage any adjacent pavement or valley gutter sections during the work. Any other pavement or valley gutter sections damaged by the Contractor or his/her agents, or subcontractors shall be replaced in full at the contractor's expense.
- B. For the removal of existing concrete valley gutter, the provision of TxDOT Item 104 - Removing Concrete shall apply. This item shall include all work done within the Project Area. The Contractor shall saw cut all concrete as shown on the Plans. TxDOT item 104 is modified as follows:
  - 1. The removal of existing concrete valley gutter is considered incidental to this pay item.
- C. Valley gutter thickness, dimensions, and reinforcement shall be as noted on the plans and shown in the City of Keller's Paving Construction Detail "Concrete Valley Gutter" (P-10). The cost for furnishing and placing reinforcement is subsidiary to the price bid. All joints shall comply with City of Keller's Paving Construction Detail "Concrete Pavement Joints" (P-05).
- D. All work performed shall be in accordance with TxDOT Item 530 - Intersections, Driveways, and Turnouts.
- E. A sawed dummy joint will be required.

- F. For the furnishing and placing of the proposed driveway, all concrete for construction shall be Class "C" concrete having a minimum of five (5) sacks of cement per cubic yard and a minimum compressive strength of 3,600 psi at 28 days. The cost for furnishing and placing reinforcement is subsidiary to the price bid. All driveway construction shall be in compliance with the Texas Accessibility Act Article 9102 of the Texas Civil Statute as administered by the Texas Department of Licensing and Regulations. Concrete shall also conform to the following requirement: the total air entrainment shall be 5% +/- 1% and shall conform to ASTM C260, all concrete which includes a water reducing agent shall conform to ASTM C494 and be of Types Contractor A, D, F and G only.
- G. Locations noted in the plans are subject to field verification and approval by the Owner. The replacement limits can be adjusted as deemed necessary by the Owner. Contractor shall match existing grades and width unless directed otherwise by the Owner. The Contractor shall maintain positive drainage along the valley gutter. The Contractor shall be responsible to return the valley gutter to its original grade, free of defects, localized low spots or "bird baths," or deformities.
- H. Flexible Base material used as a base for curb and gutter replacement shall be in compliance with Section 32 11 23 - Flexible Base. Flexible Base shall be considered subsidiary to the concrete valley gutter replacement item.
- I. The Contractor shall remove and replace the valley gutter in sections in order to maintain street traffic and driveway access at all times throughout the duration of the Project.

## **2.10 CONCRETE SIDEWALK**

- A. This item shall consist of the furnishing and placing four (4) feet or five (5) feet wide (match existing width) and four (4) inch thick concrete sidewalk replacement. The furnishing, placing, demolition, removal, and haul-off of the existing sidewalk, which is being replaced, as indicated on the plans. All items needed to construct the additional sidewalk according to City of Keller's Paving Construction Detail "Concrete Sidewalk" (P-15) is considered subsidiary to this item. The unit bid price for this item shall include all sidewalk curb(s) needed to meet grades. Work shall be in accordance with TxDOT Item 531 - Sidewalks.
- B. For the removal of existing sidewalk, the provision of TxDOT Item 104 - Removing Concrete shall apply. This item shall include all work done within the Project Area. The Contractor shall saw cut all concrete as shown on the plans at existing joint, unless directed otherwise by the Owner. The removal of sidewalk is considered incidental to this item unless the plans specifically callout "removal of sidewalk". TxDOT Item 104 is modified as follows:
  - 1. The removal of existing sidewalk is considered incidental to this pay item.
- C. Locations noted in the plans are subject to field verification and approval by the Owner. The replacement limits can be adjusted as deemed necessary by the Owner. The Contractor shall be responsible to return the sidewalk section an appropriate grade, free of defects, localized low spots or "bird baths," or deformities.
- D. Flexible Base material used as a base for curb and gutter replacement shall be in compliance with Section 32 11 23 - Flexible Base. Flexible Base shall be considered subsidiary to the sidewalk replacement item.
- E. For the furnishing and placing of the proposed sidewalk, all concrete for construction shall be Class "A" having a minimum of five (5) sacks of cement per cubic yard and a minimum compressive strength of 3,600 psi at 28 days. The cost for furnishing and placing reinforcement, dowels to existing sidewalk, and expansion joints is subsidiary to the price bid. All sidewalk construction shall be in compliance with the Texas Accessibility Act Article 9102 of the Texas Civil Statute as administered by the Texas Department of Licensing and Regulations. Concrete shall also conform to the following requirement: the total air entrainment shall be 5% +/- 1% and shall conform to ASTM C260, all concrete which includes a water reducing agent shall conform to ASTM C494 and be of Types A, D, F and G only.

- F. Any sidewalk found to be in non-compliance shall be removed and brought to compliance at the Contractor's expense. This item also includes all testing required by the Specifications or the Owner and/or Inspector.

## **2.11 BARRIER FREE RAMP**

- A. The work under this item shall be as specified in the plans, and details provided. Work shall be in accordance with TxDOT Item 531 - Sidewalks. All barrier free ramp (also referred to as curb ramps) construction shall be in compliance with the Texas Accessibility Act Article 9102 of the Texas Civil Statute as administered by the Texas Department of Licensing and Regulations. Any barrier free ramps found to be in non-compliance shall be removed and brought to compliance at the Contractor's expense. This item also includes all testing required by the Specifications or the Owner's and/or Inspector. Work shall be in compliance with the details provided in the plans and all applicable TxDOT Specifications as well as ADA and TAS requirements.
- B. For the removal of existing barrier free ramp and adjacent sidewalk, the provision of TxDOT Item 104 - Removing Concrete shall apply. This item shall include all work done within the Project Area. The Contractor shall saw cut all concrete as shown on the plans at existing joint, unless directed otherwise by the Owner. The removal of barrier free ramp is considered incidental to this item unless the plans specifically callout "removal of barrier free ramp". TxDOT Item 104 is modified as follows:
  - 1. The removal of existing barrier free ramp and adjacent sidewalk is considered incidental to this pay item.
- C. For the furnishing and placing of the proposed barrier free ramp, all concrete for construction shall be Class "A" having a minimum of five (5) sacks of cement per cubic yard and a minimum compressive strength of 3,600 psi at 28 days. The cost for furnishing and placing reinforcement is subsidiary to the price bid. All sidewalk construction shall be in compliance with the Texas Accessibility Act Article 9102 of the Texas Civil Statute as administered by the Texas Department of Licensing and Regulations. Concrete shall also conform to the following requirement: the total air entrainment shall be 5% +/- 1% and shall conform to ASTM C260, all concrete which includes a water reducing agent shall conform to ASTM C494 and be of Types A, D, F and G only.
- D. Locations noted in the plans are subject to field verification and approval by the Owner. The replacement limits can be adjusted as deemed necessary by the Owner. The Contractor shall be responsible for constructing the barrier free ramp to appropriate grades, free of defects, localized low spots or "bird baths," or deformities.
- E. Flexible Base material used as a base for curb and gutter replacement shall be in compliance with Section 32 11 23 - Flexible Base. Flexible Base shall be considered subsidiary to the barrier free ramp replacement item.

## **PART 3 EXECUTION**

### **3.01 VERIFICATION OF EXCAVATION AND FORMING**

- A. Prior to the installation of any concrete, examine the excavation and forms for the grades, lines, and levels required to receive the new Work. Ascertain that all excavation and compacted subgrades are adequate to receive the concrete to be installed.
- B. Correct all defects and deficiencies before proceeding with the Work.

### **3.02 EXISTING IMPROVEMENTS**

- A. All existing public utilities within the limits of removal shown on the Plans with a surface feature including, but not limited to, water valve stacks and lids, manholes, water meters, inlets, junction boxes, vaults, etc. shall be located prior to construction, protected during construction, and adjusted to final grade, as necessary. This Work shall be considered incidental to this pay item.

- B. All franchise utilities with a surface feature including, but not limited to, manholes, vaults, etc. shall be located prior to construction and protected during construction. Contractor shall contact franchise utility, if adjustment to final grade is necessary. This Work shall be considered incidental to this pay item.

### **3.03 INSTALLATION - GENERAL**

- A. The width, thickness, and type of concrete pavement shall be specified on the Plans or as approved by the Owner.
- B. Construction operations shall be restricted to the existing right-of-way. If additional area is required, the Contractor shall furnish the Owner with written permission from the property owner for any part of the operation he conducts outside the established right-of-way.
- C. The Contractor shall maintain traffic access at all intersections. Vehicle access shall also be maintained to all residential, commercial, and public properties and elsewhere as designated by the Owner.

### **3.04 PLACING CONCRETE**

- A. Placing of concrete should not commence or continue until the condition of the subgrade has been approved by the Owner.
- B. The placing of concrete shall be continuous as much as possible between transverse joints.
- C. After removing forms, any visible areas of honeycomb or minor defects shall be immediately filled with mortar, having one part of Portland cement and two parts fine aggregate, and shall be applied with a wooden float.
- D. Any equipment wheels operating on the pavement, shall operate at least 1 foot from the edge of the pavement. The equipment wheels shall be rubber-tired.

### **3.05 JOINTS**

- A. All longitudinal and transverse joints shall conform to the details and shall be constructed at the locations shown on the Plans or as directed by the Owner.
- B. All joints shall be constructed true to line with their faces perpendicular to the surface of the pavement.
- C. Transverse joints shall be constructed at right angles to the centerline of the pavement, unless otherwise called for on the Plans or as determined by the Owner. The joints shall not vary more than 1/4 inch from a true line.
- D. The surface of the pavement adjacent to all joints shall be finished to a true surface. Where indicated on the Plans, joints shall be edged to the radius shown or a minimum 1/4 inch radius. The surface across the joints shall be tested with a 10 foot straightedge as the joints are finished and any irregularities shall be corrected before the concrete has hardened.

### **3.06 SURFACE REQUIREMENTS**

- A. All high spots in the surface, exceeding 1/8 inch from the straightedge but not more than 1/2 inch in 10 feet shall be removed or reduced by rubbing with a carborundum brick and water until contact with coarse aggregate is made. If contact with coarse aggregate is made before reaching an acceptable tolerance, such high spots shall be removed by an approved surface-grinding machine before acceptance of the pavement.
- B. High spots in excess of 1/2 inch in 10 feet will be evaluated by the Owner and if the Work is rejected, it shall be removed and replaced at the Contractor's expense.
- C. The Contractor shall take immediate steps to eliminate the cause of the defective surface.

### 3.07 SAWING JOINTS

- A. All contraction joints, longitudinal lane-tie joints with tie bars, and end of pour joints shall be sawed.
- B. Joints shall be sawed before any traffic is permitted on the pavement.
  - 1. The concrete saw will be permitted on the pavement to saw the joints, but the water supply truck will not be permitted on the pavement until the compressive strength is not less than 3,000 psi.
  - 2. When permitted on the pavement, the water supply truck must be kept a minimum of 50 feet behind the sawing operation.
- C. At least two (2) approved concrete saws shall be available for use at all times, and one saw shall be capable of sawing a joint groove 2-1/2 inch deep.
- D. The saw cut for transverse end-of-pour joints shall be made to receive the joint sealing material.
- E. Longitudinal lane-tie joints with the tie bars shall be sawed in accordance with the alignment and dimensions indicated on the Plans.
- F. For joints formed in one operation, the joint groove shall be sawed before any transverse cracks develop. Raveling or spalling along the joint shall be repaired as specified elsewhere in this Section.
- G. Transverse contraction joints shall be sawed in two stages:
  - 1. Stage 1 sawing
    - a. The first stage shall be a relief cut directly over the center of the load transfer assembly. The initial relief cut shall be made as soon as the saw can be placed on the freshly poured concrete, and the sawing shall continue as long as the pavement can support the saw without making or appreciably raveling of the joint.
    - b. When water is not used in the sawing operation, membrane curing compound shall be applied immediately.
    - c. When water is used in the sawing operation, the slurry resulting from the sawing operation shall be completely removed from the cut and from the immediate area by flushing with a jet of water. Additional membrane curing compound shall be applied within 12 hours after the relief cut has been made.
  - 2. Stage 2 Sawing
    - a. Second stage sawing of joints shall not start until the concrete has cured for a minimum of 48 hours. The joint groove shall be centered over the relief cut and sawed to the specified dimensions shown on the Plans plus any increase in width of the relief cut due to shrinkage or contraction. Groove width tolerance shall be  $\pm 1/16$  inch.
    - b. Joints sawed without the use of water shall be blown clean of all foreign material by a jet of compressed air.
    - c. If water was used in the sawing operation, the slurry resulting from the sawing operation shall be completely removed from the groove and the immediate area by flushing with a jet of water and then blown dry with compressed air.
- H. All transverse joint grooves shall receive a final cleaning with a jet of compressed air adequate to remove all foreign material, just prior to permanent sealing.
- I. If the specified seal is not installed within seven days of final sawing, the joint groove shall be temporarily sealed with a suitable material or device to prevent the infiltration of foreign material.
- J. Traffic shall not be permitted over the full width joint grooves prior to the installation of either the permanent seal or temporary seal.

### 3.08 PATCHING JOINTS

- A. After the joints have been sawed and cleaned, they shall be inspected for spalls and voids.
- B. All loose, unsound or damaged concrete shall be removed to the satisfaction of the Owner.
- C. Spalls and voids will be classified as minor, intermediate or major spalls and shall be repaired according to the Owner.

### 3.09 SEALING JOINTS

- A. All transverse expansion, contraction, construction, and longitudinal bulkhead construction joints shall be filled and sealed with an approved hot-poured elastic type compound.
- B. Immediately after the joints are cleaned with the compressed air, and with the surface of the concrete in the joint dry, the joint shall be sealed with an approved hot-poured elastic type compound.
- C. Pouring of the sealing compound shall be done so as to fill the joint to 1/4 inch below top of pavement. Any sealing compound spilled on the surface of the pavement shall be removed immediately.
- D. After the first pour has cooled to the temperature of the pavement and settled, a second pour shall be made to bring the sealing compound to 1/4 inch of the surface of the pavement.
- E. Traffic shall not be permitted over the poured joint until the compound has hardened sufficiently to resist pickup.

### 3.10 CLEANUP

- A. After the concrete has gained sufficient strength, but no sooner than within 12 hours, the fixed forms shall be removed and the spaces on both sides shall be immediately backfilled with sound earth of topsoil quality.
- B. The backfill shall be compacted, leveled and left in a neat, workmanlike condition.
- C. At a seasonally correct time approved by the Owner, the disturbed area shall be raked, have topsoil placed thereon, and sodded in accordance with Section 32 9223, Sodding

### 3.11 TESTING

- A. During the course of the Work, the Owner may require the taking of standard test cores and cylinders, by a testing laboratory acceptable to the Owner.
- B. The making of cylinders, the drilling of cores and testing shall be at the expense of the Contractor.
- C. Four test cylinders shall be taken from a representative portion of the concrete being placed for every 150-cubic yards of concrete pavement places, but in no case shall less than 2 sets of cylinders be take from any one day's placement.
  - 1. Sampling shall be in accordance with ASTM C31 and ASTM C172.
- D. Slump tests for consistency of Portland cement concrete shall be made in accordance with ASTM C143/C143M and ASTM C172/C172M.
- E. In the event the test results on a core indicates a deficiency in either thickness or compressive strength or in the event the test results on a cylinder indicates a deficiency in compressive strength, the following adjustments in the unit price for concrete shall be made based on the average of three (3) cores:
  - 1. Thickness

|  |                                    |
|--|------------------------------------|
|  | Percent of Reduction in Unit Price |
|--|------------------------------------|

|                                             |                  |
|---------------------------------------------|------------------|
| <b>Under Required Thickness</b>             |                  |
| 0 to 1/4 inch                               | None             |
| by more than 1/4 but not exceeding 1/2 inch | 20               |
| by more than 1/2 but not exceeding 1 inch   | 50               |
| by more than 1 inch                         | Remove & Replace |

2. Compressive Strength

|                                            |                                           |
|--------------------------------------------|-------------------------------------------|
| <b>Under Required Compressive Strength</b> | <b>Percent of Reduction in Unit Price</b> |
| 0 to 150 psi                               | None                                      |
| by more than 150 but not exceeding 300 psi | 20                                        |
| by more than 300 but not exceeding 500 psi | 50                                        |
| by more than 500 psi                       | Remove & Replace                          |

3. Reduction in the unit price are additive, that is if an area is deficient by 3/8 inch and is under strength by 200 psi, the total reduction is 20% plus 20% or a reduction of 40%.
4. The area of a deficient core shall be determined by the drilling and testing of two (2) additional cores, one (1) on each side of the deficient core and 20 feet from it, when possible.
5. The extra core drilling and testing shall be at the Contractor's expense.

**END OF SECTION**

## **SECTION 32 17 23 PAVEMENT MARKINGS**

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

- A. This Section includes pavement markings complete with materials, layout of markings and preparation of pavement surfaces.

#### **1.02 REFERENCE STANDARDS**

- A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:
  - 1. TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, latest edition
    - a. Item 666 - Retroreflectorized Pavement Markings
    - b. Item 668 - Prefabricated Pavement Markings
    - c. Item 672 - Raised Pavement Markers

#### **1.03 REQUIREMENTS OF REGULATORY AGENCIES**

- A. Pavement markings shall conform to the current requirements of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

#### **1.04 SUBMITTAL OF MANUFACTURER'S LITERATURE**

- A. Submit manufacturer's literature of all paints to be used in the Work. Manufacturer's literature shall show paint: type, texture, color, temperature limitations, recommended use, spreading rate, drying time, and cleanup.

#### **1.05 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver all materials to the Project site in original, unopened waterproof containers. Packaging containers shall bear manufacturing labels intact and legible.
- B. Store all materials in waterproof containers, under protective covering, off the ground and away from extreme heat or cold until ready for use.
- C. Handling of materials shall be in accordance with the manufacturer's recommendations.

### **PART 2 PRODUCTS**

#### **2.01 REQUIREMENTS**

- A. For pavement markings, the following TxDOT requirements are required:
  - 1. Type II Marking Material per TxDOT Item 666.
  - 2. Cleaning for new asphalt surfaces includes air blast or broom the pavement surface for new asphalt surfaces (less than three (3) years old) and for retracing of all surfaces to remove loose material.
  - 3. Apply on surfaces with a minimum surface temperature of 50°F.
  - 4. Apply at least 22 gallons per mile on asphalt for a solid four (4) inch line. Adjust application rates proportionally for other widths.

#### **2.02 TYPE I MARKING MATERIALS**

- A. Type I pavement markings will not be allowed, unless otherwise approved by the Owner.
- B. Furnish in accordance with DMS-8220, "Hot Applied Thermoplastic."

- C. Furnish pavement marking material used for Type I profile markings and shadow markings in accordance with DMS-8220, "Hot Applied Thermoplastic."

### **2.03 TYPE II MARKING MATERIALS**

- A. Furnish in accordance with DMS-8200, "Traffic Paint."

### **2.04 GLASS TRAFFIC BEADS**

- A. Furnish drop-on glass beads in accordance with DMS-8290, "Glass Traffic Beads" or as approved. Furnish a double-drop of Type II and Type III drop-on glass beads where each type bead is applied separately in equal portions (by weight), unless otherwise approved. Apply the Type III beads before applying the Type II beads.

### **2.05 LABELING**

- A. Use clearly marked containers that indicate color, mass, material type, manufacturer, and batch number.

### **2.06 PREFABRICATED PAVEMENT MARKINGS**

- A. Furnish prefabricated pavement marking materials in accordance with DMS-8240, "Permanent Prefabricated Pavement Markings."

### **2.07 RAISED PAVEMENT MARKERS (RPMS)**

- A. Reflectorized Pavement Markers
  - 1. Furnish RPMS in accordance with DMS-4200, "Pavement Markers (Reflectorized)."
  - 2. Types include: I-A, I-C, I-R, II-A-A and II-C-R
- B. Traffic Buttons
  - 1. Furnish RPMS in accordance with DMS-4300, "Traffic Buttons." types I-A, I-C, I-R, II-A-A, II-C-R, W, Y and B. Round or oval unless otherwise specified on the plans.
  - 2. Types include: I-A, I-C, I-R, II-A-A, II-C-R, W, Y and B.
- C. The following are descriptions for each type of RPM:
  - 1. Type I-A
    - a. The approach face must retro-reflect amber light. The body, other than the retro-reflective face, must be yellow.
  - 2. Type I-C
    - a. The approach face must retro-reflect white light. The body, other than the retro-reflective face, must be white or silver-white.
  - 3. Type I-R
    - a. The trailing face must retro-reflect red light. The body, other than the retro-reflective face, must be white or silver-white, except for I-R plowable markers which may be black.
  - 4. Type II-A-A
    - a. The 2 retro-reflective faces (approach and trailing) must retro-reflect amber light. The body, other than the retro-reflective faces, must be yellow.
  - 5. Type II-C-R
    - a. Contain 2 retro-reflective faces with an approach face that must retro-reflect white light and a trailing face that must retro-reflect red light. The body, other than the retro-reflective faces, must be white or silver-white.
  - 6. Type W

- a. Must have a white body and no reflective faces.
- 7. Type Y Must have a yellow body and no reflective faces.
  - a. Must have a yellow body and no reflective faces.
- 8. Type B
  - a. Must have a black body and no reflective faces.

## **2.08 ADHESIVES**

- A. Furnish adhesives that conform to the following requirements:
  - 1. DMS-6100, "Epoxy and Adhesives," Type II—Traffic Marker Adhesives.
  - 2. DMS-6130, "Bituminous Adhesive for Pavement Markers."
  - 3. The Contractor may propose alternate adhesive materials for consideration and approval.

## **PART 3 EXECUTION**

### **3.01 VERIFICATION OF EXISTING CONDITIONS**

- A. Prior to the placing of any pavement markings, examine the limits of the new Work and ascertain that the existing surfaces are adequate to receive the material to be installed.

### **3.02 PREPARATION OF SURFACE**

- A. Surfaces to be painted must be thoroughly dry and free from dirt, loose paint, oil, grease, wax and other contaminants.
- B. Costs incurred for removing and disposing of unsuitable materials in preparation of the surfaces to receive the new Work, shall be incidental to the price paid for the pavement markings.

### **3.03 PERFORMANCE - GENERAL**

- A. Pavement marking operation shall be limited to the type of Work and the limits as specified on the Plans. If additional area is required by Contractor for storage of equipment or supplies, Contractor shall furnish Owner with written permission obtained from the Property Owner of the storage area, permitting the storage.
- B. Unless otherwise specified on the Plans or approved by Owner, Contractor shall conduct his operations and use of his equipment in such a manner that traffic will be maintained throughout the Project.
- C. For Work within public rights-of-way and other areas as determined by Owner, the provisions for maintaining traffic shall be as specified in the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Costs incurred in maintaining traffic shall be at Contractor's expense.
- D. Contractor's equipment shall have sufficient paint capacity to enable sustained pavement marking operations and shall be equipped so as to assure uniform application of the paint and thermoplastic pavement markings.
- E. The color of the paint, and the width or type of markings shall be as specified on the Plans or as directed by Owner.
- F. Markings shall be applied so that they adhere adequately to the surface.
- G. Markings shall be applied in accordance with the applicable requirements of TxDOT Item 666 - Retroreflectorized Pavement Markings, Item 668 - Prefabricated Pavement Markings, and Item 672 - Raised Pavement Markers for permanent pavement markings and raised pavement markers.

#### **3.04 INSTALLATION**

- A. Installation shall be in accordance with TxDOT Item 666 - Retroreflectorized Pavement Markings, Item 668 - Prefabricated Pavement Markings, and Item 672 - Raised Pavement Markers.

#### **3.05 LAYOUT FOR MARKINGS**

- A. Layout work necessary for the location and placing of markings, as specified on the Plans or as determined by Owner, shall be the responsibility of Contractor and shall be at his expense.

#### **3.06 TOLERANCES**

- A. New markings and/or retraced markings shall be placed, with reasonable tolerance, in their proper locations.
- B. Incorrect or misplaced markings shall be obliterated and remarked in accordance with Owner's instructions.
- C. Costs incurred to obliterate and remark incorrect or misplaced markings will be at Contractor's expense.

#### **3.07 PROTECTION OF MARKINGS**

- A. Protection of the wet paint and thermoplastic pavement markings shall be the responsibility of Contractor, and all costs incurred to provide the protection will be at his expense.

#### **3.08 WEATHER AND TIME LIMITATIONS**

- A. Markings shall not be placed when rain is threatening or when the surface to be painted is wet.
- B. Weather and temperature limitation shall be in accordance with TxDOT Item 666 - Retroreflectorized Pavement Markings, Item 668 - Prefabricated Pavement Markings, and Item 672 - Raised Pavement Markers.

