CSB
CITY OF LYTLE, TEXAS

Railroad Street/McDonald Street 12” Water Main Loop – CSB - #2025-02-02

BID OPENING DATE:
MARCH 7, 2025

CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
FOR
CITY OF LYTLE
Railroad Street/McDonald Street 12" Water Main Loop – CSB - 2025-02-02

TABLE OF CONTENTS

THIS PAGE LEFT BLANK INTENTIONALLY

PROPOSAL OPENING DATE:
March 7, 2025

CSB – 2025-02-02
SCHEDULE SUMMARY

Wednesday	**February 12, 2025** The Devine News and www.CivCastUSA.com	Bid Documents Released and 1st Legal Advertising for Bid
Wednesday	**February 19, 2025** The Devine News and www.CivCastUSA.com	2nd Legal Advertising for Bid
Friday	**February 21, 2025** **10:00 A.M.** Zoom Meeting with Link to be Provided Through www.CivCastUSA.com	Pre-Bid Conference
Wednesday	**February 26, 2025**	Last day for inquiries and clarifications. (*Please submit all questions via www.CivCastUSA.com*)
Friday	**March 7, 2025** **10:00 AM** www.CivCastUSA.com/ebidding and City of Lytle City Hall **10:05 AM** Zoom Meeting with Link to be Provided through www.CivCastUSA.com	**Deadline for Submission of Bids via www.CivCastUSA.com or via Hard Copy** **Opening of Bids via Teleconference**
Monday	**March 24, 2025** City of Lytle City Hall	City Council Meeting Award of Bid and Contract

Note: This schedule is preliminary and may be modified at the discretion of the owner.

THIS PAGE LEFT BLANK INTENTIONALLY

INVITATION TO BID
CSB – 2025-02-02

Railroad Street/McDonald Street 12" Water Main Loop

The City of Lytle, Texas is accepting Competitive Sealed Bids for all Bids using CivCast USA ("CivCast") website www.CivCastUSA.com for all supervision, materials, labor and equipment necessary for the Railroad Street/McDonald Street 12" Water Main Loop project in City of Lytle, Texas.

Copies of the bidding documents may be reviewed and obtained from www.CivCastUSA.com: search "Railroad Street/McDonald Street 12" Water Main Loop". Bidders must register on this website in order to view and/or download specifications, plans, and other related documents for this project. There is NO charge to view or download documents. Historically Underutilized Businesses (HUBs), minority businesses, women's business enterprises, and labor surplus area firms are encouraged to submit a proposal.

A NON-MANDATORY PRE-BID TELECONFERENCE WILL BE HELD VIA ZOOM ON FRIDAY FEBRUARY 21, 2025 at 10:00 A.M. A LINK TO THE ZOOM MEETING WILL BE PROVIDED THROUGH WWW.CIVCASTUSA.COM

BIDS MUST BE RECEIVED VIA E-BIDDING USING THE CIVCAST WEBSITE OR, IF SUBMITTING BY HARD COPY, BY THE CITY SECRETARY OF THE CITY OF LYTLE NO LATER THAN 10:00 AM ON FRIDAY, MARCH 7, 2025. NO BID WILL BE ACCEPTED AFTER THAT DATE AND TIME. ALL BIDS RECEIVED AFTER THAT DATE AND TIME WILL BE CONSIDERED UNRESPONSIVE. IT IS THE SOLE RESPONSIBILITY OF THE BIDDER TO ENSURE THAT HIS/HER BID IS ACTUALLY SUBMITTED THROUGH THE CIVCAST WEBSITE OR IN THE CITY SECRETARY'S OFFICE PRIOR TO THE BID SUBMISSION DEADLINE.

Any Bids submitted via hard copy for consideration must include one (1) original in hard copy and one (1) electronic version, be clearly marked on the outside of the sealed envelope with the words "CSB – 2025-02-02, Railroad Street/McDonald Street 12" Water Main Loop" Attention: City Secretary, and must contain the name of the company submitting the Bid.

BIDS WILL BE PUBLICLY OPENED AND READ VIA TELECONFERENCE VIA ZOOM ON FRIDAY, MARCH 7, 2025 AT 10:05 A.M. A LINK TO THE ZOOM MEETING WILL BE PROVIDED THROUGH WWW.CIVCASTUSA.COM.

Bid security in the amount of not less than five percent (5%) of the total amount of the Bid must accompany each Bid as a guarantee that the Successful Bidder will enter into a proper Contract and execute Bonds and Guaranties on the forms provided within eight (8) calendar days after the date Contract Documents are received by the Contractor.