**END OF SECTION**

## **SECTION 32 92 23 SODDING**

### **GENERAL**

#### **1.01 SCOPE**

- A. This Section includes sodding complete with earth bed preparation, providing and placing topsoil, compacting and finishing topsoil, furnishing and placing sod, watering sod, rolling and tamping sod, mowing sod, replacing defective or deteriorated sod and maintenance and care of sod in place.
- B. This Section includes the re-establishment of existing irrigation systems, and landscaping.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 8900 - Site Construction Performance Requirements

#### **1.03 REFERENCE STANDARDS**

- A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:
  - 1. TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, latest edition
    - a. Item 160 - Topsoil
    - b. Item 170 - Irrigation System
    - c. Item 192 - Landscape Planting
    - d. Item 193 - Landscape Establishment
  - 2. North Central Texas Council of Governments (NCTCOG) Public Works Construction Standard Specification, latest edition.
    - a. Item 204.5 - Sodding

#### **1.04 SUBMITTALS**

- A. Contractor shall submit copies of Sod Growers Certificate to the Owner indicating nursery from which sod was taken, grass species and percentage.
- B. When requested by the Owner, submit evidence of topsoil borrow pit agreement for pits used by the Contractor.

#### **1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Sod shall be delivered to the project site on suitable wooden pallets. Sod shall be delivered in manageable rolls and the amount of sod delivered shall not exceed that which can be installed in one 24-hour period. Sod that has been damaged during delivery will be rejected.
- B. Store sod in such a manner as to protect roots and grass material from exposure to wind and sunlight, freezing or other injury. When stacked, sod shall be placed roots-to-roots or grass-to-grass in rolls. Sod shall be kept moist during storage, under shade or covered with moistened burlap. Sod that has been damaged or has deteriorated because of storage will be rejected.
- C. Sod shall be handled in a manner to prevent breaking or other damage. Sod shall not be handled by pitch forks or by dumping from trucks or other vehicles. Care shall be taken at all times to retain the native soil on the roots of each sod roll during stripping and handling. Sod that has been damaged by handling will be rejected.

## **1.06 ENVIRONMENTAL REQUIREMENTS**

- A. Cultivate the area to a depth of 4 inches before placing the sod. Plant the sod specified and mulch, if required, after the area has been completed to lines and grades as shown on the plans. Apply fertilizer uniformly over the entire area and water.
- B. Plant between the average date of the last freeze in the Spring and 6 weeks before the average date for the first freeze in the Fall according to the Texas Almanac for the Project Area.
- C. Sod shall not be placed when the ambient air temperature is below 32 degrees F .

## **1.07 PROTECTION OF WORK**

- A. Provide suitably approved warning signs and barricades for protection of new sodding from pedestrian or vehicular traffic. Protect all newly sodded areas during the progress of the Work and until the completion of the turf establishment period.
- B. Protect all adjacent construction from topsoil spills and perform such cleanup of affected surfaces before it becomes compacted by traffic.

## **1.08 PLANTING SCHEDULE**

- A. The Contractor will be required to have a minimum of 90% of the sod placed at least one (1) month prior to final acceptance of the complete Project to insure adequate rooting of the sod.

## **1.09 FINAL ACCEPTANCE**

- A. The Contractor shall establish a dense cover of sod grass on all disturbed areas. These areas shall be maintained until final acceptance of the Work by the Owner.
- B. The Owner will inspect the sodded turf to insure that the sod is well established, weed free, in a growing and vigorous condition. Areas that do not meet the approval of the Owner shall be re-sodded at the Contractor's expense.
- C. The Contractor shall get the Property Owner's signature on the City provided form, after sodding is completed and established. Signed forms shall be returned to the City prior to final acceptance and payment is issued. This shall be considered subsidiary to the sodding item.

## **PRODUCTS**

### **2.01 SOD - GENERAL**

- A. Sod material shall be in compliance with NCTCOG Item 204.5 - Sodding.
- B. Sod shall be dense, well-rooted growths of perennial and desirable grasses, indigenous to the general locality where it is proposed for use.
  - 1. Sod species shall match existing species removal unless otherwise approved by the Owner.
- C. Sod shall be free of noxious weed, relatively free of weeds and undesirable plants, and large stones, roots and other material which might be detrimental to the growth, development or future maintenance of the sod.
- D. Sod shall be in strips of uniform width, not less than 10 inches wide, with lengths of not less than 18 inches and an area of not less than 4.5 sq feet.
- E. Sod grown on peat will not be accepted.
- F. Sod shall be of uniform height when harvested. Vegetation more than 4 inches in height shall be mowed to a height of 3 inches.

### **2.02 TOPSOIL - GENERAL**

- A. Use easily cultivated, fertile topsoil that is free from objectionable material and resists erosion.
- B. Secure additional topsoil, from approved sources outside the right of way.

- C. Ensure that the topsoil obtained from sites outside the right of way has a pH of 5.5 to 8.5, per Tex-128-E. Topsoil is subject to testing by the Owner.

## **2.03 WATER**

- A. Use water that is clean and free of industrial wastes and other substances harmful to the growth of vegetation.

## **2.04 MISCELLANEOUS IRRIGATION ALLOWANCE**

- A. Irrigation material shall be in compliance with TxDOT Item 170 - Irrigation System, unless otherwise approved by the Owner.
- B. This item shall include restoring the existing irrigation system(s) as it was prior to construction.
- C. This shall include running any new lines and installation of sprinkler heads as coordinated with the Property Owner(s). This item shall also include any adjustments to existing sprinkler heads as necessary to match final grade.
- D. All materials to be the same type and manufacturer as the existing system(s). Additional compensation for increased materials to match the requirements of the existing property Owner(s) System(s) will not be considered.
- E. Perform irrigation system work under the supervision of a person possessing an irrigation's license issued by the TCEQ and provide documentation of this license.
- F. The Contractor shall get the Property Owner's signature on the City provided form after irrigation repairs are completed. Signed forms shall be returned to the City prior to final acceptance and payment is issued. This shall be considered subsidiary to this item.

## **2.05 MISCELLANEOUS LANDSCAPING ALLOWANCE**

- A. Work shall be in compliance with TxDOT Item 192 - Landscape Planting, Item 193 - Landscape Establishment, and Item 160 - Topsoil.
- B. This item shall include restoring the existing landscaping as it was prior to construction. This shall include replacing any borders, rocks, pavers, steppingstones, plantings, lawn ornaments, etc. as coordinated with the Property Owner(s). Additional compensation for increased materials to match the requirements of the existing Property Owner(s) will not be considered.
- C. The Contractor shall get the property owner's signature on the City provided form after landscaping repairs completed and landscaping is established. Signed forms shall be returned to the City prior to final acceptance and payment is issued. This shall be considered subsidiary to this item.

## **EXECUTION**

### **3.01 CONTRACTOR'S VERIFICATION**

- A. Prior to placing any topsoil, verify that earth bed in areas to receive sod have been completely stabilized to prevent settling and that grades have been made smooth, uniform and parallel to the finished grades and cross sections shown on the Plans.
- B. Ascertain that the tops and bottoms of all slopes are rounded off to form vertical curves and have been found acceptable to the Owner.
- C. Do not place of topsoil until all earth bed conditions are accepted.
- D. Prior to placing sod, verify that topsoil has been placed on the prepared earth bed to the proper depths shown on the Plans and as specified herein. Do not place any sod until topsoil conditions are satisfactory.

### **3.02 PREPARATION OF SUBGRADE**

- A. Complete all fine grading within the areas to be covered with topsoil as necessary to bring the surface of the proposed subgrade to the elevations indicated on the Plans and parallel to the

proposed finished grade. The surface of the subgrade, immediately prior to being covered with topsoil, shall be raked or otherwise loosened to a minimum depth of 2 inches to facilitate making a bond between the subsoil and the topsoil.

### **3.03 PLACING AND SPREADING TOPSOIL**

- A. Topsoil shall be placed and spread over the area indicated on the Plans or as directed by the Owner. Topsoil shall be placed to a depth of 6 inches unless otherwise indicated in the Contract Documents. At a minimum, topsoil placed shall be sufficiently greater than that shown on the Plans so that, after natural settlement or rolling, the completed Work will conform to the lines, grades and elevations indicated on the Plans.
- B. After spreading topsoil, all large lumps, rocks, roots, debris or other foreign matter shall be removed from the topsoil by raking and disposed of off the site of the Work. Spreading shall be completed in such a manner that sodding operations can proceed without additional moving of topsoil. Topsoil furnished and placed shall be incidental to the sodding operations.

### **3.04 SODDING**

- A. Sod shall be laid within 24 hours after cutting and shall be properly protected during handling and placing. Sod shall be lifted from trucks or storage piles and placed on a moist earth bed by hand, making close joints without overlapping. All gaps between sections of sod and openings at angles shall be plugged with sod.
- B. Rolling of the sod shall be done after initial watering and after the water has sufficiently soaked into the ground so that distortion of the sod surface and excessive compaction of the sod and the soil will not occur. The roller used shall be a water filled type at least 3 feet wide and 30 inches in diameter and shall weigh approximately 300 pounds. Roller shall be adequate to cause sod to make firm contact with the soil. A tamper, acceptable to the Engineer, shall be used to press the sod firmly in place in areas not accessible to a roller. After tamping or rolling, the sod shall present a smooth, even surface, free from bumps or depressions.
- C. Damaged, deteriorated or otherwise defective sod will be rejected by the Contractor and except as otherwise provided herein, removed from the Project. Sod which has been permitted to dry out or become otherwise injured during transportation, handling, storage or placing shall be rejected. Where permitted by the Owner, rejected sod, if suitable, may be pulverized and used for filling, where necessary.

### **3.05 TURF ESTABLISHMENT**

- A. After laying, the sod shall be watered until saturated. Sod shall be watered whenever excessive drying is evident during the period set for establishment. Sufficient water shall be applied to wet the sod through completely and to wet at least 2 inches of the sod bed each time watering is required. Watering shall be done in a manner that will prevent erosion due to the application quantities of water. The watering equipment shall be of a type that will prevent damage to the finished surfaces of topsoil and sod. The sod shall be watered as required until firmly knit in place and in a vigorous growing condition.
- B. Where weeds or other undesirable vegetation threaten to smother the planted species, such vegetation shall be mowed or, in the case of rank growths, uprooted, raked and removed from the area. All mowed cuttings, uprooted or raked vegetation, shall be legally disposed of away from the Project Site.
- C. The establishment period shall extend for a period from the time of sodding until the sodded areas have received final acceptance of the entire Work covered by the Contract. The minimum period shall be 45 days.

**END OF SECTION**

## **SECTION 33 11 00 WATER UTILITY DISTRIBUTION PIPING**

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

- A. This Section includes water main Work complete with water main piping, valves, hydrants, thrust blocks, structures, fittings, joints, joint materials, nuts, bolts, glands, gaskets, plugs, service lines, meters, and meter boxes, and accessories as shown and required. This Section also includes bedding and laying of water line piping, hydrostatic testing of new water line piping systems, flushing and chlorination of water line piping systems.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 33 00 - Submittal Procedures
- B. Section 01 77 00 - Closeout Procedures
- C. Section 31 23 33 - Trenching and Backfilling
- D. Section 32 13 13 - Concrete Paving
- E. Section 32 17 23 - Pavement Markings

#### **1.03 REQUIREMENTS OF REGULATORY AGENCIES**

- A. Conform to the applicable requirements of State and Local health authorities having jurisdiction for disinfection and testing of water mains.
- B. Water piping and appurtenances shall be NSF 61 certified. The certification should be stamped on the exterior wall of the pipe/appurtenance.

#### **1.04 REFERENCE STANDARDS**

- A. Unless otherwise specified, the Work of this Section shall conform to the applicable portions of the following Standard Specifications:
  - 1. ASTM A48/A48M: Standard Specification for Gray Iron Castings
  - 2. ASTM D698:
  - 3. ASTM D1785: Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
  - 4. AWWA C110: Ductile-Iron and Gray-Iron Fittings
  - 5. AWWA C111/A21.11: Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
  - 6. AWWA C105/A21.5: Polyethylene Encasement for Ductile-Iron Pipe Systems
  - 7. AWWA C153/A21.53: Ductile-Iron Compact Fittings
  - 8. AWWA C200: Steel Water Pipe, 6 In. (150 mm) and Larger
  - 9. AWWA C502: Dry-Barrel Fire Hydrants
  - 10. AWWA C509/C515: Resilient-Seated Gate Valves for Water Supply Service
  - 11. AWWA C600: Installation of Ductile-Iron Mains and Their Appurtenances
  - 12. AWWA C651: Disinfecting Water Mains
  - 13. AWWA C900: Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm)
  - 14. AWWA C906:
  - 15. NSF 14: Plastics Piping System Components and Related Materials

16. NSF 61: Drinking Water System Components - Health Effects
17. City of Keller Water Construction Details
18. North Central Texas Council of Governments (NCTCOG) Public Works Construction Standards, latest edition
  - a. Item 502.10.3 - Water Conduit Connections
  - b. Item 502.10.2.4 - Meter Boxes
  - c. Item 504 - Open Cut - Backfill
  - d. Item 504.2.2 - Pipe Embedment Material for Storm, Water and Wastewater Mains"
  - e. Item 504.2.26 - Sand
  - f. Item 504.5.2.3 - Class "B" Embedment"
  - g. Item 504.5.2.8 - Class "B-4" Embedment
  - h. Item 506 - Open Cut – Water Conduit Installation
  - i. Item 506.6 - Connecting to Existing Water Conduits

#### **1.05 SUBMITTALS**

- A. Product Data:
  1. Submit catalog data showing sizes, and manufacturing standards
- B. Affidavits:
  1. Submit manufacturer affidavit of compliance with the Contract Documents shall be submitted to the Owner and shall include the following, where applicable:
    - a. Pipes, specials and fittings (AWWA C200)
    - b. Manufacturer's standard repair procedures.
    - c. Manufacturer's written quality control procedures.
    - d. Manufacturer's Installation Instructions: Indicate special installation requirements.
    - e. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements
- C. Restrained Joints:
  1. Submit manufacturer's data for restrained joint pipe and fittings for the Owner's review.
- D. Testing Plan:
  1. Submit a plan detailing flushing limits of pipe to be tested, bleed down points, proposed water source, and water disposal method and location. The plan should include proposed disinfection chemical and dechlorination method, as well as how the chemical will be introduced into the pipe and how the treated water will be dechlorinated prior to disposal.

#### **1.06 CLOSEOUT PROCEDURES**

- A. The following shall be submitted in accordance with Section 01 77 00 - Closeout Procedures:
  1. Manufacturer's field reports.
  2. Project record documents:
    - a. Accurately record actual locations of piping mains, valves, connections, and invert elevations.
    - b. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

3. Provide a final record laying schedule.
4. Submit certified copies of hydrostatic test results of completed force main sections as specified in Part 3 of this specification.

#### **1.07 STORAGE OF MATERIALS**

- A. Pipe shall be stored in a manner to minimize infiltration of dirt, debris and other extraneous materials.
- B. Piping materials shall not be stacked higher than four 4 feet. Suitable racks, chairs and other supports shall be provided to protect preformed pipe mating surfaces from damage. Store bottom tiers off the ground, alternate tiers and chock tier ends.
- C. Store hydrants, valves, wells and prefabricated structures off the ground, drained and kept free of water to protect against damage from freezing. Hydrants, valves, wells, their accessories and appurtenances shall be kept in their original containers until ready for installation.
- D. Gaskets, glands, joint and sealing materials subject to ultra-violet or ozone attack shall be protected from the sunlight, atmosphere and weather; and stored in suitable enclosures until ready for installation.
- E. The Contractor shall submit a Stockpile Plan that designates locations for temporary storage of excavated pavement. The stockpile plan is subject to approval by the Owner. If stockpile(s) are located on private property, the Contractor must supply the Owner with a written letter of permission from the property owner to include the final state of the land to be used.

#### **1.08 HANDLING OF MATERIALS**

- A. Load and unload piping using suitably approved hoists and skidding. Piping shall not be dropped, bumped or allowed to impact against itself. Damaged piping shall be rejected by the Contractor.
- B. Lifting devices shall be suited to the Work and shall protect surfaces from damage.

#### **1.09 PRIVATE WATER SERVICE RECONNECTION**

- A. Work shall be in compliance with requirements of the building and plumbing code or other applicable rules and regulations of the City. The final connection on the private side shall be completed by a Licensed Plumber.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL**

- A. All brass parts shall be "lead free" as required by the EPA Regulations.
- B. It is the intent of the Articles in Part 2 of this specification section is to specify in detail the various types of pipe, joints, and fittings which have been indicated throughout the Plans and Specifications.
- C. These Articles shall not be construed as allowing any alternate type of material to that which is indicated on the Plans or elsewhere in the Specifications.
- D. Short water service lines are measured as the service lines from the water main to the nearest property line, while long water services are measured from the water main to the further property line on the opposite side on the street; these services will be measured as units installed. Long water services shall include a casing pipe, refer to details shown in Plans.
- E. This item shall consist of removal and disposal of existing water service boxes, assemblies, and lines, furnishing, placing, cleaning, and testing of water service boxes, assemblies, and lines. Install all water meter boxes, assemblies and service lines as shown on the plans. Work shall be in compliance with NCTCOG Items 502.10.3 "Water Conduit Connections", 502.10.2.4 "Meter Boxes", 504 "Open Cut - Backfill", 506 "Open Cut – Water Conduit Installation", and 506.6 "Connecting to Existing Water Conduits", unless otherwise specified below or in plans.

Contractor shall provide water meter assemblies and all other necessary materials; however, City Staff will be responsible for the removal and installation of the water meters.

- F. In general, all water service boxes, and corresponding service lines are to be replaced in the exact location as existing. However, locations noted in the plans are subject to field verification and approval by the Owner. The placement can be adjusted as deemed necessary by the Owner.
- G. The Contractor shall provide a minimum of 24-hour notice to residents prior to water services being interrupted via door hangers. The Contractor shall be responsible for providing and distributing door hanger within prior to the minimum notice requirement. The Contractor shall submit a draft of the door hanger to the Owner for approval before distributing to residents. Door hangers and all material, and labor associated with the production and distribution shall be considered subsidiary to this Item.

## **2.02 DUCTILE IRON PIPE SYSTEM**

- A. Mechanical joints for ductile iron pipe shall be compression gasket type, conforming to AWWA C111/A21.11 except that slots with the same width as the diameter of the bolt holes in mechanical joints shall not be allowed in the bell flange.
- B. Fittings and plugs shall be ductile iron compact fittings, mechanical joint, pressure rating of 350 psi, conforming to AWWA C153/A21.53, and rubber gasket joints conforming to AWWA C111/A21.11, with double thickness cement mortar lining and coal tar enamel coating on the outside of fittings.
- C. Mega Lugs shall be required for all fittings.

## **2.03 POLYVINYL CHLORIDE (PVC) PIPING SYSTEMS**

- A. Rigid polyvinyl chloride bell and spigot type pressure pipe and couplings, size 4 inches and larger, shall conform to AWWA C900, Pressure Class 235, DR 18 unless otherwise indicated in the Contract Documents.
- B. Fittings and plugs for PVC pipe, unless specified otherwise, shall be ductile iron and as specified in Part 2 for Ductile Iron Pipe Systems.
- C. Mega Lugs shall be required for all fittings.

## **2.04 POLYETHYLENE ENCASEMENT**

- A. service line casing material and size shall be in compliance with the City of Keller's Water Construction Details.
- B. Polyethylene material for encasement shall be either 4 mil high density, cross-laminated polyethylene film or 8 mil linear low-density polyethylene film per AWWA C105/A21.5.

## **2.05 VALVES AND HYDRANTS**

- A. Gate Valves:
  - 1. The gate valve and joint assemblies shall be wrapped in polyethylene according to AWWA C105.
  - 2. Gate valve shall be resilient seat type with a non rising stem and a two (2) inch square operator nut resilient seat gate valve shall conform to AWWA C509.
  - 3. All nuts and bolts shall be 304 stainless steel.
  - 4. A permanently attached valve extension stem shall be required for any valve with an operating length to ensure that its top is within 18" - 24" of the box lid.
  - 5. Gate valve shall be in compliance with the City of Keller's Water Construction Details.
- B. Fire Hydrants:

1. Approved fire hydrant manufactures are Mueller, Clow, and M&H.
2. All fire hydrants shall conform to AWWA C502.
3. Concrete pad in unpaved areas shall be considered subsidiary to this item.
4. A blue location maker shall be placed in the center of the roadway opposite from the fire hydrant.
  - a. Stemsonite 1-88-55A or approved equal
  - b. Blue location maker shall be considered subsidiary to this item.

## **2.06 TAPPING SLEEVES**

- A. Tapping sleeve shall be stainless steel.
- B. Tapping sleeve shall be RomacSSTII, Smith-Blair 665 or approved equal.
- C. Tapping sleeve shall be in compliance with the City of Keller's Water Construction Details.

## **2.07 VALVE BOXES**

- A. Valve box shall be AWWA two-piece and adjustable. Valve box extension shall be cast iron conforming to ASTM A48/A48M. PVC is not allowed.
- B. All valve covers shall be painted blue.
- C. For new gate valves, concrete boxouts shall be considered subsidiary to the item.
- D. A "V" shall be saw cut in the curb at all valve locations with the "V" pointed towards the valve. This shall be considered subsidiary to the item.
- E. Valve box shall be in compliance with the City of Keller's Water Construction Details.
- F. Overall length shall be adjustable to meet grade.

## **2.08 WATER SERVICE LINE AND METER BOX**

- A. Single water service assembly material and configuration shall be in compliance with the City of Keller's Water Construction Details.
- B. Double water service assembly material and configuration shall be in compliance with the City of Keller's Water Construction Details.
- C. All service line installation shall be open cut unless conditions are deemed appropriate to properly use the trenchless installation - piercing (also known as missiles or bullet mole). The Contractor shall provide the City with information and proof of suitable conditions and shall receive City approval prior to using trenchless installation methods such as, piercing.
- D. The new water service lines shall be Polyethylene (DR-9), AWWA C906, with trace wire (Endorace or approved equivalent) from the water main to the property line.
- E. The service line shall be and continuously embedded in cushion sand per NCTCOG Item 504.2.26 "Sand". The service line shall be one (1) inch unless specified differently on the Plans. A rigid, solid tubular stainless-steel liner must be used inside the end of polyethylene plastic to prevent it from collapsing as connection is tightened and to provide support to allow the gasket in the connection to establish a reliable seal. The furnishing and installing of pipe, cushion sand, and liner for services line installation is considered incidental to this pay item. The removal of existing water service lines, assemblies and meter boxes is considered incidental to this pay item. This surplus material shall become property of the Contractor and shall be properly disposed of at an off-site location by the Contractor. Service lines crossing under the roadway shall be installed by open cut in a casing pipe, unless otherwise specified by the City. Service lines shall be a minimum of 30-inches below the bottom of the pavement and a minimum of 18-inches below flowline of the ditch. No additional payment will be made if rock is encountered during excavation. Casing pipe shall be two (2) inch diameter schedule 40 class 200 psi PVC

pipe. Recon "Raci" casing spacers or approved equal and double spacers at each end are required. Both ends of casing pipe shall be plugged with a minimum width of six (6) inches of grout. The furnishing and installing of casing pipe, spacers, and grout for services line installation is considered incidental to this pay item.

- F. The service line shall be one (1) inch unless specified differently on the Plans. A rigid, solid tubular stainless-steel liner must be used inside the end of polyethylene plastic to prevent it from collapsing as connection is tightened and to provide support to allow the gasket in the connection to establish a reliable seal. The furnishing and installing of pipe, cushion sand, and liner for services line installation is considered incidental to this pay item. The removal of existing water service lines, assemblies and meter boxes is considered incidental to this pay item. This surplus material shall become property of the Contractor and shall be properly disposed of at an off-site location by the Contractor.
- G. Service lines crossing under the roadway shall be installed by open cut in a casing pipe, unless otherwise specified by the Contractor. Service lines shall be a minimum of 30-inches below the bottom of the pavement and a minimum of 18-inches below flowline of the ditch. No additional payment will be made if rock is encountered during excavation. Casing pipe shall be two (2) inch diameter schedule 40 class 200 psi PVC pipe. Recon "Raci" casing spacers or approved equal and double spacers at each end are required. Both ends of casing pipe shall be plugged with a minimum width of six (6) inches of grout. The furnishing and installing of casing pipe, spacers, and grout for services line installation is considered incidental to this pay item.
- H. The Contractor shall provide a trench width sufficiently wide to allow for six (6) inches minimum of granular embedment on either side of the service line per NCTCOG Item 504.5.2.8 "Class "B-4" Embedment".
- I. For long services, backfill shall be flexible base, compacted to 95% of maximum density.
- J. For short services, backfill shall be Type "B" backfill compacted to 95% of maximum density (ASTM D698) per NCTCOG Item 504.5.2.3 "Class "B" Embedment" or flexible base compacted to 95% of maximum density.
- K. Refer to Plans for information on embedment and backfill. The furnishing and installing of backfill and embedment for services line installation is considered incidental to this pay item.
- L. Services along roadways without curb and cutter shall be located a minimum of 18" below the ditch flowline.
- M. Contractor shall perforate meter spacer nipples as directed by the Owner.
- N. Recessed arm hole in meter box shall be places nearest the back of curb.
- O. Meter boxes shall be furnished and installed by Contractor.
- P. Meter box and lid for double water services shall be DFW Plastics model #DFW38C-14-AF1F Deep.
- Q. Meter boxes and lid for single water services shall be DFW Plastics model #DFW37C-12-AF1F Deep.
- R. Eight (8) inch minimum crushed rock shall be placed under the meter box per NCTCOG Item 504.2.2 "Pipe Embedment Material for Storm, Water and Wastewater Mains", Grade 8.
- S. Tapping Saddle "ROMANC 202NS-1" CC".
- T. Corporation Stop "F1000-4-G"
- U. City approved manufactures are Ford and Muller, applicable part numbers for different components considered to be the assembly can be found on City Details including ball angle service valve, compression and meter nut, straight meter coupling and meter spacer nipple (schedule 80 PVC), and U-branch and ball valve burn stop, FIP and swivel meter nut for double services.

## **2.09 THRUST BLOCKING**

- A. Horizontal and vertical thrust blocking shall be in compliance with the City of Keller's Water Construction Details.
- B. Horizontal and vertical thrust blocking is required.
- C. Thrust blocking shall be considered subsidiary to various water items.

## **PART 3 EXECUTION**

### **3.01 CONTRACTOR'S VERIFICATION**

- A. Prior to the installation of any water piping or materials, examine all trenches and other excavations for the proper grades, lines, levels and clearances required to receive the new Work. Ascertain that all excavation bottoms, compacted subgrades and pipe bedding are adequate to receive water main materials to be installed. Correct all defects and deficiencies before proceeding with the work.
- B. Expose the existing water main piping and structures to which the new Work is to be connected and notify the Owner of the same. Owner will verify the vertical and horizontal locations of the existing system and shall inform the Contractor as to the necessary adjustments required to align the new water line work with the existing system.

### **3.02 PREPARATION**

- A. Remove all lumps, blisters and excess coatings from the socket and plain ends of pipe. Wire brush and wipe clean the outside surfaces of all plain ends and the inside surfaces of all socket ends before installation. Any pipe or fitting which has acquired a coating of mud or other foreign material shall be scrubbed clean with heavily chlorinated water.
- B. Pipe fittings, valves, hydrants, accessories and appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective or damaged materials shall be rejected and removed from the Project by the Contractor.

### **3.03 INSTALLATION - GENERAL**

- A. Foreign matter shall be prevented from entering the pipe while it is being placed in the trench. During and after laying operations, no debris, clothing or other materials shall be placed in the pipe.
- B. During the progress of Work, watertight plugs shall be carried along and inserted in the end of each pipe as it is laid to prevent foreign matter or rodents from entering the pipe. This watertight plug shall be fastened in the end of the water main in such a manner as to prevent it from floating or being otherwise displaced whenever construction operations are temporarily halted, such as at noon or at the end of the days Work.
- C. Each section of pipe, when placed to grade and line, shall have firm bearing on the trench bedding throughout its length between bell holes.
- D. Cutting of pipe shall be done with approved tools and by approved methods suitable for the pipe material. Pipe cutting methods that produce a smooth, square-cut end without damage to the pipe and that minimize airborne particles, shall be employed. Pipe cutting shall be performed using the recommendations of the manufacturer for the type of pipe materials being cut and according to the best trade practices.
- E. When cutting pipe or fittings, care shall be taken to prevent damage to linings and coatings. Damage to linings shall be cause for rejection of the complete Section. Damage to exterior coatings shall be corrected to original Specifications.
- F. Where pipe using a resilient gasket to effect the seal is cut, the cut pipe end shall be tapered at a 30-degree angle with the centerline of the pipe, and ground smooth, on the outside end to remove any sharp edges or burrs which might damage the gasket.

- G. Unless otherwise specified, pipe shall be laid with bell ends facing in the direction of laying. After a length of pipe is placed in the trench, the spigot shall be centered in the bell end of the adjacent pipe section, the pipe shoved into position and brought to true alignment and secured with sand tamped under and on both sides of the pipe except at bell holes. Adequate support shall be provided for all water main pipe.
- H. After the bottom of trench has been excavated the pipe bedding material will be installed in accordance with Section 31 23 33 - Trenching and Backfilling. The pipe shall then be installed strictly in accordance with the manufacturer's recommendations. After the pipe is laid, the bedding shall be continued above the pipe as specified in Section 31 23 33 - Trenching and Backfilling. Particular care shall be taken to assure filling and tamping all spaces under, around and above the top of the pipe.
- I. A continuous and uniform bedding as specified in Section 31 23 33 - Trenching and Backfilling shall be provided in the trench for all buried pipe.
- J. Backfill shall be as indicated on the Plans and as specified in Section 31 23 33 - Trenching and Backfilling.
- K. Install bolts, studs, and nuts of the type specified per the manufacturer's installation and torquing requirements.

#### **3.04 INSTALLATION OF RESTRAINED JOINTS**

- A. Restrained joints shall be provided where indicated on the plans. Joints shall be assembled in strict accordance with manufacturer's directions. Joints shall be fully extended after assembly.

#### **3.05 FITTINGS, STRAPPING, AND LUGGED PIPE**

- A. Install all fittings to the lines, levels and locations indicated on the Plans.
  - 1. Thrust blocks shall be constructed as indicated on the Plans or as required by the Owner.
  - 2. Fittings shall be provided with restraints as specified herein, as indicated on the Plans, or as required for a functional installation.
- B. Where lugged pipe and special fittings are indicated on the Plans, furnish and install all necessary tie rods, nuts, and washers.

#### **3.06 POLYETHYLENE ENCASEMENT**

- A. Where called for on the Plans, service lines and water lines shall be encased in a polyethylene film tube.
- B. The polyethylene film tube shall be installed in accordance with AWWA C105/A21.5, Method A.
  - 1. Method A consists of cutting the polyethylene tube two feet longer than the pipe to provide an overlap at the joints.
  - 2. Service taps, bends, tees and other connections shall be made to polyethylene encased pipe in accordance with AWWA C105/A21.5.
- C. Cost of the polyethylene encasement shall be incidental to the respective item.

#### **3.07 VALVES**

- A. Valves shall be installed to the grade, lines, levels and locations indicated on the Plans.
- B. Valve connections shall be as specified for the piping materials used. Valves shall be set with the stem plumb on permanent, firm foundations as indicated on the Plans.
- C. Where required, valves shall be supported with special supports as indicated on the Plans and as approved by the Owner. Valves shall be installed so as not to receive support from the connecting pipe.
- D. In no case shall valve installation be used to bring misaligned pipe into alignment.

### **3.08 VALVE BOXES**

- A. Install valve boxes to the grade, lines, levels and locations indicated on the Plans. Valve boxes shall not transmit shock or stress to the valve and shall be set plumb with covers centered over operating nuts and flush with the indicated surface elevations. Valve boxes that shift or fill during backfilling shall be uncovered and reset.

### **3.09 HYDRANTS**

- A. All hydrants shall be installed plumb to the lines, levels, grades and locations indicated on the Plans. Hydrants shall be set to the established grade, shall have their nozzles parallel to or at right angles to and facing the grade or curb.
- B. Hydrant drain/weep holes shall be plugged.
- C. Where necessary to adjust for proper hydrant location, the Contractor shall install additional pipe between the water main and road box. Hydrant and valve extensions shall be installed to adjust hydrant to proper grade.
- D. Upon substantial completion of cleanup, the Contractor shall recheck all hydrants for plumb and grade and shall make all adjustments as necessary at this time. The Work of constructing fire hydrants shall not be considered complete until these final adjustments for plumb and grade have been made.

### **3.10 TAPPING VALVE ASSEMBLY**

- A. Install all tapping valve assemblies of sizes and to the lines, elevations, locations and details indicated on the Plans.
- B. The tapping sleeve shall be assembled around the main, and the tapping performed in strict accordance with the manufacturer's recommendations.
- C. Tapping shall be accomplished without interruption of service.

### **3.11 ANCHORS, ENCASEMENTS, AND RESTRAINTS**

- A. Plugs, tees, sleeves, bends, caps, straps and lug piping shall be provided with suitable anchors, encasements and restraints as indicated on the Plans. Anchoring, encasement and restraint methods shall be as detailed. All bearings shall be as shown.
- B. Anchors, encasements and restraints shall rest on firm, stable, compacted subgrade and shall be provided for all standard and special fittings.

### **3.12 WATER SERVICE LINES**

- A. When so indicated in the Proposal, or on the Plans, the Contractor shall provide water service lines in accordance with this Section.
- B. Water service lines shall be installed after the water main has been successfully tested and put into service, including the installation of fire hydrants. The service lines shall be of the type indicated on the Plans and shall be a minimum of 1 inch or as otherwise indicated on the Plans or Proposal.
- C. Water service lines shall be provided for all lots or parcels at the locations indicated on the Plans, within these Contract Documents or as designated by the Owner. Service lines shall extend from the water main to within 1 foot of the limits of a right-of-way or easement at a minimum 5 foot depth terminating with a curb stop and meter box as specified herein.
- D. Backfilling of open cut construction for water services shall be in accordance with Section 31 23 33 - Trenching and Backfilling, after the service line, including curb stop, has been laid and approved by the Owner. Prior to backfilling the service line the Contractor shall request an inspection by the Owner and obtain approval of the service line.
- E. Service lines shall be open cut. Alternative methods such as piston mole, boring, tunneling, etc. will not be allowed.

- F. Existing water mains shall be kept in service until all water services have been connected to the new mains. Contractor shall repair all water services damaged during the installation of the new water mains. Only after the new mains have been tested and accepted and put into service, will service connections be made to the new mains.
- G. Backfill, method of construction under pavements, and new water service lines shall be as specified in this Section.

### **3.13 CORPORATION STOPS**

- A. Corporation stops shall be located on water main piping where indicated on the Plans, or as determined by the Owner.
- B. Corporation stops on PVC water mains shall be made with full circle service saddles.

### **3.14 SERVICE SADDLES**

- A. Where service saddles are to be installed, the entire circumference of the main shall be free of all loose material. Installation of the saddle and tapping of the main shall be in accordance with manufacturer's recommendations.

### **3.15 CURB STOPS**

- A. Install curb stops of the types and sizes indicated on the Plans. Curb stops shall include furnishing and installing a meter box.

### **3.16 REMOVE GATE VALVE**

- A. Gate valve on the existing water main shall be removed in accordance with the following:
  - 1. The removal of existing structures shall consist of removing and salvaging the existing frame and cover, and valve.

### **3.17 REMOVE EXISTING FIRE HYDRANTS**

- A. Fire hydrants on the existing water main shall be removed by excavating and removing the existing fire hydrant, gate valve, and valve box.
  - 1. The existing hydrant lead shall be capped and blocked.
  - 2. The fire hydrant, valve, and box shall be salvaged and delivered to a location as designated by the Owner.

### **3.18 RELOCATION OF FIRE HYDRANTS**

- A. Relocation of hydrants shall include the provision of new hydrant shoes, frost jacket and restraints. Provide all new materials required for hydrant relocation.
  - 1. Reinstall hydrants at the new locations to the lines and levels shown.
  - 2. Make all joint connections to new or existing water mains, joints, couplings, etc., as shown and as required.
  - 3. Provide all anchorage and restraint for a complete installation.

### **3.19 HYDROSTATIC TESTING**

- A. General:
  - 1. After the pipe has been laid and backfilled, the pipe shall be hydrostatically tested for leakage.
  - 2. A meeting shall be held by Contractor, affected subcontractors and Owner prior to any testing of mains, valves, hydrants and appurtenances.
  - 3. Contractor shall notify Owner in writing at least 48 hours prior to hydrostatic testing of mains, valves, hydrants and appurtenances.

4. Contractor shall furnish the pump, pipe connection, hydrants, valves and any other necessary apparatus including gages and meters and all personnel necessary for conducting the test.
5. Before applying the test pressure, all air shall be expelled from the pipe. If necessary to accomplish this, taps shall be made at points of higher elevation and afterwards plugged.
6. Hydrostatic testing shall be witnessed and accepted by Owner.
7. Test sections will normally not exceed 1 mile and in the event more than one 1 mile of water main is tested, the permissible leakage will remain at the amount determined for one (1) mile of pipe.
8. Hydrostatic testing shall conform to AWWA C600.

### **3.20 FLUSHING**

- A. After completion of water main installation, flush the new mains, valves, hydrants, and appurtenances completely.
  1. Flushing shall be completed prior to hydrostatic pressure testing and chlorination.
  2. Contractor shall notify Owner in writing at least 24 hours prior to flushing mains, valves, hydrants, and appurtenances.
  3. Flushing shall be witnessed and accepted by Owner.
- B. Heavily chlorinated water discharged from a disinfected system shall be controlled adequately to protect any surface water resource or adjacent property from potential environmental damage, or from creation of a hazard to traffic.
- C. Remove and dispose of all temporary installations at completion of the flushing operation.
- D. After flushing, and prior to final approval of the system, the Contractor shall pump down all fire hydrants and verify that the hydrant valve is properly seated to prevent the hydrant standpipe from filling with water.

### **3.21 DISINFECTION**

- A. Contractor shall disinfect water main before making any connections to existing water mains. After satisfactory hydrostatic testing and flushing of the new water main, disinfect the complete system in accordance with AWWA C651 by introduction of a chlorine-water solution throughout the water main piping.
- B. The liquid mixture shall be applied by means of a solution-feed chlorinating device. Contractor shall install corporation stop and feed chlorine solution through the corporation stop at the beginning of the main or valved section.
- C. A slow flow of water shall be let into the main approximately at the point of injection of the chlorine solution, at a rate such that the chlorine dosage of the entering water shall be at least 25 parts per million (ppm). An open discharge shall be maintained at the far end of the section of main being chlorinated, and the introduction of chlorine solution and water shall continue until the water discharging at the far end shall carry the required dosage of chlorine.
- D. As the main is filled with chlorinated water, each outlet from the main shall be opened and sufficient water drawn off to assure that the full dosage of chlorine reaches each outlet.
- E. Back pressure causing a reversal of flow in the main being chlorinated shall be prevented, and pressure in the main shall be held down to a point which will make it impossible for chlorinated water to be forced into other sections of the main or water system.
- F. The chlorine treated water shall remain in the main at least 24 hours, and at the end of that time the chlorine residual at pipe extremities and other representative points shall be at least 10 ppm. If the chlorine residual less than 10 ppm at the end of 24 hours, further application of

chlorine shall be made and the retention period repeated until the required 10 ppm residual is obtained.

- G. Should the initial treatment of all or any section of the mains, in the opinion of the Owner, prove ineffective, the chlorination procedure shall be repeated until confirmed tests show that water sampled from the new mains conforms to the foregoing requirements.
- H. Contractor shall collect water samples and cause analyzes to be made at his own expense.
- I. Testing laboratory and sample collection shall meet the approval of public health authorities having jurisdiction.

### **3.22 WATER FOR CLEANING, TESTING AND DISINFECTION**

- A. Water for cleaning, testing and disinfection shall be obtained from a potable water supply.
- B. Contractor shall provide and remove temporary connections between the source water system and the mains constructed under this contract. Temporary connections shall meet the approval of the Owner, the authority controlling the source water system, and Public Health authorities having jurisdiction.

### **3.23 BACTERIOLOGICAL ANALYSIS**

- A. Prior to placing a water main in service, not less than two (2) consecutive water samples taken 24 hours apart for bacteriological analysis shall be collected and each analysis shall show results meeting state and local drinking water standards.
- B. Contractor shall collect water samples and cause analyzes to be made at his own expense.
- C. Samples shall be collected in accordance with AWWA C651.
- D. Testing laboratory and sample collection shall meet the approval of public agency having jurisdiction.

### **3.24 CLEANING (PIGGING)**

- A. When required in the Plans or Specifications, all water main shall be mechanically cleaned. Cleaning shall be with a metal bodied, mandrel type solid plug (pig) with scrapers. The pig shall be pulled or otherwise propelled through the entire line prior to testing or connecting to any existing water main.

### **3.25 TRENCH SAFETY & EXCAVATION PROTECTION**

- A. The provisions of TxDOT Item 402, "Trench Excavation Protection", shall apply except as modified or clarified below:
- B. In addition to personnel safety, the "Trench Safety Plan", developed by the Contractor, must provide for sheeting and shoring procedures capable of providing support of the trenches or boring pits, giving due consideration to the proximity of existing structures and other facilities along the proposed utility lines.
  - 1. The cost of trench dewatering, if required, shall be subsidiary to various water items.

## **END OF SECTION**

## **SECTION 33 41 00 STORM UTILITY DRAINAGE PIPING**

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

- A. This Section includes storm sewer Work indicated on the Plans complete with pipes, joints, structures, pipe bedding, final inspection and appurtenances.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01 33 00 - Submittal Procedures
- B. Section 31 23 13 - Subgrade Preparation
- C. Section 31 23 33 - Trenching and Backfilling

#### **1.03 REFERENCE STANDARDS**

- A. Unless otherwise specified, the Work for this Section shall conform to the applicable portions of the following Standard Specifications:
  - 1. AASHTO M 330: Standard Specification for Polypropylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
  - 2. ASTM A48/A48M: Standard Specification for Gray Iron Castings
  - 3. ASTM C76: Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
  - 4. ASTM C361: Standard Specification for Reinforced Concrete Low-Head Pressure Pipe
  - 5. ASTM C443: Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
  - 6. ASTM C478/C478M: Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
  - 7. ASTM C507: Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
  - 8. ASTM C877: Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections
  - 9. ASTM C990: Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
  - 10. ASTM C1433: Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
  - 11. ASTM D3212: Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
  - 12. ASTM D4101: Standard Classification System and Basis for Specification for Polypropylene Injection and Extrusion Materials
  - 13. ASTM F477: Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
  - 14. ASTM F2881/F2881M: Standard Specification for 12 to 60 in. [300 to 1500 mm] Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications
  - 15. TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, latest edition
    - a. Item 104 - Removing Concrete

- b. Item 402 - Trench Excavation Protection
- c. Item 432 - Riprap
- d. Item 464 - Reinforced Concrete Pipe
- e. Item 465 - Junction Box, Manholes, and Inlets
- f. Item 472 - Removing and Re-Laying Culvert

#### 16. City of Keller Storm Drain Construction Details

### 1.04 SUBMITTALS

- A. Complete Shop Drawings shall be submitted to the Owner.
- B. Submit shop drawings and design information for all precast concrete sections.

### 1.05 STORAGE OF MATERIALS

- A. Piping material shall not be stacked higher than 4 feet or as recommended by the manufacturer, whichever is lowest. Suitable racks, chairs, and other supports shall be provided to protect preformed pipe mating surfaces from damage. Store bottom tiers off the ground, alternate tiers and chock tier ends.
- B. Jointing and sealing materials used in the storm sewer system shall be protected from sunlight and stored in as cool and clean a place as practicable until ready for application.

### 1.06 HANDLING OF MATERIAL

- A. Load and unload materials using suitable approved equipment. Material shall not be dropped, bumped or allowed to impact against itself. Damaged material shall be rejected by the Owner.
- B. Lifting devices shall be suited to the Work and shall protect surfaces from damage.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. It is the intent of the Articles in Part 2 of this specification section is to specify in detail the various types of sewer pipe, joints, manholes, etc. which have been indicated throughout the Plans and Specifications. These Articles shall not be construed as allowing any alternate type of material to that which is indicated on the Plans or elsewhere in the Specifications.

### 2.02 REINFORCED CONCRETE PIPE

- A. Reinforced concrete pipe shall conform to ASTM C76 and TxDOT Item 464 - Reinforced Concrete Pipe. Pipe sizes 12-to-30-inch diameter shall be Class II thru V, circular reinforced. Pipe sizes 36-to-108-inch diameter shall be Class I through V, circular reinforced, arch reinforced, or elliptical reinforced.
- B. TxDOT Item 464 - Reinforced Concrete Pipe, shall apply except as modified or clarified below:
  - 1. Refer to TxDOT Item 464 - Reinforced Concrete Pipe for materials, installation, jointing, and fittings.
  - 2. Reinforced concrete pipe shall be Class III unless noted otherwise in the Plans.
  - 3. Trench excavation, including embedment and backfill, is considered subsidiary to this item.
  - 4. Backfill for the culverts shall be Cement Treated Base (CTB), Class L, Plant-Mixed material per TxDOT Item 276 "Cement Treatment (Plant Mixed)", compacted to 95% of maximum density. Backfill material, labor, equipment, and tools needed are considered subsidiary to this item.
  - 5. The Contractor shall maintain positive drainage throughout construction and after the culvert is installed.

6. Contractor shall survey flowline of existing culvert prior to placement of proposed culvert to ensure proper drainage is maintained. Survey shall be considered subsidiary to this item.
  7. The Contractor shall construct culvert in sections in order to maintain street traffic and driveway access at all times throughout the duration of construction activities.
  8. Connection to existing structures including the concrete collar and grout shall be considered subsidiary to this item.
- C. The design of all pipes shall meet the d-load requirements for the class of pipe indicated on the Plans.
- D. When not specified, pipe joints shall be made with cold applied pipe joint sealer, per TxDOT Item 464 - Reinforced Concrete Pipe.

## **2.03 JOINTS FOR CONCRETE , BOX SECTIONS AND MANHOLES**

- A. Premium Joints:
1. Premium joints for circular pipe shall conform to ASTM C443 limited as follows: Section 5.1 of ASTM C443, "Physical Requirements for Gaskets," shall be replaced with Section 6.9 of ASTM C361, "Rubber Gaskets." Also, Section 5 of ASTM C443 shall be limited to a modified grooved tongue to receive a rubber gasket.
  2. Premium joints for elliptical pipe shall conform to ASTM C877, external sealing bands for non-circular concrete pipe.
    - a. The width of the sealing bands shall be at least equal to twice the depth of the groove. For modified bell tongue and groove pipe, use the next larger gasket.
    - b. The length of the sealing bands shall be equal to the outside circumference of the pipe at its largest diameter plus an amount equal to the width of the gasket to be used.
  3. Only lubricant, as supplied by the pipe manufacturer, shall be used on the groove and on the tongue in making up joints, and the joints shall be coupled in accordance with the pipe manufacturer's requirement.
- B. Preformed Flexible Joint Sealant:
1. Butyl Rubber Sealant complying with ASTM C990.
- C. The inside annular space of all concrete pipe 36-inch diameter (or equivalent) and larger shall have the inside annular space filled with cement mortar and troweled flush. Mortar shall consist of 1-part Portland cement and two (2) parts of plaster sand. Mortar for inside joints shall be mixed with only enough water for "dry packing."

## **2.04 DUAL WALL CORRUGATE POLYPROPYLENE PIPING**

- A. Dual Wall Corrugate Polypropylene Pipe shall have a smooth interior and annular exterior corrugations. Pipe 12 through 60-inch diameter shall meet the requirements of ASTM F2881/F2881M or AASHTO M 330.
- B. Polypropylene compound for pipe and fitting production shall be impact modified copolymer meeting the material requirements of ASTM F2881, Section 5 and AASHTO M 330, Section 6.1.
- C. Pipe shall be joined using a bell & spigot joint meeting the requirements of ASTM F2881/F2881M or AASHTO M 330. The joint shall be watertight according to the requirements of ASTM D3212.
- D. Gaskets shall meet the requirements of ASTM F477. Gasket shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A manufacturer approved joint lubricant shall be used on the gasket and bell during assembly.

E. Fittings

1. Fittings shall conform to ASTM F2881/F2881M or AASHTO M 330. Bell and spigot connections shall utilize a welded or integral bell and valley or inline gaskets meeting the watertight joint performance requirements of ASTM D3212.