Upon consideration of the Bids, the City Council plans to award a Contract; however, the City reserves the right to reject any or all bids, to waive any or all irregularities, formalities or technicalities, and to accept any bid that it deems advantageous to the City. Bids shall be valid for a period of ninety (90) days from the date Bids are opened. Each bidder agrees to waive any claim it has or may have against the city, the Engineer, and their respective employees, arising out of or in connection with the administration, evaluation or recommendation of any bid. The Successful Bidder will be required to furnish a performance bond and a payment bond each in an amount of 100% of the total contract price.

1st Advertisement: The Devine News, Wednesday, February 12, 2025

2nd Advertisement: The Devine News, Wednesday, February 19, 2025

BID TYPE – BID NUMBER
CITY OF LYTLE BID TITLE
SCOPE OF WORK AND SPECIAL CONDITIONS

I. SCOPE OF WORK

The scope of work under this bid shall include all materials, labor, equipment, supervision, and incidentals for construction of new 12" PVC water main pipe and associated appurtenances. Work of the Contract includes, but is not limited to the following:

1. The installation of approximately 4,200 linear feet of new 12" PVC water pipe and associated appurtenances and the abandonment of approximately 3,000 linear feet of existing 6" water main. The work limits are between Railroad Street at the N. Prairie Street intersection, along Railroad Street to the McDonald Street intersection; along McDonald Street to the IH-35 southbound frontage road intersection; and under IH-35 to the northbound frontage road and FM 2790 intersection.

All work shall be performed in accordance with the Construction Plans developed for the project which are available from www.CivCastUSA.com and Technical Specifications provided herein.

II. RESPONSIBILITIES OF THE CONTRACTOR

The bidder must be capable of performing all responsibilities normally associated with providing the installation of new 12" PVC water pipe and associated appurtenances in accordance with the Construction Plans developed for the Project and Technical Specifications provided herein. The successful bidder shall furnish all supervision, materials, labor, and equipment for work delineated above.

III. CONSTRUCTION SCHEDULE

Following award of bid, City and the City's Engineer will meet with the successful bidder to develop and submit a construction schedule for the total scope of work. City may also request successful bidder to develop and submit a construction schedule for phase of the project if applicable. The successful bidder will be required to complete the entire scope of work as outlined in Section I above within **400** calendar days after the date of the first written notice to proceed issued by the City, **with the work along McDonald Street between SH 132/Main Street and IH-35, inclusive of the crossing under IH-35, be completed by September 30, 2025**. The work to be performed shall be commenced within ten (10) calendar days after the date a written notice to proceed has been issued to successful bidder by the City. Construction activity is allowed Monday through Friday, 7:00 a.m. to 7:00 p.m. Saturday and Sunday, 9:00 a.m. to 6:00 p.m., unless otherwise permitted by the Director of Public Works in compliance with the City's noise regulations.

IV. USE OF SUBCONTRACTORS

The City specifically prohibits the use of subcontractors without written authorization. Authorized subcontractors are subject to the same insurance requirements as stated in the Contractor Insurance Requirements provided in this Bid.

V. SAFETY REGULATIONS

The successful bidder's personnel shall wear orange safety vests on all job sites. Work gloves and other appropriate clothing/shoes shall be worn. The successful bidder's personnel must have received the appropriate safety training prior to start of work.

VI. TRAFFIC CONTROL PLANS

Contractor will be responsible for installing and maintaining a Traffic Control Plan contained in the Construction Plans if applicable.

VII. SUBSURFACE UTILITY EXPLORATION

It is not represented that Construction Plans show all existing utility structures and infrastructure. It is the Contractor's responsibility to determine the depth, location and their existence which may conflict with the proposed construction by referring to available records, consulting appropriate municipal departments and utility owners and by making necessary exploration and excavations. All investigative work will be done and all repairs required after completion of investigative work shall be performed by the Contractor at no additional cost to the project, unless otherwise stated in the contract documents. Whatever existing utilities, not indicated on the Construction Plans, present obstructions to grade and alignment of pipe, immediately notify the City and City's Engineer, who without delay, will determine whenever existing utilities are to be relocated, or grade and alignment of proposed pipe changed. When necessary to move services, poles, guy wires, decorative lights, pipelines, or other obstructions, the Contractor shall contact and coordinate and make arrangements with owners of said utilities. The City will not be liable for damages on account of delays due to changes or adjustments made by owners of privately owned utilities and faulty workmanship by owners of privately owned utilities which hinder progress of work regardless of work authorized by the City or other entities. It is the Contractor's responsibility to install the proposed utilities and maintain proper clearances with all existing utilities and meet the regulatory requirements. Any damage to existing sprinklers or sanitary sewer service lines shall be repaired to the City's satisfaction at no additional cost to the project.