**2.05 SAFETY END SECTIONS, WINGWALLS, AND HEADWALLS**

- A. Furnish, construct, and install safety end treatments for drainage structures, or install or replace pipe runners or pipe runner assemblies on existing drainage structures.
- B. Safety end treatments, wingwalls, and headwalls shall be in compliance with TxDOT Item 466 - Headwalls and Wingwalls, and TxDOT Item 467 - Safety End Treatment.
- C. For cast-in-place safety end treatments, the provisions of TxDOT Item 467 - Safety End Treatment" and Item 432 - Riprap, shall apply except as modified or clarified below:
  1. Refer to TxDOT Item 467 - Safety End Treatment and Item 432 - Riprap, for materials, and installation.
  2. Refer to details included in Plans for more information.
  3. The Contractor shall maintain positive drainage throughout construction and after culvert and end treatment are installed.
  4. Synthetic fibers listed on the "fibers for concrete" material producer list (MPL) may be used in lieu of steel reinforcing in riprap concrete, unless noted otherwise.
  5. Provide pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, GR B), ASTM A500 GR B, or API 5Lx52.
  6. Provide ASTM A307 bolts and nuts.
  7. Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.
  8. Payment for riprap and toe wall is included in the price bid for each safety end treatment.
  9. Construct concrete riprap and all necessary inverts in accordance with the requirements of TxDOT Item 432 - Riprap.

**2.06 STORM STRUCTURES**

- A. Materials for storm sewer structures shall conform to the requirements indicated on the Plans, TxDOT Item 465 - Junction Boxes, Manholes, and Inlets, and as specified below.
- B. Construct manhole in accordance with City of Keller Storm Drain Construction Details "Storm Drain Vault" (D-17) and "Ring and Cover Detail" (D-16). This item includes each manhole constructed at all depths and complete in place, including excavation, form work, concrete, reinforcing steel, and labor to perform Work. Concrete boxouts, frames, grates, rings, and covers are subsidiary to this Item.
- C. Unless shown on Plans, all manhole, water valve and cleanout concrete boxouts shall be maintained and protected during the paving operation. The will be responsible for replacing any boxout that is damaged, at no additional cost to the Owner.
- D. Precast Concrete (if applicable):
  1. Precast concrete manhole, flat top slabs, risers, cone, bases, grade rings, transition sections and bottom sections shall conform to ASTM C478/C478M, and shall be circular with circular reinforcement.
    - a. For depths greater than 32 feet, the manhole shall be designed for the earth loading at the design depth of bury with a factor of safety of 1.5.

2. Base slab shall be minimum 8 inches thick for depths up to 25 feet and minimum 12 inches thick for depths greater than 25 feet.
  3. Transition sections, reducers and flat top slabs shall be designed for the earth loading at the design depth of bury with a factor of safety of 1.5.
  4. Precast concrete manhole tee units shall conform to ASTM C76, Class IV and shall be circular with circular reinforcement. Shop Drawings shall be provided for all manhole tees.
  5. The joints on the precast manhole tee shall be the same as the joints on the storm sewer section.
- E. Frames and Covers:
1. Frames and covers for manholes, catch basins, and inlets shall conform to TxDOT Item 417 - Frames, Grates, Rings, and Covers, ASTM A48/A48M, Class 30, gray iron and shall be of the types and sizes as indicated on the Plans. The castings shall be neatly made and free from cracks, holes and other defects.
  2. Surfaces of casting shall be ground to assure proper fit and to prevent rocking.

## **EXECUTION**

### **3.01 GENERAL**

- A. All existing public utilities within the limits of replacement shown on the Plans with a surface feature including, but not limited to, water valve stacks and lids, manholes, water meters, vaults, etc. shall be located prior to construction, protected during construction, and adjusted to final grade, as necessary.
- B. All franchise utilities with a surface feature including, but not limited to, manholes, vaults, etc. shall be located prior to construction and protected during construction. Contractor shall contact franchise utility and the City if adjustment to final grade is necessary.
- C. This work shall be considered incidental to this pay item.

### **3.02 GROUNDWATER**

- A. Groundwater was encountered along South Treehouse Lane approximately seven (7) to eight (8) feet below existing grade (see Geotechnical Report for more information). All pumping and dewatering needed for excavation, removal of existing CMP and headwall, placing new RCP, backfill and embedment during construction is considered subsidiary to this item.

### **3.03 VERIFICATION OF EXCAVATION AND BEDDING**

- A. Prior to the installation of any storm sewer piping, structures, or materials, examine all trenches and other excavations for the proper grades, lines, levels and clearances required to receive the new Work.
- B. Ascertain that all excavation bottoms, compacted subgrades and pipe bedding are adequate to receive the storm sewer materials to be installed.
- C. Correct all defects and deficiencies before proceeding with the Work.

### **3.04 CLEANING EXISTING RCP**

- A. Use only the type of cleaning material which will not create hazards to health or property or affect the environment.
- B. General
  1. All materials, equipment, and personnel necessary to complete the cleaning of pipes and manholes must be present on the jobsite prior to isolating the manhole or line segment and beginning the cleaning process.

2. Maintain clean work and surrounding premises within the work limits so as to comply with Federal, State, and local environmental and anti-pollution laws, ordinances, codes, and regulations when cleaning and disposing of waste materials, debris, and rubbish.
3. Keep the work and surrounding premises within work limits free of accumulations of dirt, dust, waste materials, debris, and rubbish.
4. Suitable containers for storage of waste materials, debris, and rubbish shall be provided until time of disposal.
  - a. It is the sole responsibility of the Contractor to secure a licensed legal dump site for the disposal of this material.
  - b. Under no circumstances shall debris removed from the main or manhole be dumped onto streets or into ditches, catch basins, storm drains, or sanitary sewers.
5. The cleaning process shall remove all grease, sand, silts, solids, debris, etc. from each pipe segment, including the manhole(s).
6. Selection of cleaning equipment and the method for cleaning shall be based on the condition of the pipes at the time work commences and will be subject to approval by the Owner.
7. All cleaning equipment and devices shall be operated by experienced personnel.
8. Satisfactory precautions shall be taken to protect the pipes and manholes from damage that might be inflicted by the improper use of the cleaning process or equipment.
9. Any damages done to a pipe and/or structure by the Contractor shall be repaired by the Contractor at no additional cost and to the satisfaction of the Owner.
10. The Contractor may be required to demonstrate the performance capabilities of the cleaning equipment proposed for use on the project.
  - a. If the results obtained by the proposed pipe cleaning equipment are not satisfactory, the Contractor shall use different equipment and/or attachments, as required, to meet Owner satisfaction.
  - b. More than 1 type of equipment/attachments may be required at a location.
11. When hydraulic or high velocity cleaning equipment is used, a suitable sand trap, weir, dam, or suction shall be constructed in the downstream manhole in such a manner that all the solids and debris are trapped for removal.
12. Whenever hydraulically propelled cleaning tools which depend upon water pressure to provide their cleaning force, or any tool which retard the flow of water in the pipes are used, precautions shall be taken to ensure that the water pressure created does not cause any damage or flooding to public or private property being served by the manhole section involved.
13. Any damage of property, as a result of flooding, shall be the liability and responsibility of the Contractor.
14. When water from fire hydrants are necessary, the water shall be conserved and not used unnecessarily.
  - a. No fire hydrant shall be obstructed or used when there is a fire in the area.
  - b. It is the responsibility of the Contractor to obtain the fire hydrant, water meter and all related charges for the set-up, including the water usage bills from respective water purveyor agency.
  - c. All expenses shall be considered incidental to the cleaning of the existing pipes.

A. Methods

1. Hydraulic Cleaning

- a. Hydraulic-propelled devices which require a head of water to operate must utilize a collapsible dam.
- b. The dam must be easily collapsible to prevent damage to the pipe, property, etc.
- c. When using hydraulically propelled devices, precautions shall be taken to ensure that the water pressure created does not cause damage or flood public or private property.
- d. Do not increase the hydraulic gradient of the sewers beyond the elevation that could cause overflow of sewage into area waterways or laterals.

2. High-Velocity Cleaning

- a. Cleaning equipment that uses a high velocity water jet for removing debris shall be capable of producing a minimum volume of 50 gpm, with a pressure of 1,500 psi, for a pipe and 3,500 psi for the (manhole) structure at the pump.
  - 1) Any variations to this pumping rate must be approved, in advance, by the Owner.
  - 2) To prevent damage to older pipes and property, a pressure less than 1500 psi can be used.
  - 3) A working pressure gauge shall be used on the discharge of all high-pressure water pumps.
  - 4) For pipes 18 inches and larger in diameter, in addition to conventional nozzles, use a nozzle which directs the cleaning force to the bottom of the pipe.
  - 5) Operate the equipment so that the pressurized nozzle continues to move at all times.
  - 6) The pressurized nozzle shall be turned off or reduced anytime the hose is on hold or delayed in order to prevent damage to the line.

3. Mechanical Cleaning

- a. Mechanical cleaning, in addition to normal cleaning when required, shall be with approved equipment and accessories driven by power winching devices.
- b. Submit the equipment manufacturer's operational manual and guidelines to the Owner, which shall be followed strictly unless modified by the Owner.
- c. All equipment and devices shall be operated by experienced operators so that they do not damage the pipe in the process of cleaning.
- d. Buckets, scrapers, scooters, porcupines, kites, heavy duty brushes, and other debris-removing equipment/accessories shall be used as appropriate and necessary in the field, in conjunction with the approved power machines.
- e. The use of cleaning devices such as rods, metal pigs, porcupines, root saws, snakes, scooters, sewer balls, kites, and other approved equipment, in conjunction with hand winching device, and/or gas, electric rod propelled devices, shall be considered normal cleaning equipment.

**4.02 EXISTING STORM SEWERS AND DRAINS**

- A. Expose the existing storm sewer and structures to which the new Work is to be connected and notify the Owner of same. Owner will verify the vertical and horizontal locations of the existing system and shall inform the Contractor as to the necessary adjustments required to align the new storm sewer Work with the existing system.

#### **4.03 PREPARATION**

- A. The outside surface of the spigot end and the inside surface of the bell end of the pipe shall be cleaned and free of any foreign materials, other than the sealant recommended by the manufacturer, prior to installation.
- B. Pipe, frames, covers, accessories, and appurtenances shall be examined carefully for damage and other defects immediately prior to installation. Defective or damaged material shall be rejected and removed from the Project by the Contractor.

#### **4.04 INSTALLATION - GENERAL**

- A. Each section of pipe, when placed to grade and line, shall have firm bearing on the trench bedding throughout its length.
- B. Cutting of pipe shall be done with approved tools and by approved methods suitable for the pipe material. Pipe cutting methods that produce a smooth, square-cut end without damage to the pipe and that minimize air-borne particles, shall be employed.
  - 1. Pipe cutting shall be performed using the recommendations of the manufacturer of the type of the pipe materials being cut and according to the best trade practices.
  - 2. When cutting pipe, care shall be taken to prevent damage to the interior and exterior surfaces. Damage to either shall be cause for rejection of a complete section of pipe.
- C. During the preparation of the pipe bedding and until the trench has been satisfactorily backfilled, the trench shall be kept free of water. If necessary, the Contractor shall be provided and maintain dewatering operation at no additional cost to the Owner. The dewatering system shall remain in operation until the trench is backfilled.
- D. Backfill shall be as indicated on the Plans and as specified in Section 31 23 33 - Trenching and Backfilling

#### **4.05 PIPE BEDDING**

- A. After the bottom of trench has been excavated the pipe bedding material will be installed in accordance with Section 31 23 33 - Trenching and Backfilling. The pipe shall then be installed strictly in accordance with the manufacturer's recommendations.
- B. After the pipe is laid, the bedding shall be continued above the pipe as specified in Section 31 23 33 - Trenching and Backfilling. Particular care shall be taken to assure filling and tamping all spaces under, around and above the top of the pipe.
- C. A continuous and uniform bedding as specified in Section 31 23 33 - Trenching and Backfilling, shall be provided in the trench for all buried pipe.

#### **4.06 STORM STRUCTURES**

- A. Construct storm sewer manholes, catch basins, inlets and other structures to the grades, lines and levels indicated on the Plans and as specified. Structures shall be complete with concrete bases, reinforcing, frames, covers, adjustment rings, etc., as shown and as required for a complete installation.
- B. Forms will be required for all concrete walls. Outside wall forms for cast-in-place concrete may be omitted with approval if the surrounding material can be trimmed to a smooth vertical face.
- C. Excavate, shape, bed, and backfill in accordance with the City of Keller's Standards of lifts and compaction. Take precautions in placing and compacting the backfill to avoid any movement of the manholes. Remove and replace junction boxes damaged by the Contractor at no expense to the Owner.
- D. Place the bases or risers of manhole for box storm drains before or in conjunction with placement of the storm drain. Backfill the manhole and storm drain as a whole. Shape and route floor inverts passing out or through manhole as shown on the Plans. Shape by adding and

shaping mortar or concrete after the base is placed or by placing the required additional material with the base.

- E. Storm sewer structures shall conform to the type of material and dimensions indicated on the Plans.
- F. Precast Concrete Structures:
  - 1. Construct precast concrete structures as detailed on the Plans. Provide mortar joints struck smooth. Provide three (3) to five (5) courses of 8 inch grade rings at top of structure for future adjustment of castings.
- G. Provide and install all frames and covers to the elevations indicated on the Plans. Castings shall be set in a full bed of cement mortar 1/2 inch thick, minimum. Mortar joints shall be struck smooth.
- H. Steps shall be installed at the plant by the manufacturer of precast units. Field install steps for brick, block, or cast in place structures of the types and in the locations indicated on the Plans.
- I. Pipe up to 42 inches in diameter, shall be connected to storm structures using a grouted joint, as indicated on the Plans. The pipe shall be properly supported, so that any settlement will not disturb the connection.
- J. Sump shall be provided, as indicated on the Plans, in all catch basins and storm manholes having outlets of 18 inches in diameter or less.
- K. Flow channels shall be constructed in all structures not requiring a sump and shall be constructed as indicated on the Plans.

#### **4.07 FIELD QUALITY CONTROL**

- A. After all the pipe and structures have been laid, constructed and backfilled, the system shall be final inspected. The storm sewer system shall be ready for the final inspection within two (2) weeks after the completion of each 2,000 feet section of storm sewer installed.
- B. The final inspection shall consist of a visible and audible check of the sewers and structures to ascertain that all lift holes filled, the channeling of the manhole bottoms completed, all visible or audible leaks stopped, all pipe has been placed straight and true to the proper slopes and elevations, the required grade rings for adjustment have been placed, the frame and cover properly installed, the required end section installed, all trenches and structures backfilled in a workmanlike manner, and that the system has been thoroughly cleaned.
- C. The final inspection shall be considered complete when all the repairs have been made.

#### **4.08 REMOVE STORM SEWER**

- A. Excavate and remove the existing storm sewer where indicated on the Plans. Bulkhead the opening in storm sewers or structures where the existing storm sewer has been removed.
- B. Dispose of removed material off the right-of-way in accordance with Federal, State, and Local regulations.
- C. Where removal of existing storm sewer is occurring in essentially the same location as a new sewer or structure, the removal of the existing sewer is incidental to the project, unless otherwise indicated in the Proposal.

#### **4.09 REMOVE CULVERTS**

- A. Excavate and remove culverts where indicated on the Plans. Backfill the completed work as specified under Section 31 23 33 - Trenching and Backfilling.
  - 1. Dispose of removed material off the right-of-way in accordance with Federal, State, and Local regulations.

#### **4.10 REMOVE STRUCTURE**

- A. Excavate and remove structures where indicated on the Plans. Bulkhead the ends of any sewers remaining in place. Backfill the completed work as specified under Section 31 23 33 - Trenching and Backfilling.
- B. Dispose of removed material off the right-of-way in accordance with Federal, State, and Local regulations.
- C. Removal of existing storm structures is incidental to the project if a new structure or sewer is being constructed in essentially the same location, unless otherwise indicated in the Proposal.

#### **4.11 REMOVE AND REPLACE STORM SEWER**

- A. Remove and replace storm sewer shall consist of the complete removal and disposal of the existing sewer and replacement with the size and type of sewer as called for on the Plans or specified by the Owner.
  - 1. Dispose of removed material off the right-of-way in accordance with Federal, State, and Local regulations.
- B. The Contractor shall remove culvert in sections in order to maintain street traffic and driveway access at all times throughout the duration of construction activities.
- C. Materials and installation shall be in accordance with the requirements of this section and Section 31 23 33 - Trenching and Backfilling, as applicable.

#### **4.12 REMOVE AND REPLACE STORM STRUCTURE**

- A. Remove and replace storm structure shall consist of the complete removal and disposal of the existing structure and replacement with the size and type of structure as called for on the Plans or specified by the Owner.
  - 1. Dispose of removed material off the right-of-way in accordance with Federal, State, and Local regulations.
- B. Materials and installation shall be in accordance with the requirements of this section and Section 31 23 33 - Trenching and Backfilling, as applicable.

#### **4.13 TRENCH SAFETY & EXCAVATION PROTECTION**

- A. The provisions of TxDOT Item 402 - Trench Excavation Protection, shall apply except as modified or clarified below:
  - 1. In addition to personnel safety, the "Trench Safety Plan", developed by the Contractor, must provide for sheeting and shoring procedures capable of providing support of the trenches or boring pits, giving due consideration to the proximity of existing structures and other facilities along the proposed utility lines.
  - 2. The cost of trench dewatering, if required, shall be subsidiary to various storm items.

**END OF SECTION**



**2024 ANNUAL STREET MAINTENANCE PROJECT  
KELLER, TEXAS  
JULY 10, 2024**

**GEOTECHNICAL ENGINEERING REPORT**





July 10, 2024

Wade Trim  
Attn: Amanda T. Roddy, P.E.  
Phone: 682-291-9492  
Email: aroddy@wadetrim.com

**GEOTECHNICAL INVESTIGATION  
GEOTEX ENGINEERING #G23-2393  
2024 ANNUAL STREET MAINTENANCE PROJECT  
KELLER, TEXAS**

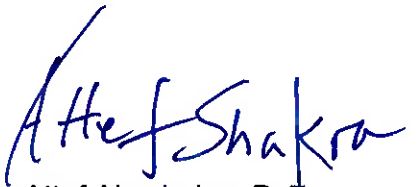
Ms. Roddy,

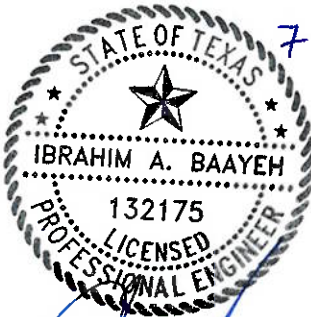
As requested, Geotex Engineering, LLC has completed the Geotechnical Investigation for the above referenced project. This investigation was conducted in accordance with Proposal No. GP23-2393 dated December 15, 2023. Authorization to proceed was received on May 13, 2024.

We appreciate the opportunity to provide professional geotechnical engineering services to you. We are available to discuss any questions which may arise regarding this report. Please do not hesitate to call when we can provide any additional services.

Sincerely,

Geotex Engineering, LLC

  
Attef Abushakra, P. E.  
Senior Geotechnical Engineer

 7-10-2024  
  
Ibrahim A. Baayeh, P. E.  
Director of Geotechnical Engineering

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**APPENDIX A – BORING LOGS AND SUPPORTING DATA**

**APPENDIX B – GENERAL DESCRIPTION OF PROCEDURES**

# GEOTECHNICAL INVESTIGATION 2024 ANNUAL STREET MAINTENANCE PROJECT KELLER, TEXAS

## 1.0 PROJECT DESCRIPTION

This report presents the results of the geotechnical investigation conducted for the planned pavement reconstruction of the City of Keller's 2024 Street Maintenance project. The project corridor encompasses a total of approximately 23,100 linear feet of existing streets, which generally consists of asphalt pavement in various conditions of serviceability. Concrete pavement was found at Boring P14-2 location. We understand that the streets will undergo street rehabilitation by full depth reconstruction or mill and overlay.

One option for the reconstruction consists of Reclaimed Asphalt Pavement (RAP) beneath a surface layer of Hot Mixed Asphaltic Concrete (HMAC). The reclaimed material should be a uniform mixture of pulverized existing asphalt surfacing and underlying base and be treated with cement or cem-lime to provide the new pavement subgrade within the roadway. However, consideration may also be given to using Cement Treated RAP with Staged HMAC Overlay. Both of these alternatives will be included in this report.

The subject streets are presented in Table 1 below:

**Table 1: Street Names, Locations and Lengths**

| Street Name                     | Starting         | Ending               | Street Rehabilitation Activity | Approx. Length (ft) |
|---------------------------------|------------------|----------------------|--------------------------------|---------------------|
| Indian Blanket Drive            | Overleaf Street  | Rufe Snow Drive      | Full-Depth Reconstruction      | 1,000               |
| N. Meadow Circle                | Pate Orr Road    | Indian Blanket Drive | Full-Depth Reconstruction      | 1,100               |
| S. Meadow Circle                | Overleaf Street  | Indian Blanket Drive | Full-Depth Reconstruction      | 800                 |
| Overleaf Street                 | S. Meadow Circle | Indian Blanket Drive | Full-Depth Reconstruction      | 200                 |
| Chandler Road                   | Johnson Road     | Keller Parkway       | Full-Depth Reconstruction      | 2,600               |
| Ledara Drive                    | Rhonda Road      | Edge of Pavement     | Full-Depth Reconstruction      | 2,000               |
| Dana Lane                       | Johnson Road     | Ledara Drive         | Full-Depth Reconstruction      | 2,700               |
| Rhonda Road                     | Johnson Road     | Dana Lane            | Full-Depth Reconstruction      | 1,200               |
| Valle Vista Court               | Edge of Pavement | Valle Vista Lane     | Full-Depth Reconstruction      | 900                 |
| Valle Vista Lane                | Bancroft Road    | Edge of Pavement     | Full-Depth Reconstruction      | 1,100               |
| Shady Oak Drive                 | Oak Valley Drive | Pheasant Ridge       | Full-Depth Reconstruction      | 700                 |
| Country Hill Drive              | Oak Valley Drive | Shady Oak Lane       | Full-Depth Reconstruction      | 700                 |
| N. Meadow Circle <sup>(1)</sup> | Pate Orr Road    | Overleaf Street      | Mill & Overlay                 | 200                 |

| Street Name          | Starting             | Ending                         | Street Rehabilitation Activity | Approx. Length (ft) |
|----------------------|----------------------|--------------------------------|--------------------------------|---------------------|
| Overleaf Street      | Indian Blanket Drive | N. Meadow Circle               | Mill & Overlay                 | 300                 |
| E & W Wimpole Court  | Edge of Pavement     | Edge of Pavement               | Mill & Overlay                 | 1,000               |
| Wessex Court         | Wessex Road          | Edge of Pavement               | Mill & Overlay                 | 200                 |
| Wessex Road          | Windsor Forest Trail | E. Wimpole Court               | Mill & Overlay                 | 1,000               |
| Westminster Trail    | Windsor Forest Trail | E. Wimpole Court               | Mill & Overlay                 | 1,400               |
| Wiltshire Court      | Westminster Trail    | Edge of Pavement               | Mill & Overlay                 | 300                 |
| Windsor Forest Trail | Florence Road        | Spanish Trail/Edge of Pavement | Mill & Overlay                 | 3,700               |

1 - One (1) boring shared with other proposed section

## 2.0 PURPOSE AND SCOPE

The purpose of this investigation was to:

- Identify the subsurface stratigraphy and groundwater conditions present at the site.
- Evaluate the physical and engineering properties of the subsurface soil and bedrock strata for use in geotechnical analyses.
- Provide geotechnical recommendations for use in the design and construction of the proposed pavement improvements.

The scope of this investigation consisted of:

- Drilling and sampling of a total of forty-eight (48) soil borings to depths of about 6 to 10 feet.
- Laboratory testing of selected soil and bedrock samples obtained during field investigation.
- Preparation of a Geotechnical Report that includes:
  - Evaluation of Potential Vertical Movement (PVM)
  - Recommendations for pavement and pavement subgrade preparation.

## 3.0 FIELD AND LABORATORY INVESTIGATION

### 3.1 General

The borings were advanced utilizing truck-mounted drilling equipment outfitted with continuous flight augers. Undisturbed samples of cohesive soils strata were obtained using 3-inch diameter tube samplers, which were advanced into the soils in 1-to 2-foot increments by the continuous thrust of a hydraulic ram located on the drilling equipment.

After sample extrusion, a hand penetrometer measurement was performed on each cohesive soil to provide an estimate of soil stiffness.

All samples obtained were placed in plastic bags to minimize changes in the natural moisture condition, labeled according to the appropriate boring number and depth, and placed in protective cardboard boxes for transportation to the laboratory. The approximate locations of the borings performed at the site are shown on the boring location map that is included in Appendix A. The specific depths, thicknesses, and descriptions of the strata encountered are presented on the individual Boring Log illustrations, which are also included in Appendix A. Strata boundaries shown on the boring logs are approximate.

### 3.2 Laboratory Testing

Laboratory tests were performed to identify the relevant engineering characteristics of the subsurface materials encountered and to provide data for developing engineering design parameters. The subsurface materials recovered during the field exploration were initially logged in the field by the drill crew and were later described by a Staff Engineer after the samples arrived in the laboratory. These descriptions were later refined by a Geotechnical Engineer based on results of the laboratory tests performed. All recovered soil samples were classified and described in part using the Unified Soil Classification System (USCS) and other accepted procedures.

In order to determine soil characteristics and to aid in classifying the soils, classification testing was performed on selected samples as requested by the Geotechnical Engineer. Classification testing was performed in general accordance with the following ASTM testing standards:

- Moisture Content ASTM D2216
- Atterberg Limits ASTM D4318
- Percent of Particles Finer than No. 200 Sieve ASTM D1140

Additional tests were performed to aid in evaluating the chemical characteristics, which consisted of the following:

- Overburden Swell Tests ASTM D4546
- Soluble Sulfates TEX-145-E

The results of these tests are presented at the corresponding sample depths on the appropriate Boring Log illustrations. The classification tests are described in more detail in Appendix B (General Description of Procedures).

#### 3.2.1 Overburden Swell Tests

Selected samples of the near-surface cohesive soils were subjected to overburden swell tests. For this test, a sample is placed in a consolidometer and is subjected to the estimated in-situ overburden pressure. The sample is then inundated with water and allowed to swell. Moisture contents are determined both before and after

completion of the test. Test results are recorded as the percent swell, with initial and final moisture content.

### **3.2.2 Soluble Sulfates**

Soluble sulfate tests were performed on representative samples obtained. These results are provided in Appendix A (Boring Logs and Supporting Data). Subgrade materials in some areas of Texas have experienced sulfate-induced heave treatment with calcium-based additives such as lime. In general, a sulfate level less than 3,000 ppm is considered to have an acceptably low potential for sulfate induced heaving. The result of the sulfate test performed on a representative near-surface soil sample from test boring in this study indicate value of about 100 to 1,274 ppm, and thus should be considered to pose a low of sulfate-induced heaving after lime treatment. However, additional sulfate testing is recommended to be performed prior to construction for the subgrade to receive lime treatment.

## **4.0 SITE CONDITIONS**

### **4.1 Stratigraphy**

Based upon a review of the recovered samples, as well as the Geologic Atlas of Texas, Dallas Sheet, this site is in an area characterized by soil and bedrock strata associated with the Woodbine Formation and the Grayson Marl and Main Street Limestone, undivided. Some intermixing of the two geological formations should be expected along the alignments.

The Woodbine Formation is considered to have formed in a deltaic depositional environment, and as a result, it is highly variable in composition, both laterally and vertically. This formation is typically composed of overburden sand and clay soils overlying shale and sandstone bedrock. Dense and irregular shaped masses ("erratics") of very hard well cemented sandstone and concretions occur at random throughout the formation where often coring equipment is needed to penetrate the very hard sandstone. All parties should have contingency plans in place in the event such hard materials are encountered during construction.

The Grayson Marl and Main Street Limestone, undivided formations are typically composed of overburden clay soils overlying interbedded limestone and shale bedrock.

Asphalt pavements were present at the ground surface within the borings with the exception of P14-2, which had concrete pavements beneath the asphalt pavement. The asphalt pavement had thicknesses of about 0.5 to 7 inches and the concrete having a thickness of about 10 inches. The base materials encountered ranged in thicknesses from about 0 to 10 inches.

**Table 2a: Pavement Section for Full Depth Reconstruction Borings**

| Street Name          | Boring No. | Thickness (inches) |      | Street Name        | Boring No. | Thickness (inches) |      |
|----------------------|------------|--------------------|------|--------------------|------------|--------------------|------|
|                      |            | Asphalt            | Base |                    |            | Asphalt            | Base |
| Indian Blanket Drive | P1-1       | 2.25               | 9.75 | Dana Lane          | P7-1       | 2.0                | 6.0  |
|                      | P1-2       | 5.5                | 6.5  |                    | P7-2       | 2.0                | 8.0  |
| N. Meadow Circle     | P2-1       | 7.0                | NE   |                    | P7-3       | 2.0                | 7.0  |
|                      | P2-2       | 7.0                | NE   |                    | P7-4       | 4.5                | NE   |
| S. Meadow Circle     | P3-1       | 7.0                | 4.0  |                    | P7-5       | 3.0                | 4.0  |
|                      | P3-2       | 6.5                | NE   | Rhonda Road        | P8-1       | 2.0                | NE   |
| Overleaf Street      | P4-1       | 7.0                | 4.0  |                    | P8-2       | 2.5                | 5.0  |
| Chandler Road        | P5-1       | 4.0                | 2.0  | Valle Vista Court  | P9-1       | 2.0                | NE   |
|                      | P5-2       | 3.0                | 3.0  | Valle Vista Lane   | P9-2       | 2.0                | NE   |
|                      | P5-3       | 1.5                | NE   |                    | P10-1      | 6.0                | NE   |
|                      | P5-4       | 2.0                | NE   | Shady Oak Drive    | P10-2      | 2.0                | NE   |
|                      | P5-5       | 2.25               | NE   |                    | P11-1      | 4.5                | NE   |
| Ledara Drive         | P6-1       | 1.5                | 5.0  | Country Hill Drive | P11-2      | 5.0                | NE   |
|                      | P6-2       | 2.5                | NE   |                    | P12-1      | 5.0                | NE   |
|                      | P6-3       | 1.25               | NE   |                    | P12-2      | 4.75               | NE   |
|                      | P6-4       | 1.5                | NE   |                    |            |                    |      |

**Table 2b: Pavement Section for Mill & Overlay Borings**

| Street Name         | Boring No. | Thickness (inches)    |      | Street Name          | Boring No. | Thickness (inches) |      |
|---------------------|------------|-----------------------|------|----------------------|------------|--------------------|------|
|                     |            | Asphalt               | Base |                      |            | Asphalt            | Base |
| N. Meadow Circle    | P13-1      | 7.25                  | NE   | Wiltshire Court      | P18-1      | 6.75               | NE   |
| E & W Wimpole Court | P14-1      | 6.75                  | NE   | Windsor Forest Trail | P19-1      | 7.0                | NE   |
|                     | P14-2      | 0.5 on top of 10" PCC | 4.0  |                      | P19-2      | 5.25               | NE   |
| Wessex Court        | P15-1      | 6.5                   | 4.0  |                      | P19-3      | 6.75               | NE   |
| Wessex Road         | P16-1      | 7.0                   | 4.0  |                      | P19-4      | 6.0                | NE   |
|                     | P16-2      | 6.5                   | 4.0  |                      | P19-5      | 6.25               | NE   |
| Westminister Trail  | P17-1      | 6.5                   | NE   |                      | P19-6      | 6.75               | NE   |
|                     | P17-2      | 6.5                   | NE   |                      | P19-7      | 7.0                | NE   |
|                     | P17-3      | 6.75                  | NE   |                      |            |                    |      |

Fill material generally consisting of clay and sandy soils with varying amounts of gravel. The fill soils present within the borings are generally very soft to hard in consistency for the clays and very loose to medium dense in condition for the sands. It should be noted that it is sometimes difficult to differentiate between undisturbed native soils and native fill soils particularly when the materials are sandy.

Beneath the fill material, clay and sandy soils were encountered. The clay soils are generally stiff to very stiff in consistency and the sandy soils are generally loose to very dense in condition, are various shades of brown, reddish brown, reddish tan in color and contain varying amounts of calcareous nodules, ferrous nodules, iron oxide stains, and

cemented sand fragments. The soils extended to depths of about 5 feet in boring P6-4 and to the maximum depths explored in the remaining borings.

## 4.2 Groundwater

Groundwater seepage was encountered at depths ranging from 6 to 9 feet during and upon completion of drilling activities in Borings P14-1, P15-1, P16-1, and P16-2. In the remaining borings, groundwater seepage was not encountered within the borings performed for this study during drilling activities and was observed dry upon completion of drilling operations. Groundwater levels may be anticipated to fluctuate with seasonal and annual variations in rainfall, and also may vary as a result of development and landscape irrigation.

## 5.0 ENGINEERING ANALYSIS

### 5.1 Estimated Potential Vertical Movement (PVM)

Potential Vertical Movement (PVM) was evaluated utilizing different methods for predicting movement, as described in Appendix B, and based on our experience and professional opinion. At the time of our field investigation, the overburden soils were generally found to be dry to wet in moisture condition. Based upon the results of our analysis, the estimated PVM for the various roadways are presented in Table 3 below. Estimated PVM was based at the soil moisture conditions existing at the time of the field investigation.

**Table 3: Streets Estimated PVM**

| Street Name          | Borings                         | Estimated PVR (inches) |
|----------------------|---------------------------------|------------------------|
| Meadow Circle N      | P2-1 and P2-2                   | 1.5                    |
| Meadow Circle S      | P3-1 and P3-2                   |                        |
| Indian Blanket Drive | P1-1 and P1-2                   |                        |
| Overleaf Dr.         | P13-1 and P4-1                  |                        |
| Valle Vista Ct       | P9-1 and P9-2                   | 1.0                    |
| Valle Vista Ln       | P10-1 and P10-2                 |                        |
| Windsor Forest Trail | P19-1 through P19-7             | 1.0                    |
| Wessex Road          | P16-1 and P16-2                 |                        |
| Wessex Ct            | P15-1                           |                        |
| Wimpole Ct           | P14-1 and P14-2                 |                        |
| Westminster Trail    | P17-1, P17-2 and P17-3          |                        |
| Wiltshire Court      | P18-1                           |                        |
| Dana Dr              | P7-1, P7-2, P7-3, P7-4 and P7-5 | 4.5                    |
| Ledara Dr            | P-6-1, P-6-2, P-6-3 and P-6-4   |                        |
| Rhonda Road          | P8-1 and P8-2                   |                        |
| Chandler Rd          | P5-1, P5-2, P5-3, P5-4 and P5-5 |                        |
| Shady Oak Dr         | P11-1 and P-11-2                | 4.0                    |
| Country Hill Dr      | P12-1 and P12-2                 |                        |

If the near surface soils are allowed to dry appreciably to significant depth prior to or during construction, the potential for post-construction vertical movement may increase. Please note that dry, average, and wet are relative terms based on moisture content and plasticity.

## **5.2 Existing Fill**

Fill material generally consisting of clay and sandy soils with varying amounts of gravel were present beneath the pavement in some of the borings to depths ranging between 1 and 2 feet. For concrete pavements, traffic loads are distributed over a large area whereas for asphalt pavements traffic loads are more concentrated. As a result, the zone of influence, or bulb of pressure, for concrete pavements for primarily automobile traffic extends approximately 1 foot below the top of pavement while the zone of influence for asphalt pavements extends to about 2 feet.

The fill soils present within the borings are generally very soft to stiff in consistency for the clays and loose to medium dense in condition for the sands. Based on field and laboratory testing we believe the existing fill was placed satisfactorily and maybe left in place but subject to proof rolling.

## **6.0 PAVEMENT RECOMMENDATIONS**

### **6.1 General**

The pavement subgrade recommendations provided herein are derived from the subgrade information that was obtained from our geotechnical investigation, design assumptions based on project information, our experience with similar projects in this area and on the guidelines and recommendations of the American Concrete Pavement Association (ACPA). It is ultimately the responsibility of the Civil Engineer of Record and/or other design professionals who are responsible for pavement design to provide the final pavement design and associated specifications for this project.

### **6.2 Behavior Characteristics of Expansive Soils Beneath Pavement**

Near-surface soils at this site are considered to have low to moderate potential for volume change with changes in soil moisture content. The moisture content can be stabilized to some degree in these soils by covering them with an impermeable surface, such as pavement. However, if moisture is introduced as a result of surface water percolation or poor drainage, the soils can heave and/or soften, causing distress to pavements in contact with the soil in the form of cracks.

The edges of pavement are particularly prone to moisture variations, and as a result, these areas often experience the most distress. When cracks appear on the surface of the pavement, these openings can allow moisture to enter the pavement subgrade, which can lead to further weakening of the pavement section as well as accelerated failure of the pavement surface.

In order to minimize the potential impacts of expansive soil on paved areas and to improve the long-term performance of the pavement, we have the following recommendations:

- Subgrade treatments should be extended beyond the back of curbs or edges of pavements.
- Avoid long areas of low-sloping roadway and adjust adjacent slopes to provide maximum drainage away from pavement edges.

### **6.3 Pavement Subgrade Preparation Recommendations**

The anticipated subgrade soils in the proposed paving areas will generally consist of fat clay, lean clay, silty lean clay, clayey sand and sand soils. It is common for these soils to pump when subjected to high levels of moisture. In addition, these soils located at and near the ground surface will allow surface water to infiltrate until the water becomes perched on a less permeable layer. A commonly used method to reduce the potential for pumping, improve the strength properties of the subgrade soils, provide a working platform, and provide a uniform subgrade in this area is to treat the soils with lime or cement or install an aggregate base layer. The following recommendations discuss general earthwork recommendations for pavement subgrade areas as well as the installation of an aggregate base layer.

#### **6.3.1 Soil Preparation for New Pavements**

- Remove all asphalt pavement and aggregate base and stockpile for reuse as grade raise fill and cement treated RAP. We anticipate typical stripping depth of about 2 to 11 inches for the asphalt and base. Alternatively, the existing pavement and aggregate base can be milled and treated in-place. In areas experiencing alligator cracking, pumping and/or are in relatively poor condition, we recommend the removal of the existing pavement and reworking the subgrade as described below.
- Perform any cut operations as needed. We anticipate that excavation of overburden soils can be accomplished with conventional earthwork equipment and methods.
- After stripping and performing necessary cuts, the exposed subgrade should be proof rolled. Proof rolling should consist of rolling the entire pavement subgrade in mutually perpendicular directions with a heavily-loaded, tandem-axle dump truck weighing at least 25 tons or other approved equipment capable of applying similar loading conditions. Any soft, wet or weak soils that are observed to rut or pump excessively during proof rolling should be removed and replaced with well-compacted, on-site clayey material as outlined below. The proof rolling operation should be performed under the observation of a qualified geotechnical engineer.

- After proof rolling, all exposed surfaces should be scarified and reworked to a depth of 12 inches. The soils should then be recompacted to a minimum of 95 percent of the maximum dry density obtained in accordance with ASTM D698 (standard Proctor), and to a moisture content that is at or above the material's optimum moisture content, as determined by the same test.
- In areas to receive fill, fill may be derived from on-site or may be imported. The fill should be placed in maximum 6-inch compacted lifts, compacted to at least 95 percent of the maximum dry density, as determined by ASTM D698 (standard Proctor), and placed at a moisture content that is at least the optimum moisture content, as determined by the same test ( $\geq +0\%$ ). Fill materials may be obtained from on-site or may be imported as long as the materials are essentially free of organic materials and particles in excess of 4-inches their maximum dimension. Fill materials should have no less than 35 percent material passing a No. 200 mesh sieve and a Plasticity Index of no more than 30.
- Water required to bring the fill material to the proper moisture content should be applied evenly through each layer. Any layers that become significantly altered by weather conditions should be reprocessed in order to meet recommended requirements. On hot or windy days, the use of water spraying methods may be required in order to keep each lift moist prior to placement of the subsequent lift. Furthermore, the subsurface soils should be kept moist prior to placing the pavement by water sprinkling or spraying methods.
- Fill materials should be placed on a properly prepared subgrade as outlined above. The combined excavation, placement, and spreading operation should be performed in such a manner as to obtain blending of the material, and to assure that, once compacted, the materials, will have the most practicable degree of compaction and stability. Materials obtained on-site must be mixed and not segregated.
- Soil imported from off-site sources should be tested for compliance with the recommendations herein and approved by the project geotechnical engineer prior to being used as fill. Imported materials should consist of lean clays (maximum Plasticity Index of 30) that are essentially free of organic materials and particles larger than 4 inches in their maximum dimension.
- Water should not be allowed to pond within or adjacent to the pavement corridor once grading and compaction/testing have begun, particularly once aggregate base is placed. To that end, the pavement subgrade

surface should be shaped in a way that will allow water to shed from one or more edges of the prepared subgrade

- Field density and moisture content testing should be performed at the rate of one (1) test every 5,000 square feet.

### **6.3.2 Lime Treatment**

It is our understanding that that road way at borings P1-1, P1-2, P2-1, P2-2, P3-1, P3-2, P4-1, P5-1 through P5-5, P6-1 through P6-4, P7-1 through P7-5, P8-1, P8-2, P9-1, P9-2, P-10-1, P10-2, P11-1, P11-2, P12-1 and P12-2 will require a reconstruction to the full depth at these streets. The top surface asphalt HMAC and the asphalt base may be removed and disposed or maybe be reused. Lime treatment should will be performed per procedures below:

- After completion of proof rolling and proper placement of any grade raise fills, mix lime slurry into the prepared subgrade soil after scarifying to a depth of at least 8 inches. Treat the prepared subgrade in accordance with TxDOT Item 260 to the elevations shown on the plans using an estimated seven (7) percent hydrated lime by dry weight measure (about 42 pounds of lime per square yard of treated area per 8-inch thickness) of the subgrade soil. However, the final amount of lime used should be determined once subgrade preparation is nearly complete. The amount of lime used should be sufficient to reduce the Plasticity Index of the soil to 15 or below (Atterberg Lime series) or to increase pH of the soil-lime mixture to 12.4 (pH series). To account for error, an additional 1 to 2 percent lime should be added to these test quantities.
- The hydrated lime should be applied only in an area where the initial mixing operations can be completed the same working day. The area of lime treated subgrade should extend a minimum of 2 feet or the minimum required by the City/County if more stringent, beyond the back of roadway curbs or edges.
- The material and hydrated lime should be thoroughly mixed to obtain a homogeneous, friable mixture free of clods or lumps larger than about the size of a golf ball. After initial mixing, roll the mixed material with a suitable type and size of equipment to somewhat "seal-in" moisture and to minimize moisture loss. The rolled subgrade should be left to cure for one to four days. During the curing period, the material should be kept moist. To that end, in no case should the subgrade surface be allowed to dry for more than 12 hours between instances of surface moistening/wetting.
- After the curing period, the subgrade should be thoroughly re-mixed to a depth of 6 to 8 inches until the following gradational characteristics are

achieved (after the removal of non-slaking particles such as concrete and/or asphalt fragments):

- Minimum passing 1 $\frac{3}{4}$ " sieve: 100%
- Minimum passing No. 4 sieve: 60%
- After achieving the required gradation, the treated soil-lime mixture should then be immediately compacted to at least 95 percent of the maximum dry density, as determined by ASTM D698 (standard Proctor), and placed at a moisture content that is above the optimum moisture content, as determined by the same test.
- Each lift of fill should be tested for moisture content and degree of compaction by a testing laboratory at a minimum rate of one test per 5,000 square feet per lift for parking lots, and one test per 100 linear feet per lift within roadways and drives. Geotex would be pleased to provide these services in support of this project.

### **6.3.3 Recycled Existing Pavement Section (Cement Treated RAP)**

As an alternative to the use of lime stabilization, cem-lime or cement treated RAP can be used. The preparation of the cement treated RAP should follow the recommendations provided herein.

- Remove all asphalt pavement and aggregate base and stockpile for re-use as grade raise fill and cement treated RAP. We anticipate a typical stripping depth of about 8 to 12 inches for the asphalt and base. Alternatively, the existing asphalt pavement and aggregate base can be milled and treated in-place. Any distressed, weak and pumping section of the roadway subgrade should be excavated and reworked or replaced prior to the placement of RAP.
- We recommend that the existing asphalt pavements and base materials be placed on top of the compacted subgrade with a 10% layer of fresh aggregate base and mixed and pulverized, with an estimated five (5) percent cement. The actual percentage to be used should be sufficient to achieve a 7-day cured unconfined compressive strength of 100 pounds per square inch.
- Cement should be applied such that mixing operations can be completed during the same working day.
- The cement may be placed by the slurry method (meaning that the cement should be mixed with water in trucks or in tanks and applied as a thin water suspension or slurry).

- After mixing, the RAP-cement mixture should be tested for sufficient pulverization and mixing in accordance with TxDOT Item 275. The material shall meet the following requirements when tested dry by laboratory sieves:
  - Minimum passing 1¾" sieve: 100%
  - Minimum passing ¾" sieve: 85%
  - Minimum passing No. 4 sieve: 60%
- After sufficiently re-mixed, the RAP and cement mixture should be compacted to a minimum of 98% of Standard Proctor (ASTM D698) and to a moisture content that is within two percent of optimum moisture ( $\pm 2\%$ ), as determined by the same test. Compaction should be completed within 2 hours after the application of water to the mixture of soil and cement.
- Cure for at least 3 days by "sprinkling" as described in TxDOT Item 204.
- In order to reduce the potential for reflective cracking up through the asphalt pavement, the cement treated subgrade should be rolled with a vibratory roller 1 to 2 days after final compaction to create a network of hairline cracks (microcracking). Cure for at least 2 days by "sprinkling" as described in TxDOT Item 204 after completion of microcracking.
- Field density testing should be performed within all paved areas at the rate of one field density test for each 100 feet. These tests are necessary to determine if the recommended moisture and compaction requirements have been attained.

#### **6.4 Cem-Lime Stabilization**

Cem-Lime is a proprietary cementitious slurry manufactured by Martin Marietta that is offered as an alternative to utilizing cement in a treated pulverized road base material. The quantity, placement, and project specifications for the application of Cem-Lime should follow recommendations provided by Martin Marietta, including Specifications for Cem-Lime Treatment of Pavement Subgrade, provided by Landtec Engineers, LLC published June 7, 2011. We have assumed a layer coefficient of 0.2 for the Cem-Lime treated RAP.

#### **6.5 Pavement Design Recommendations**

Specific axle loading and traffic volume characteristics have not been provided at this time. For the purposes of this design, we have used NCTCOG and TxDOT data to determine Average Daily Traffic (ADT) of the road. After reviewing available nearby traffic counts for the subject streets, no traffic counts were available. WinPAS 12 software recommends ADT for residential roads ranging from 50 to 800 and collectors from 700 to 5,000 and 3,000 to 50,000 for arterials. We have concentrated our pavement recommendations based on an ADT of 650. The following assumptions have been made in the calculation of traffic loading:

- Design Life: 10, 20 years
- Average Daily Traffic (ADT): 650
- Equivalent Single Axle Loads (ESAL's); 110,407 (10yrs), 244,953 (20yrs)
- Directional Distribution Factor: 50%
- Design Lane Factor: 100%
- Growth Rate: 2.0%
- Percent Trucks: 5.0%
- Truck Factor (ESALs/Truck): 1.7

In determination of thickness of asphalt and treated subgrade we used WinPAS 12 software, and the following assumptions were made.

- Reliability: 85%
- Overall Standard Deviation: 0.45
- Subgrade Resilient Modulus; 4,100 psi
- Drainage Coefficient: 1.0
- Initial Serviceability: 4.2
- Layer coefficient, Asphalt Cement Concrete: 0.44
- Layer coefficient, Cement Treated RAP: 0.20

Please contact this office if significant deviations from the assumptions above are anticipated.

Minimizing subgrade saturation is an important factor in maintaining subgrade strength. Water should not be allowed to pond on or adjacent to the pavement that could be saturate the pavement surfaces be sloped to provide rapid surface drainage. Positive surface drainage away from the edge of the paved areas should be maintained.

## **6.6 Flexible Pavement Design and Recommendations**

For this project, hot mix asphaltic concrete (HMAC) pavement should conform to current TxDOT or NCTCOG standards.

### **6.6.1 Full Depth HMAC**

We understand that the preferred asphalt thicknesses for the subject roadways are 3 to 4 inches thick. For this option we recommend Type C or D surface course over a minimum of 8 inches of cement treated RAP, or lime treated subgrade or, cem-lime treated subgrade.

For a 20-year design life, we recommend at least 2 inches of Type C or D surface course over 4 inches of Type B base course as specified by TxDOT, or the

minimums required by the City/County if more stringent. The full-depth asphalt should be placed over a minimum of 6 inches of cement treated RAP, lime treated subgrade or cem-lime treated RAP or subgrade.

Pavements should include a regular maintenance schedule to identify and seal cracks that may develop in the pavement surface to prevent water passing through the asphalt to the base or subgrade materials.

#### **6.6.2 HMAC Installation and Testing**

The following is recommended for HMAC:

- HMAC should be placed and compacted to contain between 5 and 9 percent of air voids.
- The target density for asphalt lifts should be 91 to 95 percent of the Maximum Theoretical Specific Gravity as determined by laboratory testing.

The following tests should be performed:

- In place field density tests to establish a rolling pattern.
- One extraction and gradation test per day's HMAC placement.
- Two cores to verify thickness and density per 5,000 feet of road placed.

#### **6.7 Mill and Overlay**

We understand that mill and overlay is proposed at boring locations P13-1, P14-1, P14-2, P15-1, P16-1, P16-2, P17-1 through P17-3, P18-1 and P19-1 through P19-7. The existing pavement in these areas appeared to be in relatively good condition. The existing asphalt in those areas had thicknesses ranging from 0.5 to 7.25 inches and was underlain by 4 inches of aggregate base. We recommend milling to 2-inch depth and overlaying with a minimum 3-inch thick asphalt. In areas experiencing alligator cracking, pumping and/or are in relatively poor condition, we recommend the removal of the existing pavement and reworking the subgrade as described under section 6.3.1 of the report.

#### **6.8 Alternative Pavement Section – Cem-Lime Treated RAP with Staged Chip Seal and/or HMAC Overlay**

The following construction procedure alternatives can be considered in the interests of phasing and project economy.

- Mill up to 2 inches of the existing pavement surface, depending upon the thickness of the existing asphalt structure.
- After milling and performing necessary cuts, the exposed subgrade should be proof rolled. Proof rolling should consist of rolling the entire pavement subgrade in mutually perpendicular directions with a heavily-loaded, tandem-axle dump truck weighing at least 25 tons or other approved equipment

capable of applying similar loading conditions. Any soft, wet or weak soils that are observed to rut more than about 1/2-inch or pump excessively (exhibiting “waving” action) during proof rolling should be removed and replaced with well-compacted, on-site clayey material or allowed to dry as outlined below. The proof rolling operation should be performed under the observation of a qualified geotechnical engineer. Geotex would welcome the opportunity to perform these services for this project.

- Pulverize the upper 8 inches of the remaining roadbed (either asphalt, aggregate base, or clays) and mix in 5% Cem-Lime.
- Overlay the Cem-Lime treated subgrade with either a double chip seal surface treatment, or 3-inches of HMAC. Chip seals and HMAC should be designed and constructed in general accordance with the recommendations provided in section 6.6.2 and 6.5 of this report, respectively.
- If a double chip seal will be applied to the Cem-Lime stabilized base, mill and remove the chip seal about 1 year following the original application (see Table 4 below) and overlay with 4 inches of HMAC. This staged construction approach is estimated to result in a design life of 10 years (see Table 5 below).

**Table 4: Estimated Design Life of Double Chip Seal over 8” Cem-Lime Treated RAP**

| Road             | Design Life (Years) |
|------------------|---------------------|
| Various Roadways | <1                  |

**Table 5: Estimated Design Life of 3” HMAC over 8” Cem-Lime Treated RAP**

| Road             | Design Life (Years) |
|------------------|---------------------|
| Various Roadways | 10                  |

- If HMAC will be utilized initially in lieu of the double chip seal surface treatment, mill the upper 1 inch of the existing asphalt pavement about 10 years after the initial construction and overlay with 3 inches of HMAC. This staged construction approach is estimated to result in a design life of 20+ years from the initial construction (see Table 6 below).

**Table 6: Estimated Design Life of 4” HMAC,  
Mill 1” after 10 Years and overlay with 3” HMAC over 8” Cem-Lime Treated RAP**

| Road             | Design Life from Initial Construction (Years) |
|------------------|-----------------------------------------------|
| Various Roadways | 20+                                           |

### 6.8.1 Staged Construction Considerations

The staged construction approach, and more specifically the estimated design life of each approach discussed in this report, is highly dependent upon the extended performance of the Cement stabilized base layer as well as the underlying subgrade. Should the stabilized base layer experience structural distress prior to the construction of the second stage HMAC overlay, further rehabilitation of the base and/or subgrade may be required beyond typical spot repairs and standard

maintenance before the second stage overlay can be constructed. This risk is likely more prominent with the double chip seal approach as the surface treatment does not significantly contribute to the pavement's structural capacity to carry traffic loads. If the Cement stabilized base does experience structural distress that is not remediated prior to construction of the second stage, the distress could potentially impact the new HMAC overlay through reflective cracking and overall reduction in service life and/or serviceability.

We recommend that care be exercised to not exceed the estimated/planned design life of the first stage of construction prior to construction of the second stage. Additionally, we recommend that a plan be developed for long-term monitoring and observation of each roadway's condition and serviceability between construction of stage 1 and 2, and through the initial service of stage 2.

## **7.0 OTHER CONSTRUCTION**

### **7.1 Utility and Service Lines**

Backfill placed within utility/culvert trenches that cross pavements should be properly compacted. If these areas are not properly compacted, settlement will occur and distress to the pavement is likely. All backfill should be placed in lifts, properly compacted and tested in accordance to the appropriate earthwork recommendations provided.

Trenches should be opened a sufficient width to safely allow compaction equipment access to the backfill and for confirmation testing to occur. The backfill should be placed in horizontal lifts. Excavations greater than 5 feet in height/depth should be in accordance with OSHA 29CFR 1926, Subpart P. The site soils should be assumed to be Type "C" soil.

At a minimum, the backfill materials above the select or granular soils should be free of rock fragments and clods larger than 4 inches and deleterious materials. Backfill for shallow (less than 10 feet) utility lines should consist of on-site clayey material and should be placed in accordance with the following recommendations. However, weathered shale should be wasted and not reused as backfill. The on-site fill soil should be placed in maximum 6-inch compacted lifts, compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D698 (standard Proctor), and placed at a moisture content that is at least the optimum moisture content, as determined by that same test. Fill materials may be derived from on-site or may be imported as long as the materials are essentially free of organic materials and particles in excess of 4 inches their maximum dimension. Imported fill materials should have no less than 35 percent material passing a No. 200 mesh sieve and a Plasticity Index of no more than 30. We also recommend that the utility trenches be visually inspected during the excavation process to ensure that undesirable fill that was not detected by the test borings does not exist at the site. This office should be notified immediately if any such fill is detected.

Utility excavations should be sloped so that water within excavations will flow to a low point away from the active construction where it can be removed from before backfilling.

The compaction of bedding material should not be water-jetted. Compacted backfill above the utilities should be on-site clays to limit the percolation of surface water.

## **7.2 Surface Drainage**

Proper drainage is critical to the performance of the paved areas. Positive surface drainage should be provided that directs water away from pavement edges. Where possible, we recommend that a slope of at least 5 percent be provided for the first 5 feet away from pavement edges. The slopes should direct water away from the pavement and should be maintained throughout construction and the life of the pavement.

## **7.3 Excavations**

Excavations greater than 4 feet in height/depth should be in accordance with OSHA 29CFR 1926, Subpart P. Temporary construction slopes should incorporate excavation protection systems or should be sloped back. Where the excavation does not extend close to building lines, these areas may be laid back. Where space allows, temporary slopes should be sloped at 1.5 horizontal to 1 vertical (1.5H: 1V) or flatter.

Where excavation slopes greater than four (4) feet in height cannot be laid back, these areas will require installation of a temporary retention system or shoring to protect the existing construction, restrain the subsurface soils and maintain the integrity of the excavation. We recommend that monitoring points be established around the retention system and that these locations be monitored during and after the excavation activities to confirm the integrity of the retention system.

The slopes and temporary retention system should be verified by and designed by the contractor's engineer and should not be surcharged by traffic, construction equipment, or permanent structures. The slopes and temporary retention system should be adequately maintained and periodically inspected to ensure the safety of the excavation and surrounding property.

## **8.0 LIMITATIONS**

The professional geotechnical engineering services performed for this project, the findings obtained, and the recommendations prepared were accomplished in accordance with currently accepted geotechnical engineering principles and practices.

Variations in the subsurface conditions are noted at the specific boring locations for this study. As such, all users of this report should be aware that differences in depths and thicknesses of strata encountered can vary between the boring locations. Statements in the report as to subsurface conditions across the site are extrapolated from the data obtained at the specific boring locations. The number and spacing of the exploration borings were chosen to obtain geotechnical information for the design and construction of a street pavement. If there are any conditions differing significantly from those described herein, Geotex should be notified to re-evaluate the recommendations contained in this report.

Recommendations contained herein are not considered applicable for an indefinite period of time. Our office must be contacted to re-evaluate the contents of this report if construction does not begin within a one-year period after completion of this report.

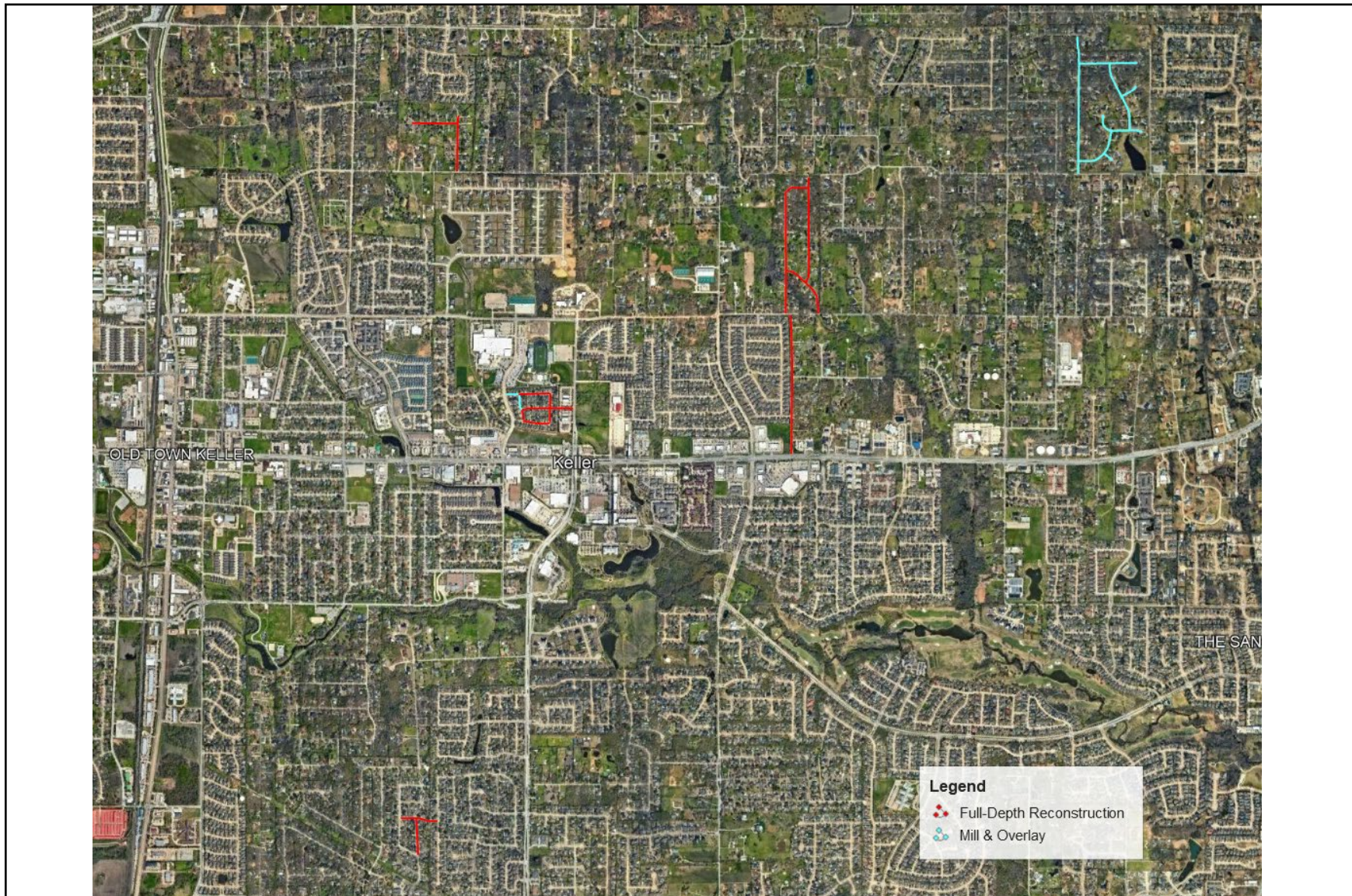
The scope of services provided herein does not include an environmental assessment of the site or investigation for the presence or absence of hazardous materials in the soil, surface water, or groundwater.

All contractors referring to this geotechnical report should draw their own conclusions regarding excavations, construction, etc. for bidding purposes. Geotex is not responsible for conclusions, opinions or recommendations made by others based on these data. The report is intended to guide preparation of project specifications and should not be used as a substitute for the project specifications.

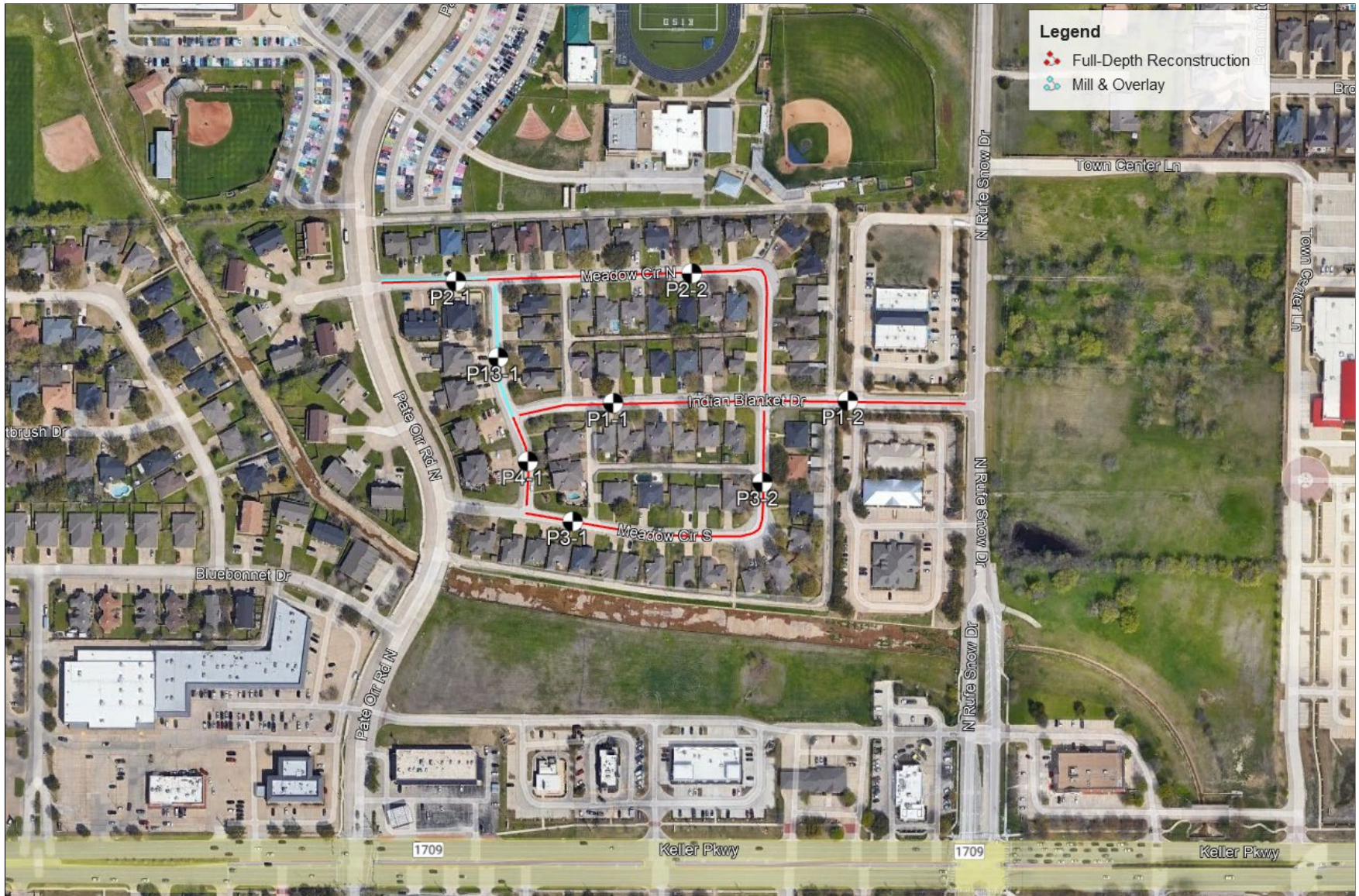
Recommendations provided in this report are based on our understanding of information provided by the Client to us regarding the scope of work for this project. If the Client notes any differences, our office should be contacted immediately since this may materially alter the recommendations.

This report has been prepared for the exclusive use of our client for specific applications 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 Geotex reviews the changes and either verifies or modifies the conclusions of this report in writing.

## **APPENDIX A - BORING LOGS AND SUPPORTING DATA**



**\*\*BORING LOCATIONS ARE INTENDED FOR GRAPHICAL REFERENCE ONLY\*\***



\*\*BORING LOCATIONS ARE INTENDED FOR GRAPHICAL REFERENCE ONLY\*\*



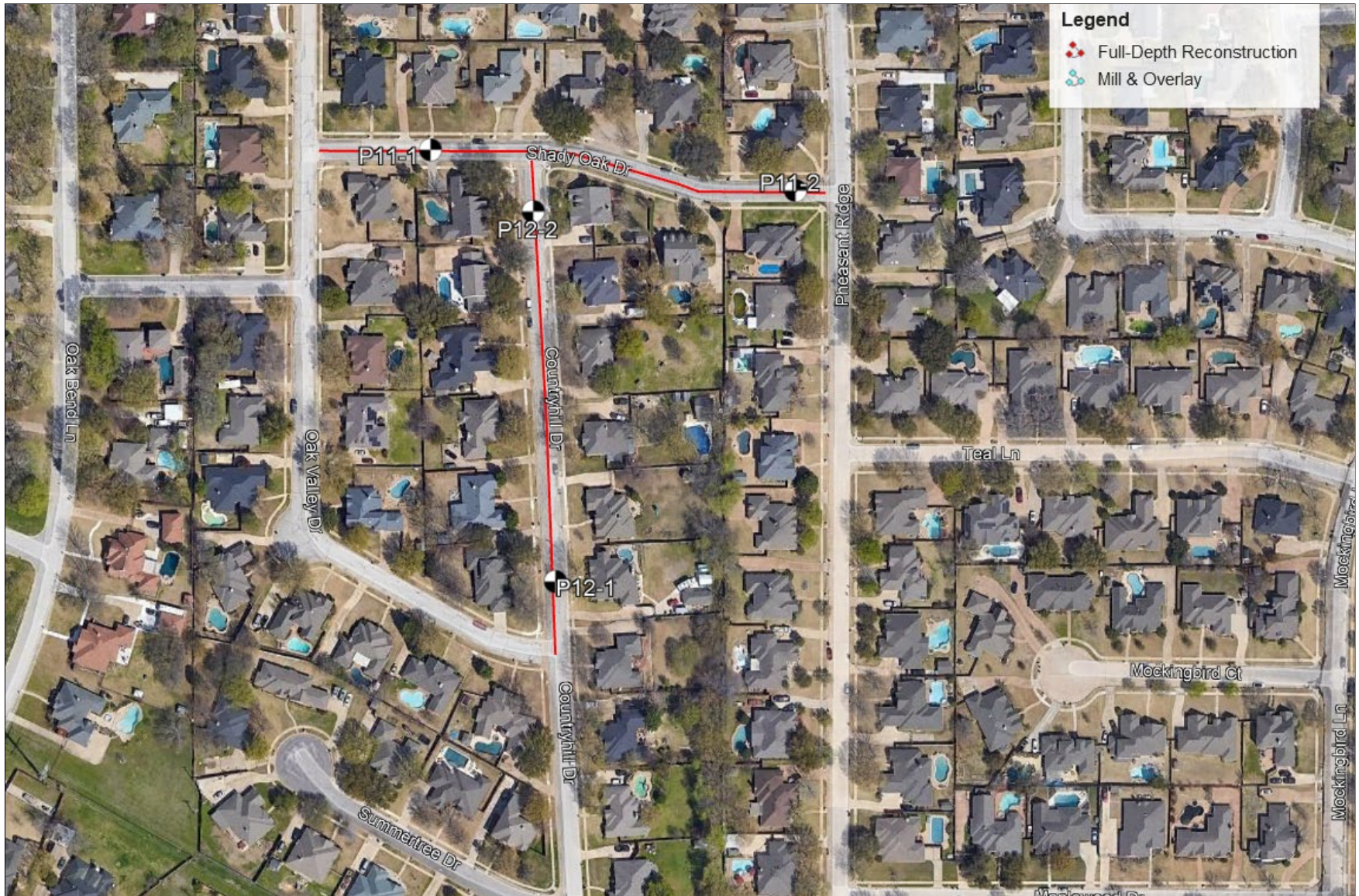
**\*\*BORING LOCATIONS ARE INTENDED FOR GRAPHICAL REFERENCE ONLY\*\***



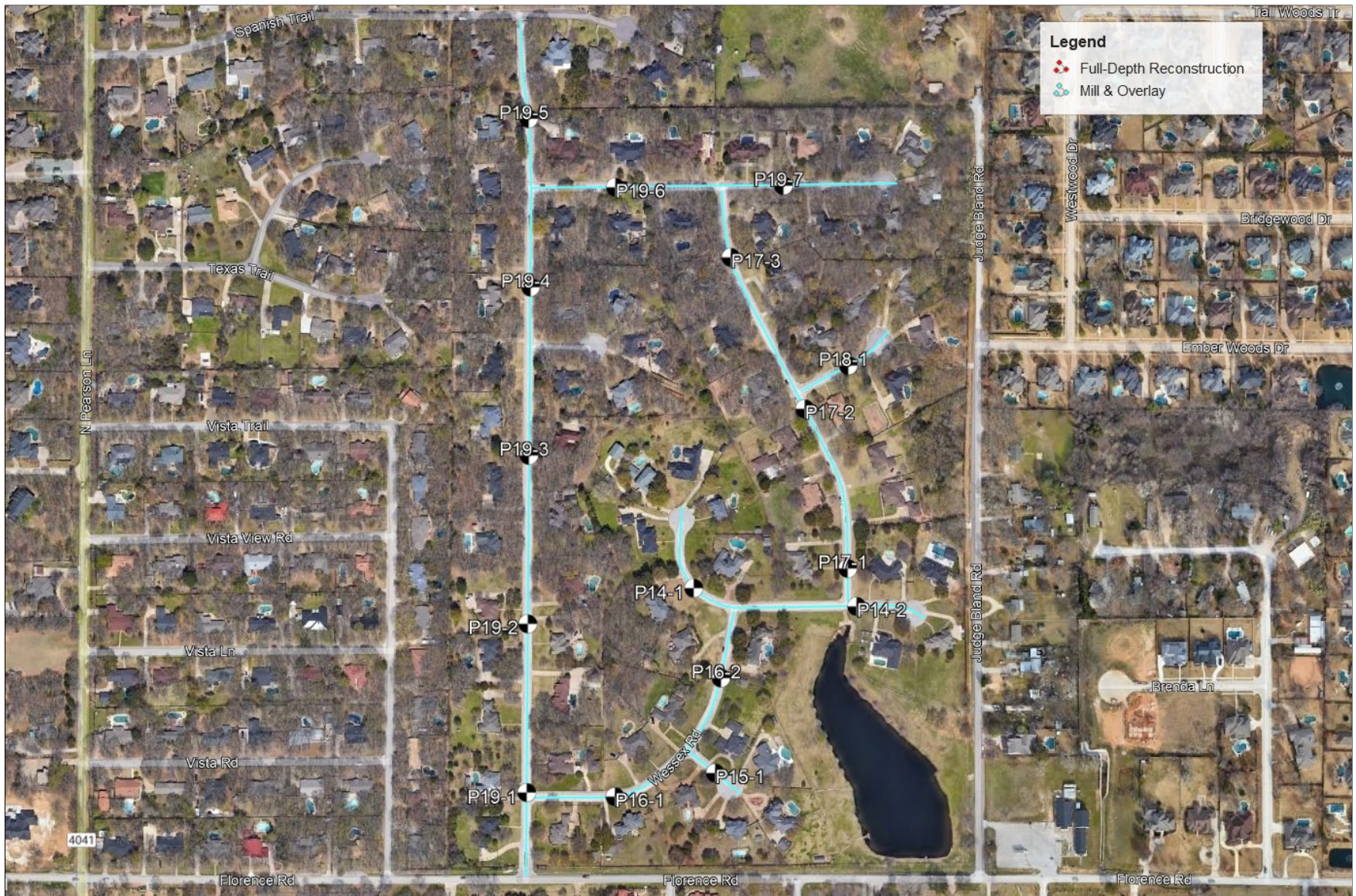
\*\*BORING LOCATIONS ARE INTENDED FOR GRAPHICAL REFERENCE ONLY\*\*



\*\*BORING LOCATIONS ARE INTENDED FOR GRAPHICAL REFERENCE ONLY\*\*



\*\*BORING LOCATIONS ARE INTENDED FOR GRAPHICAL REFERENCE ONLY\*\*



**\*\*BORING LOCATIONS ARE INTENDED FOR GRAPHICAL REFERENCE ONLY\*\***

**LITHOLOGIC SYMBOLS**

|            |                                                                                     |                          |
|------------|-------------------------------------------------------------------------------------|--------------------------|
| ARTIFICIAL |    | Asphalt                  |
|            |    | Aggregate Base           |
|            |    | Concrete                 |
|            |    | Fill                     |
| SOIL       |    | CH: High Plasticity Clay |
|            |    | CL: Low Plasticity Clay  |
|            |    | GP: Poorly-graded Gravel |
|            |   | GW: Well-graded Gravel   |
|            |  | SC: Clayey Sand          |
|            |  | SP: Poorly-graded Sand   |
| ROCK       |  | SW: Well-graded Sand     |
|            |  | Limestone                |
|            |  | Mudstone                 |
|            |  | Shale                    |
|            |  | Sandstone                |
|            |  | Weathered Limestone      |
|            |  | Weathered Shale          |
|            |  | Weathered Sandstone      |

**CONSISTENCY OF SOILS**

| CONSISTENCY: FINE GRAINED SOILS |                  |            |
|---------------------------------|------------------|------------|
| Consistency                     | SPT (blowcounts) | PP (tsf)   |
| Very Soft                       | 0 - 2            | < 0.25     |
| Soft                            | 3 - 4            | 0.25 - 0.5 |
| Medium Stiff                    | 5 - 8            | 0.5 - 1.0  |
| Stiff                           | 9 - 15           | 1.0 - 2.0  |
| Very Stiff                      | 16 - 30          | 2.0 - 4.0  |
| Hard                            | > 30             | > 4.0      |

**CONDITION OF SOILS**

| CONDITION: COARSE GRAINED SOILS |                  |                   |                      |
|---------------------------------|------------------|-------------------|----------------------|
| Condition                       | SPT (blowcounts) | TCP (values)      | Relative Density (%) |
| Very Loose                      | 0 - 4            | < 8               | 0 - 15               |
| Loose                           | 5 - 10           | 8 - 20            | 15 - 35              |
| Medium Dense                    | 11 - 30          | 20 - 80           | 35 - 65              |
| Dense                           | 31 - 50          | 80 - 5 in./100    | 65 - 85              |
| Very Dense                      | > 50             | 0 in. - 5 in./100 | 85 - 100             |

**SECONDARY COMPONENTS**

| QUANTITY DESCRIPTORS |                |
|----------------------|----------------|
| Trace                | < 5% of sample |
| Few                  | 5% to 10%      |
| Little               | 10% to 25%     |
| Some                 | 25% to 35%     |
| With                 | > 35%          |

**RELATIVE HARDNESS OF ROCK MASS**

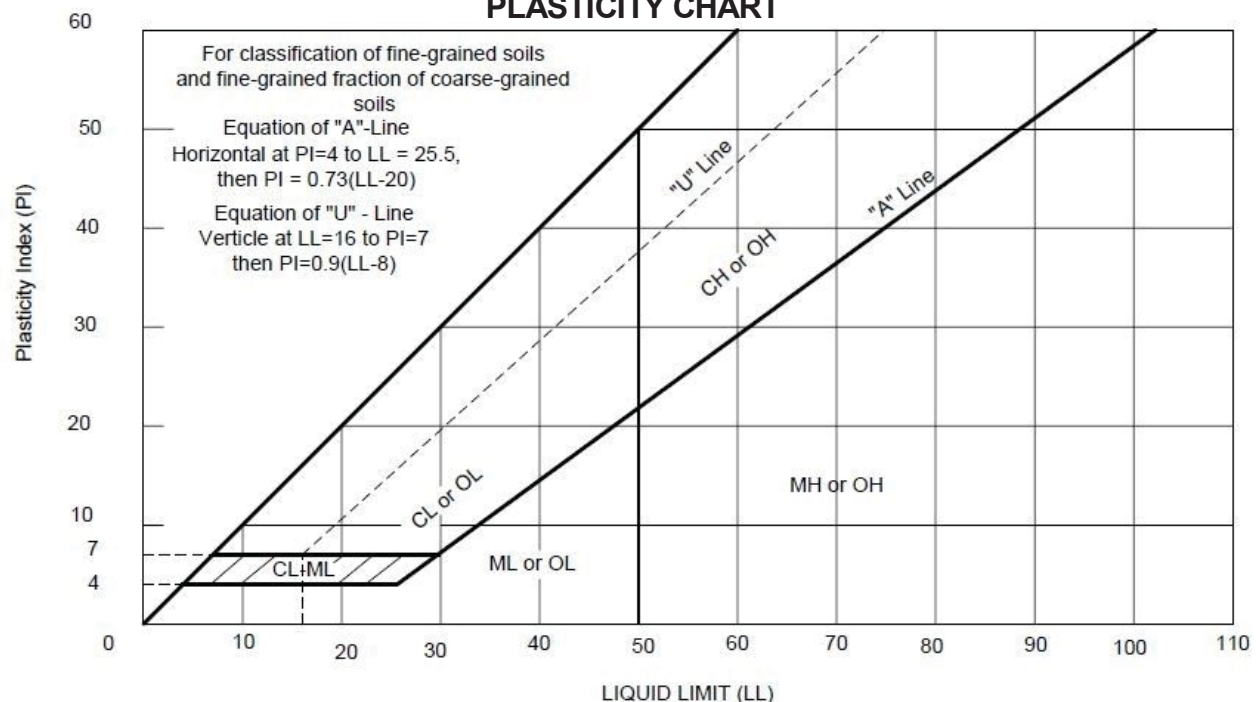
| Designation     | Description                                                                                                                                                                                                       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Very Soft       | Can be carved with a knife. Can be excavated readily with point of pick. Pieces 1" or more in thickness can be broken by finger pressure. Readily scratched with fingernail.                                      |
| Soft            | Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows with the pick point. Small, thin pieces can be broken by finger pressure. |
| Medium Hard     | Can be grooved or gouged 1/4" deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1" maximum size by hard blows with the point of a pick.                               |
| Moderately Hard | Can be scratched with knife or pick. Gouges or grooves 1/4" deep can be excavated by hard blow of the point of a pick. Hand specimens can be detached by a moderate blow.                                         |
| Hard            | Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach a hand specimen.                                                                                                 |
| Very Hard       | Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows from a hammer or pick.                                                                                       |

**WEATHERING OF ROCK MASS**

| Designation          | Description                                                                                           |
|----------------------|-------------------------------------------------------------------------------------------------------|
| Fresh                | No visible sign of weathering                                                                         |
| Slightly weathered   | Penetrative weathering on open discontinuity surfaces, but only slight weathering of rock material    |
| Moderately weathered | Weathering extends throughout rock mass, but the rock material is not friable                         |
| Highly weathered     | Weathering extends throughout rock mass, and the rock material is partly friable                      |
| Completely weathered | Rock is wholly decomposed and in a friable condition but the rock texture and structure are preserved |
| Residual Soil        | A soil material with the original texture, structure, and mineralogy of the rock completely destroyed |

**SOIL CLASSIFICATION CHART**

| MAJOR DIVISIONS                                                                        |                                                                         |                       |                                                                                                 | GROUP SYMBOL | GROUP NAME                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------|--------------|------------------------------|
| COARSE GRAINED SOILS<br><br>MORE THAN 50% OF MATERIAL IS RETAINED ON THE NO. 200 SIEVE | GRAVELS<br><br>MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE | CLEAN GRAVELS         | $Cu \geq 4$ and $1 \leq Cc \leq 3$                                                              | GW           | WELL-GRADED GRAVEL           |
|                                                                                        |                                                                         | (LESS THAN 5% FINES)  | $Cu < 4$ and/or $[Cc < 1$ or $Cc > 3]$                                                          | GP           | POORLY-GRADED GRAVEL         |
|                                                                                        |                                                                         | GRAVELS WITH FINES    | Fines classify as ML or MH                                                                      | GM           | SILTY GRAVEL                 |
|                                                                                        |                                                                         | (MORE THAN 12% FINES) | Fines classify as CL or CH                                                                      | GC           | CLAYEY GRAVEL                |
|                                                                                        | SANDS<br><br>MORE THAN 50% OF COARSE FRACTION PASSING THE NO. 4 SIEVE   | CLEAN SANDS           | $Cu \geq 6$ and $1 \leq Cc \leq 3$                                                              | SW           | WELL-GRADED SAND             |
|                                                                                        |                                                                         | (LESS THAN 5% FINES)  | $Cu < 6$ and/or $[Cc < 1$ or $Cc > 3]$                                                          | SP           | POORLY-GRADED SAND           |
|                                                                                        |                                                                         | SANDS WITH FINES      | Fines classify as ML or MH                                                                      | SM           | SILTY SAND                   |
|                                                                                        |                                                                         | (MORE THAN 12% FINES) | Fines classify as CL or CH                                                                      | SC           | CLAYEY SAND                  |
| FINE GRAINED SOILS<br><br>MORE THAN 50% OF MATERIAL PASSES THROUGH THE NO. 200 SIEVE   | SILTS AND CLAYS<br><br>LIQUID LIMIT LESS THAN 50                        | INORGANIC             | PI > 7 and plots on or above "A" line                                                           | CL           | LEAN CLAY                    |
|                                                                                        |                                                                         |                       | PI < 4 or plots below "A" line                                                                  | ML           | SILT                         |
|                                                                                        |                                                                         | ORGANIC               | $\frac{\text{Liquid limit} - \text{oven dried}}{\text{Liquid limit} - \text{not dried}} < 0.75$ | OL           | ORGANIC CLAY<br>ORGANIC SILT |
|                                                                                        | SILTS AND CLAYS<br><br>LIQUID LIMIT GREATER THAN 50                     | INORGANIC             | PI plots on or above "A" line                                                                   | CH           | FAT CLAY                     |
|                                                                                        |                                                                         |                       | PI plots below "A" line                                                                         | MH           | ELASTIC SILT                 |
|                                                                                        |                                                                         | ORGANIC               | $\frac{\text{Liquid limit} - \text{oven dried}}{\text{Liquid limit} - \text{not dried}} < 0.75$ | OH           | ORGANIC CLAY<br>ORGANIC SILT |
| HIGHLY ORGANIC SOILS                                                                   | PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR               |                       |                                                                                                 | PT           | PEAT                         |

**PLASTICITY CHART**




P1-1



P1-2



P2-1

| Boring | Description                            |
|--------|----------------------------------------|
| P1-1   | Asphalt 2.25 inches, Base 9.75 inches* |
| P1-2   | Asphalt 5.5 inches, Base 6.5 inches*   |
| P2-1   | Asphalt 7.0 inches                     |

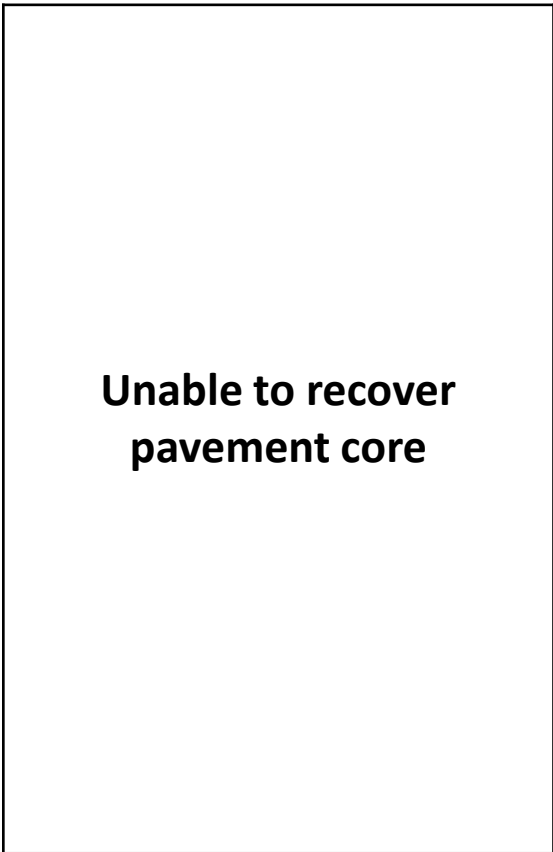
*\*Base not recovered/ partially recovered*



P2-2



P3-1



P3-2

**Unable to recover  
pavement core**

| Boring | Description                          |
|--------|--------------------------------------|
| P2-2   | Asphalt 7.0 inches                   |
| P3-1   | Asphalt 7.0 inches, Base 4.0 inches* |
| P3-2   | Asphalt 6.5 inches*                  |

*\*Not recovered/ partially recovered*



P4-1



P5-1



P5-2

| Boring | Description                          |
|--------|--------------------------------------|
| P4-1   | Asphalt 7.0 inches, Base 4.0 inches* |
| P5-1   | Asphalt 4.0 inches, Base 2.0 inches* |
| P5-2   | Asphalt 3.0 inches, Base 3.0 inches* |

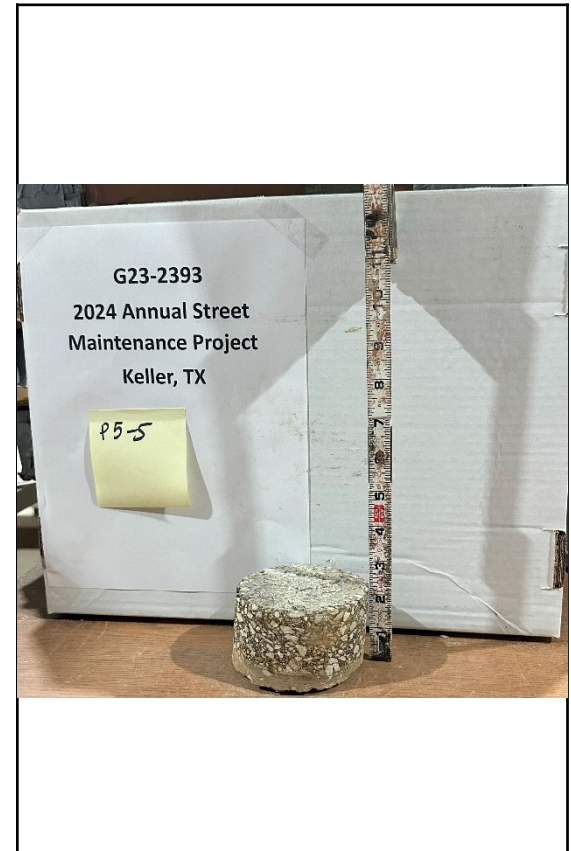
*\*Base not recovered/ partially recovered*



P5-3



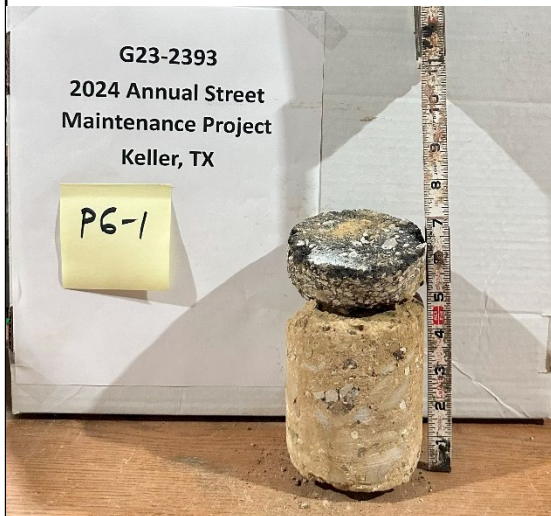
P5-4



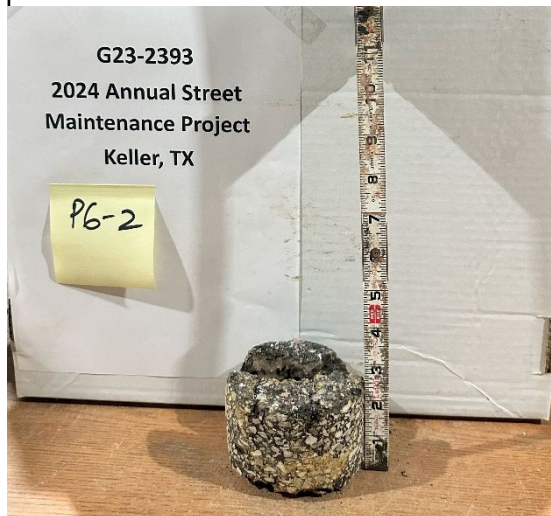
P5-5

| Boring | Description         |
|--------|---------------------|
| P5-3   | Asphalt 1.5 inches  |
| P5-4   | Asphalt 2.0 inches  |
| P5-5   | Asphalt 2.25 inches |

*\*Base not recovered/ partially recovered*



P6-1



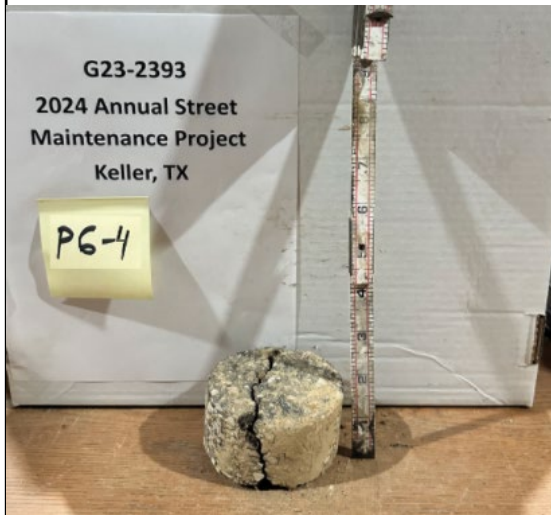
P6-2



P6-3

| Boring | Description                                        |
|--------|----------------------------------------------------|
| P6-1   | Asphalt 1.5 inches, Cement Treated Base 5.0 inches |
| P6-2   | Asphalt 2.5 inches                                 |
| P6-3   | Asphalt 1.25 inches                                |

*\*Base not recovered/ partially recovered*



P6-4



P7-1



P7-2

| Boring | Description                                       |
|--------|---------------------------------------------------|
| P6-4   | Asphalt 1.5 inches                                |
| P7-1   | Asphalt 2.0 inches, Cement Treated RAP 6.0 inches |
| P7-2   | Asphalt 2.0 inches, Cement Treated RAP 8.0 inches |

*\*Base not recovered/ partially recovered*



P7-3



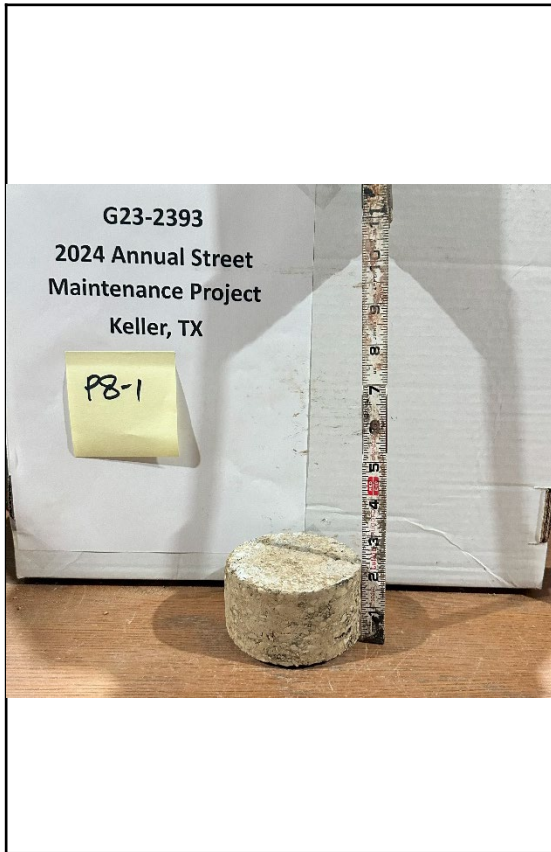
P7-4



P7-5

| Boring | Description                                       |
|--------|---------------------------------------------------|
| P7-3   | Asphalt 2.0 inches, Cement Treated RAP 7.0 inches |
| P7-4   | Asphalt 4.5 inches                                |
| P7-5   | Asphalt 3.0 inches, Base 4.0 inches*              |

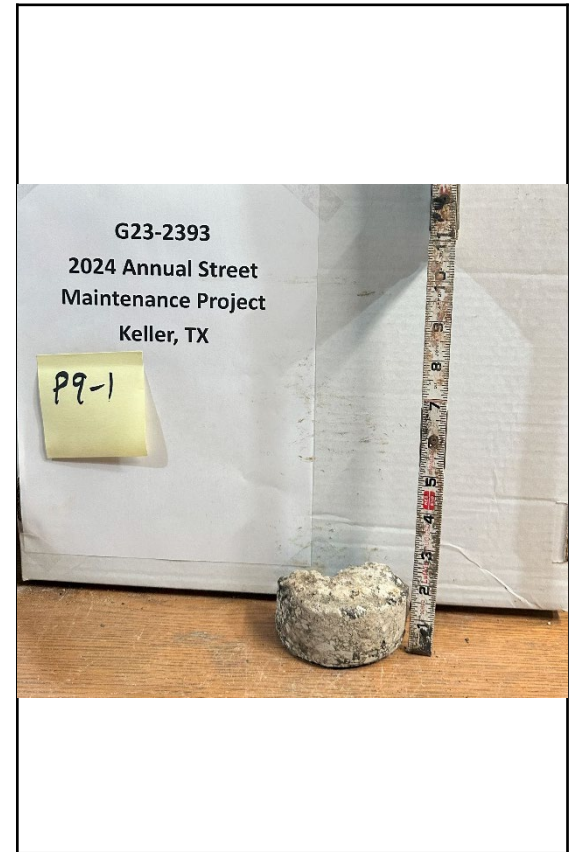
*\*Base not recovered/ partially recovered*



P8-1



P8-2



P9-1

| Boring | Description                                        |
|--------|----------------------------------------------------|
| P8-1   | Asphalt 2.0 inches                                 |
| P8-2   | Asphalt 2.5 inches, Cement Treated Base 5.0 inches |
| P9-1   | Asphalt 2.0 inches                                 |

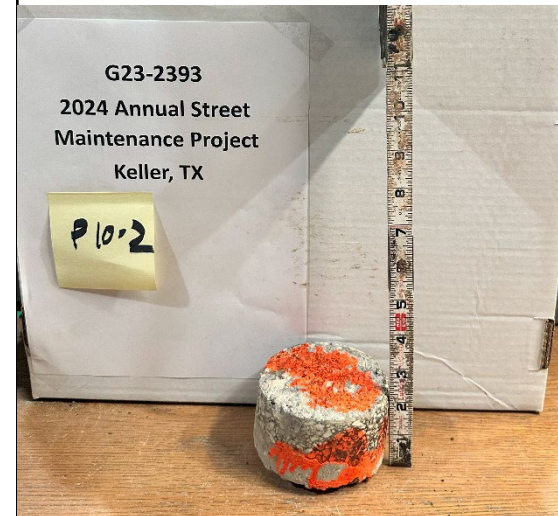
*\*Base not recovered/ partially recovered*



P9-2

**Unable to recover  
pavement core**

P10-1

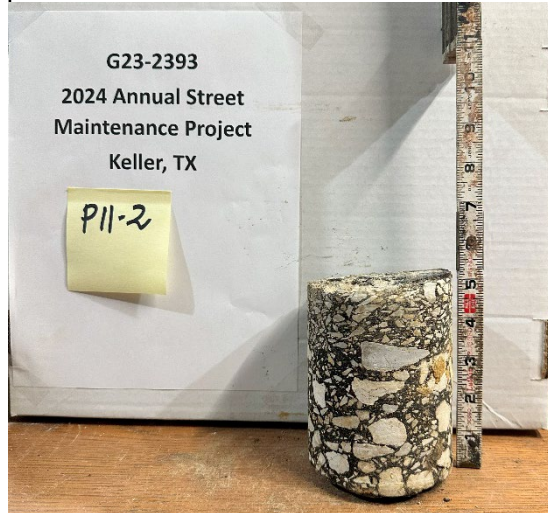


P10-2

| Boring | Description         |
|--------|---------------------|
| P9-2   | Asphalt 2.0 inches  |
| P10-1  | Asphalt 6.0 inches* |
| P10-2  | Asphalt 2.0 inches  |

*\*Not recovered/ partially recovered*

Unable to recover  
pavement core



P11-1

P11-2

P12-1

| Boring | Description         |
|--------|---------------------|
| P11-1  | Asphalt 4.5 inches* |
| P11-2  | Asphalt 5.0 inches  |
| P12-1  | Asphalt 5.0 inches  |

*\*Not recovered/ partially recovered*



P12-2



P13-1



P14-1

| Boring | Description         |
|--------|---------------------|
| P12-2  | Asphalt 4.75 inches |
| P13-1  | Asphalt 7.25 inches |
| P14-1  | Asphalt 6.75 inches |

*\*Base not recovered/ partially recovered*



P14-2



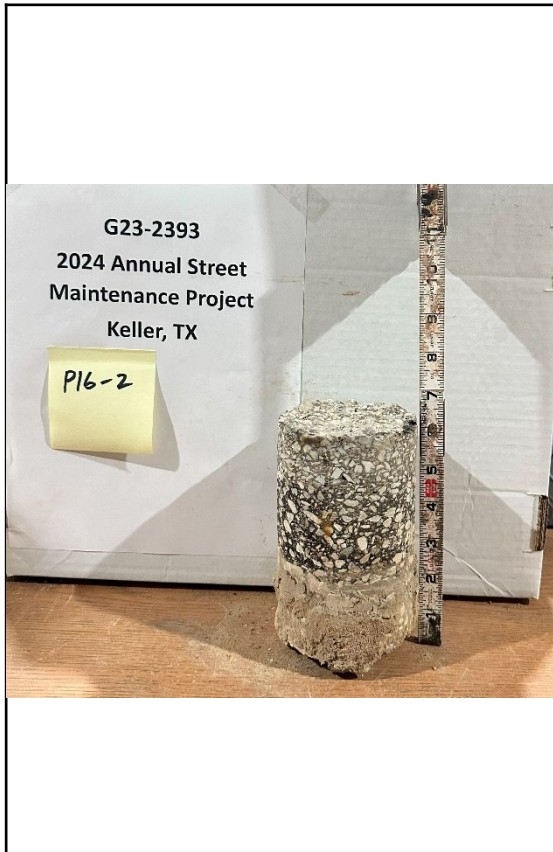
P15-1



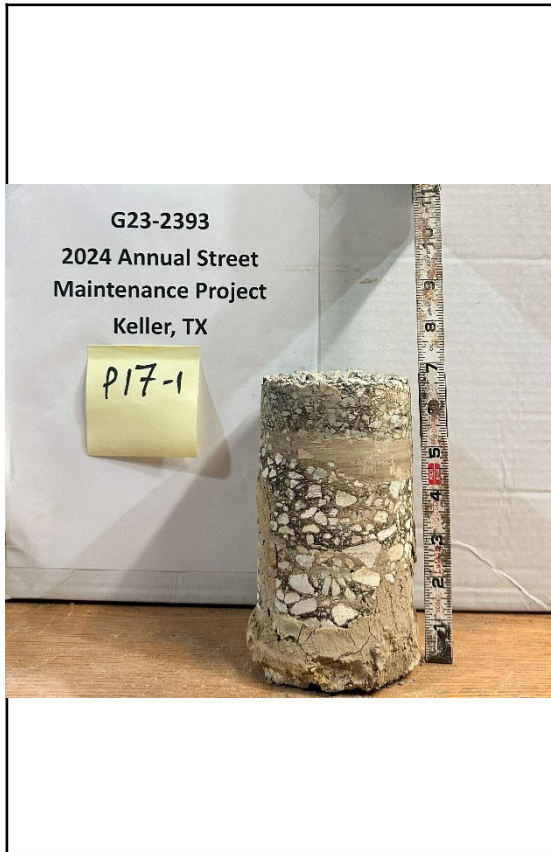
P16-1

| Boring | Description                                                |
|--------|------------------------------------------------------------|
| P14-2  | Asphalt 0.5 inches, Concrete 10.0 inches, Base 4.0 inches* |
| P15-1  | Asphalt 6.5 inches, Base 4.0 inches*                       |
| P16-1  | Asphalt 7.0 inches, Base 4.0 inches*                       |

*\*Base not recovered/ partially recovered*



P16-2



P17-1



P17-2

| Boring | Description                          |
|--------|--------------------------------------|
| P16-2  | Asphalt 6.5 inches, Base 4.0 inches* |
| P17-1  | Asphalt 6.5 inches                   |
| P17-2  | Asphalt 6.5 inches                   |

*\*Base not recovered/ partially recovered*



P17-3



P18-1



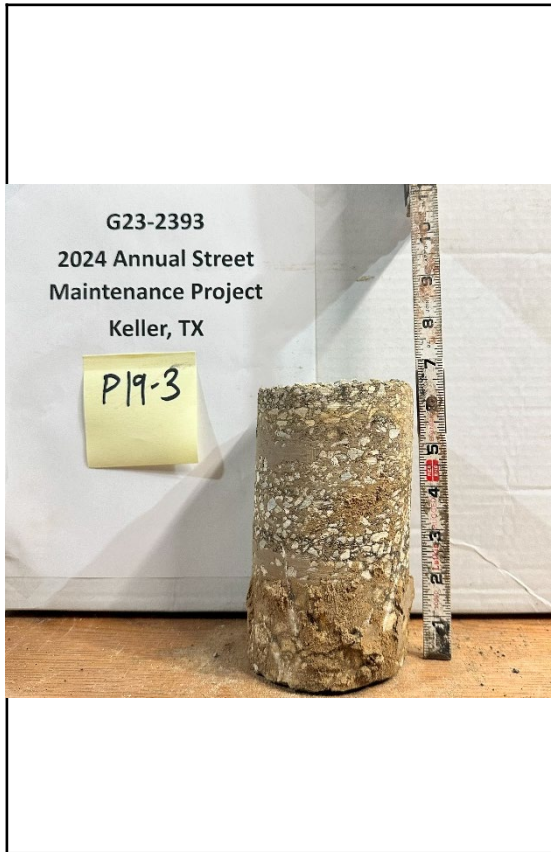
P19-1

| Boring | Description         |
|--------|---------------------|
| P17-3  | Asphalt 6.75 inches |
| P18-1  | Asphalt 6.75 inches |
| P19-1  | Asphalt 7.0 inches  |

*\*Base not recovered/ partially recovered*



P19-2



P19-3



P19-4

| Boring | Description         |
|--------|---------------------|
| P19-2  | Asphalt 5.25 inches |
| P19-3  | Asphalt 6.75 inches |
| P19-4  | Asphalt 6.0 inches  |

*\*Base not recovered/ partially recovered*



P19-5



P19-6



P19-7

| Boring | Description         |
|--------|---------------------|
| P19-5  | Asphalt 6.25 inches |
| P19-6  | Asphalt 6.75 inches |
| P19-7  | Asphalt 7.0 inches  |

*\*Base not recovered/ partially recovered*



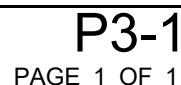
LOCATION: Keller, TX  
GPS COORDINATES: N32.936963, W97.231832  
GROUND ELEVATION: Approx. 664 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



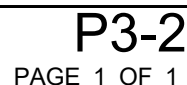
[illegible]



LOCATION: Keller, TX  
GPS COORDINATES: N32.937715, W97.231289  
GROUND ELEVATION: Approx. 666 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



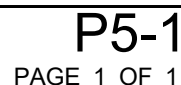
LOCATION: Keller, TX  
GPS COORDINATES: N32.936275, W97.232112  
GROUND ELEVATION: Approx. 660 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



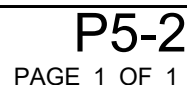
LOCATION: Keller, TX  
GPS COORDINATES: N32.936503, W97.230801  
GROUND ELEVATION: Approx. 660 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



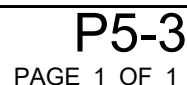
LOCATION: Keller, TX  
GPS COORDINATES: N32.936624, W97.232422  
GROUND ELEVATION: Approx. 664 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.941038, W97.216178  
GROUND ELEVATION: Approx. 676 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.939662, W97.216128  
GROUND ELEVATION: Approx. 674 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.938282, W97.216116  
GROUND ELEVATION: Approx. 678 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)

[illegible]





LOCATION: Keller, TX  
GPS COORDINATES: N32.944027, W97.215102  
GROUND ELEVATION: Approx. 670 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.945397, W97.215110  
GROUND ELEVATION: Approx. 684 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.946767, W97.215108  
GROUND ELEVATION: Approx. 688 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)





LOCATION: Keller, TX  
GPS COORDINATES: N32.942484, W97.216494  
GROUND ELEVATION: Approx. 666 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.943849, W97.216493  
GROUND ELEVATION: Approx. 666 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)

LOCATION: Keller, TX  
GPS COORDINATES: N32.945218, W97.216493  
GROUND ELEVATION: Approx. 674 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)

[illegible]



LOCATION: Keller, TX  
GPS COORDINATES: N32.946587, W97.216493  
GROUND ELEVATION: Approx. 688 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.947952, W97.216476  
GROUND ELEVATION: Approx. 696 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.942468, W97.214590  
GROUND ELEVATION: Approx. 662 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.943530, W97.215533  
GROUND ELEVATION: Approx. 666 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.951455, W97.236913  
GROUND ELEVATION: Approx. 712 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.951471, W97.238540  
GROUND ELEVATION: Approx. 726 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.949696, W97.236430  
GROUND ELEVATION: Approx. 702 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)





LOCATION: Keller, TX  
GPS COORDINATES: N32.916113, W97.239344  
GROUND ELEVATION: Approx. 702 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)





LOCATION: Keller, TX  
GPS COORDINATES: N32.914520, W97.238795  
GROUND ELEVATION: Approx. 704 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)





LOCATION: Keller, TX  
GPS COORDINATES: N32.937226, W97.232627  
GROUND ELEVATION: Approx. 664 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.951257, W97.197139  
GROUND ELEVATION: Approx. 700 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)

















LOCATION: Keller, TX  
GPS COORDINATES: N32.953066, W97.195641  
GROUND ELEVATION: Approx. 710 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.949596, W97.198757  
GROUND ELEVATION: Approx. 720 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.950967, W97.198746  
GROUND ELEVATION: Approx. 732 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)





LOCATION: Keller, TX  
GPS COORDINATES: N32.953703, W97.198719  
GROUND ELEVATION: Approx. 728 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.955071, W97.198738  
GROUND ELEVATION: Approx. 726 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



LOCATION: Keller, TX  
GPS COORDINATES: N32.954514, W97.197898  
GROUND ELEVATION: Approx. 718 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



PAGE 1 OF 1

LOCATION: Keller, TX  
GPS COORDINATES: N32.954527, W97.196270  
GROUND ELEVATION: Approx. 710 feet  
DRILL METHOD: Core/Cont. Flight Auger/Cont. Push  
DRILLED BY: James Taylor (Geotex)



# SWELL TEST RESULTS

PROJECT: Keller Annual Street Maintenance Project

CLIENT: Wade Trim

PROJECT NUMBER: G23-2393

LOCATION: Keller, TX

| Boring Number | Depth feet | Initial Moisture Content, % | Final Moisture Content, % | Vertical Swell, % |
|---------------|------------|-----------------------------|---------------------------|-------------------|
| P1-2          | 4-5        | 17.5                        | 17.6                      | 1.6               |
| P2-2          | 2-3        | 20.5                        | 22.0                      | 2.2               |
| P3-2          | 4-5        | 18.4                        | 19.0                      | 0.8               |
| P5-3          | 2-3        | 23.2                        | 23.6                      | 0.0               |
| P5-4          | 4-5        | 22.1                        | 24.8                      | 5.2               |
| P5-5          | 2-3        | 19.1                        | 19.5                      | 0.3               |
| P6-1          | 4-5        | 16.5                        | 24.9                      | 0.3               |
| P6-4          | 3-4        | 9.8                         | 14.9                      | 1.5               |
| P7-1          | 2-3        | 21.2                        | 21.4                      | 2.2               |
| P7-5          | 4-5        | 18.1                        | 18.3                      | 0.1               |
| P8-1          | 4-5        | 15.1                        | 15.5                      | 0.0               |
| P10-1         | 2-3        | 11.7                        | 12.8                      | 0.1               |
| P11-1         | 2-3        | 17.7                        | 19.6                      | 3.9               |
| P12-1         | 2-3        | 13.4                        | 16.4                      | 4.1               |



# SOLUBLE SULFATE CONTENT RESULTS

## TEX 145-E

PROJECT: Keller Annual Street Maintenance Project

PROJECT NUMBER: G23-2393

CLIENT: Wade Trim

LOCATION: Keller, TX

| Boring Number: | Depth (feet): | Soil Description                                         | Soluble Sulfate Content (ppm) |
|----------------|---------------|----------------------------------------------------------|-------------------------------|
| P1-1           | 1-2           | SANDY LEAN CLAY (CL); dark brown, brown, light brown     | 140                           |
| P1-2           | 1-2           | LEAN CLAY WITH SAND (CL); dark brown, brown, light brown | 120                           |
| P2-1           | 0.6-1.6       | FILL: CLAYEY SAND (SC); dark brown                       | 120                           |
| P2-2           | 0.6-1.6       | FILL: CLAYEY SAND (SC); dark brown                       | 120                           |
| P3-1           | 1-2           | SANDY LEAN CLAY (CL); light brown                        | 100                           |
| P3-2           | 0.5-1.5       | SANDY LEAN CLAY (CL); light brown                        | 120                           |
| P4-1           | 1-2           | SANDY LEAN CLAY (CL); brown, dark brown, light brown     | 120                           |
| P5-2           | 2-3           | SANDY LEAN CLAY (CL); brown                              | 120                           |
| P5-3           | 0.2-1.2       | FILL: SANDY LEAN CLAY (CL); brown                        | 160                           |
| P5-4           | 2-3           | FAT CLAY WITH SAND (CH); brown                           | 600                           |
| P5-5           | 0.2-1.2       | FILL: SANDY LEAN CLAY (CL); brown                        | 140                           |
| P6-1           | 0.5-1.5       | LEAN CLAY WITH SAND (CL); brown, dark brown, light brown | 118                           |
| P6-2           | 0.5-1.5       | SILTY LEAN CLAY (CL-ML); dark brown, brown, light brown  | 144                           |
| P6-3           | 0.25-1.25     | CLAYEY SAND (SC); brown                                  | 1,240                         |
| P6-4           | 2-3           | CLAYEY SAND (SC); brown, light brown                     | 1,060                         |
| P7-1           | 0.8-1.8       | CLAYEY SAND (SC); brown                                  | 154                           |
| P7-2           | 0.9-1.9       | CLAYEY SAND (SC); brown                                  | 1,274                         |
| P7-3           | 0.8-1.8       | SANDY LEAN CLAY (CL); brown                              | 180                           |
| P7-4           | 0.4-1.4       | SANDY LEAN CLAY (CL); brown                              | 138                           |
| P7-5           | 0.6-1.6       | SANDY LEAN CLAY (CL); brown                              | 580                           |
| P8-1           | 0.2-1.2       | SANDY LEAN CLAY (CL); brown                              | 1,058                         |
| P8-2           | 0.6-1.6       | SANDY LEAN CLAY (CL); brown, reddish brown               | 156                           |
| P9-1           | 0.2-1.2       | FILL: LEAN CLAY (CL); brown                              | 540                           |
| P9-2           | 0.2-1.2       | FILL: SANDY LEAN CLAY; brown                             | 120                           |
| P10-1          | 0.5-1.5       | LEAN CLAY (CL); brown, light brown                       | 1,040                         |
| P10-2          | 0.2-1.2       | SANDY LEAN CLAY (CL); brown, light brown                 | 700                           |
| P11-1          | 0.4-1.4       | LEAN CLAY (CL); light brown                              | 120                           |
| P11-2          | 0.4-1.4       | SANDY LEAN CLAY (CL); brown, light brown                 | 120                           |
| P12-1          | 0.4-1.4       | SANDY LEAN CLAY (CL); light brown                        | 520                           |
| P12-2          | 0.4-1.4       | CLAYEY SAND (SC); brown, light brown                     | 120                           |
| P13-1          | 4-5           | SANDY LEAN CLAY (CL); dark brown, light brown            | 100                           |
| P14-1          | 0.5-1.5       | CLAYEY SAND (SC); light brown, reddish tan               | 1,120                         |
| P14-2          | 1.2-2.2       | SANDY LEAN CLAY (CL); brown, light brown                 | 140                           |
| P15-1          | 0.9-1.9       | CLAYEY SAND (SC); light brown, reddish tan               | 120                           |
| P16-1          | 5-6           | CLAYEY SAND (SC); light brown, reddish tan               | 180                           |
| P16-2          | 0.8-1.8       | CLAYEY SAND (SC); light brown, reddish tan               | 200                           |
| P17-1          | 0.5-1.5       | CLAYEY SAND (SC); light brown, reddish tan               | 140                           |
| P17-2          | 5-6           | CLAYEY SAND (SC); brown, reddish tan                     | 140                           |
| P17-3          | 0.5-1.5       | CLAYEY SAND (SC); light brown, light gray                | 120                           |
| P18-1          | 0.6-1.6       | CLAYEY SAND (SC); light brown, brown; reddish tan        | 160                           |
| P19-1          | 0.6-1.6       | FILL: SANDY LEAN CLAY; brown                             | 140                           |
| P19-2          | 0.6-1.6       | SAND (SP); reddish tan                                   | 140                           |
| P19-3          | 0.5-1.5       | SAND (SP); light brown                                   | 140                           |



# SOLUBLE SULFATE CONTENT RESULTS

## TEX 145-E

PROJECT: Keller Annual Street Maintenance Project

PROJECT NUMBER: G23-2393

CLIENT: Wade Trim

LOCATION: Keller, TX

| Boring Number: | Depth (feet): | Soil Description               | Soluble Sulfate Content (ppm) |
|----------------|---------------|--------------------------------|-------------------------------|
| P19-4          | 0.5-1.5       | <b>SAND (SP)</b> ; light brown | 140                           |
| P19-5          | 0.5-1.5       | <b>SAND (SP)</b> ; light brown | 140                           |
| P19-6          | 0.5-1.5       | <b>SAND (SP)</b> ; light brown | 120                           |
| P19-7          | 0.6-1.6       | <b>SAND (SP)</b> ; light brown | 180                           |

## **APPENDIX B - GENERAL DESCRIPTION OF PROCEDURES**

## **ANALYTICAL METHODS TO PREDICT MOVEMENT**

### **INDEX PROPERTY AND CLASSIFICATION TESTING**

Classification testing is perhaps the most basic, yet fundamental tool available for predicting potential movements of clay soils. Classification testing typically consists of moisture content, Atterberg Limits, and Grain-size distribution determinations. From these results a general assessment of a soil's propensity for volume change with changes in soil moisture content can be made.

#### **Moisture Content**

By studying the moisture content of the soils at varying depths and comparing them with the results of Atterberg Limits, one can estimate a rough order of magnitude of potential soil movement at various moisture contents, as well as movements with moisture changes. These tests are typically performed in accordance with ASTM D2216.

#### **Atterberg Limits**

Atterberg limits determine the liquid limit (LL), plastic limit (PL), and plasticity index (PI) of a soil. The liquid limit is the moisture content at which a soil begins to behave as a viscous fluid. The plastic limit is the moisture content at which a soil becomes workable like putty, and at which a clay soil begins to crumble when rolled into a thin thread (1/8" diameter). The PI is the numerical difference between the moisture constants at the liquid limit and the plastic limit. This test is typically performed in accordance with ASTM D4318.

Clay mineralogy and the particle size influence the Atterberg Limits values, with certain minerals (e.g., montmorillonite) and smaller particle sizes having higher PI values, and therefore higher movement potential.

A soil with a PI below about 15 to 18 is considered to be generally stable and should not experience significant movement with changes in moisture content. Soils with a PI above about 30 to 35 are considered to be highly active and may exhibit considerable movement with changes in moisture content.

Fat clays with very high liquid limits, weakly cemented sandy clays, or silty clays are examples of soils in which it can be difficult to predict movement from classification testing alone.

#### **Grain-size Distribution**

The simplest grain-size distribution test involves washing a soil specimen over the No. 200 mesh sieve with an opening size of 0.075 mm (ASTM D1140). This particle size has been defined by the engineering community as the demarcation between coarse-grained and fine-grained soils. Particles smaller than this size can be further distinguished between silt-size and clay-size particles by use of a Hydrometer test (ASTM D422). A more complete grain-size distribution test that uses sieves to relative amount of particles according is the Sieve Gradation Analysis of Soils (ASTM D6913). Once the characteristics of the soil are determined through classification testing, a number of movement prediction techniques are available to predict the potential movement of the soils. Some of these are discussed in general below.

## **TEXAS DEPARTMENT OF TRANSPORTATION METHOD 124-E**

The Texas Department of Transportation (TxDOT) has developed a generally simplistic method to predict movements for highways based on the plasticity index of the soil. The TxDOT method is empirical and is based on the Atterberg limits and moisture content of the subsurface soil. This method generally assumes three different initial moisture conditions: dry, "as-is", and wet. Computation of each over an assumed depth of seasonal moisture variation (usually about 15 feet or less) provides an estimate of potential movement at each initial condition. This method requires a number of additional assumptions to develop a potential movement estimate. As such, the predicted movements generally possess large uncertainties when applied to the analysis of conditions under pavements.

## **POTENTIAL VERTICAL MOVEMENT**

A general index for movement is known as the Potential Vertical Rise (PVR). The actual term PVR refers to the TxDOT Method 124-E mentioned above. For the purpose of this report the term Potential Vertical Movement (PVM) will be used since PVM estimates are derived using multiple analytical techniques, and not just TxDOT methods.

Vertical movement of clay soils under pavements resulting to soil moisture changes can result from a variety causes, including poor site grading and drainage, improperly prepared subgrade, trees and large shrubbery located too close to structures, utility leaks or breaks, poor subgrade maintenance such as inadequate or excessive irrigation, or other causes.

**PVM** is generally considered to be a measurement of the change in height of a foundation from the elevation it was originally placed. Experience and generally accepted practice suggest that if the PVM of a site is less than one inch, the associated differential movement will be minor and acceptable to most people.

### **TEXAS DEPARTMENT OF TRANSPORTATION METHOD 101-E**

This method describes three procedures for preparation of soil and flexible base samples for soil constants and particle size analysis, compaction and triaxial, and sieve analysis of road-mixed material.

### **TEXAS DEPARTMENT OF TRANSPORTATION METHOD 401-A**

This method involves sieve analysis and is used to determine the particle size distribution of mineral fillers and coarse and fine aggregates for Portland cement concrete.

### **TEXAS DEPARTMENT OF TRANSPORTATION METHOD 116-E**

This method determines the resistance of aggregate in flexible base material to disintegration in the presence of water. The test provides a measure of the ability of the material to withstand degradation in the road base and detects soft aggregate that is subject to weathering. The result of this test is the Wet Ball Mill (WBM) value.

## **SPECIAL COMMENTARY ON CONCRETE AND EARTHWORK**

### **UTILITY TRENCH EXCAVATION**

Trench excavation for utilities should be sloped or braced in the interest of safety. Attention is drawn to OSHA Safety and Health Standards (29 CFR 1926/1910), Subpart P, regarding trench excavations greater than 5 feet in depth.

### **FIELD SUPERVISION AND DENSITY TESTING**

Construction observation and testing by a field technician under the direction of a licensed geotechnical engineer should be provided. Some adjustments in the test frequencies may be required based upon the general fill types and soil conditions at the time of fill placement.

It is recommended that all site and subgrade preparation, proof rolling, and pavement construction be monitored by a qualified engineering firm. Density tests should be performed to verify proper compaction and moisture content of any earthwork. Inspection should be performed prior to and during concrete placement operations.



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