In the event a utility (shown or not shown on the plan drawings) including but not limited to gas, electric, telephone, cable, standard lighting and decorating lighting, petroleum or petroleum related pipelines is exposed due to excavation and is in conflict, the appropriate company shall be contacted by the Contractor. The Contractor shall make a concerted effort to the City's Engineer's satisfaction to identify the utility (if unknown) and avoid any conflict with the utility. The Contractor shall provide all the necessary documentation for the efforts extended by the Contractor in locating the utility. The

documentation shall be either telephone conversation memos, letters, meeting on site and other coordination efforts utilized to identify the utility or pipeline. The City's Engineer will review all the documentation provided by the Contractor. In the event of a conflict with the utility, and the City's Engineer concurs that the Contractor had made a concerted effort to avoid the conflict and in spite of his effort, the conflict cannot be avoided without the utility being relocated, the City will assist in coordinating the relocation efforts of the utility with the pertinent company. (The Contractor is still responsible for coordinating efforts with the utility or the pipeline company.) The Contractor during the period the utility is being relocated, will move his crew(s) to other areas at his own expense. The Contractor will not be due any compensation for delays or downtime resulting from the coordination and relocation efforts performed by the Contractor or the utility owner due to the utility conflict. The Contractor may request additional time if the relocation effort substantially hinders his construction effort. No additional payment will be made. If the Contractor chooses to assist the utility or pipeline company in the performance of their work, he shall be doing that at his own risk. The City will not be responsible for costs incurred by the Contractor from providing such assistance to the utility or pipeline companies.

The Contractor is made aware and shall make provisions in his unit price bid to allow for changes in alignment (vertical and horizontal) of the proposed utility (storm, water, sanitary sewer or force main) and roadway during construction to avoid conflicts, conditions encountered in the field, and to expedite construction. The Contractor is made aware that the water line may be required to be installed at a deeper elevation than shown on the plan drawings to avoid conflicts and to maintain clearances with utilities. No additional payment shall be made for the increased installation efforts expended by the Contractor. The City will not be responsible for any claims for downtime costs resulting from such conflicts. If the change in alignment results in increased quantities of the pertinent item, the Contractor shall be paid at the established bid unit price in the Contract.

THIS PAGE LEFT BLANK INTENTIONALLY

INSTRUCTIONS TO BIDDERS

READ THIS ENTIRE DOCUMENT CAREFULLY AND FOLLOW ALL INSTRUCTIONS. YOU ARE RESPONSIBLE FOR FULFILLING ALL THE REQUIREMENTS STATED HEREIN. THE INSTRUCTIONS AND CONDITIONS APPLY TO ALL BIDS/PROPOSALS AND BECOME A PART OF THE TERMS AND CONDITIONS OF ANY BID/PROPOSAL SUBMITTED AND ANY AGREEMENT ENTERED INTO SUBSEQUENT THERETO, UNLESS EXCEPTION IS TAKEN IN WRITING BY BIDDER WHEN SUBMITTING BID.

1. BIDS, PREPARATION AND SUBMITTAL

Bidders must utilize the Bid Form and must submit either via e-bidding using www.CivCastUSA.com website or, if submitting by hard copy, one (1) original in hard copy and one (1) electronic version of the sealed bid/written quote/proposal as required in the Invitation to Bid to the City Secretary prior to the response due date and time as described in the Invitation to Bidders. Bidders are strongly encouraged to submit their bid via e-bidding using www.CivCastUSA.com. Failure to submit the required bid documents may result in the bid being declared unresponsive to specification and may not be further evaluated.

For Bids submitted by hard copy, all figures must be written in ink or typed. Figures written in pencil or erasures are not acceptable. However, mistakes may be crossed out, corrections inserted and initialed in ink by the person signing the Bid Form. No oral, telegraphic, telephonic, e-mailed or facsimile bids will be considered. For additional instructions related to Bid Preparation, please see the General Conditions of Bidding contained herein.

2. INTENT OF BID DOCUMENTS

Bidders should fully inform themselves as to all conditions and matters which can in any way affect the costs thereof. Should a bidder find discrepancies in, or omission from, the bid documents or should there be any doubt as to their meaning and intent, the Bidder should notify the City or the City's Engineer by submitting a question through www.CivCastUSA.com prior to the last day for inquires and clarifications as outlined in the Bid Summary Schedule and obtain clarification prior to submitting a bid.

The submission of a bid by Bidder shall be conclusive evidence that the Bidder is fully acquainted with and satisfied as to character, quality and quantity of equipment and/or services to be furnished.

3. PRE-BID CONFERENCE

A non-mandatory pre-submittal conference will be held via Zoom on Friday, February 21, 2025 at 10:00 A.M. A link for the Zoom meeting will be provided through www.CivCastUSA.com.

DELIVERY OF BIDS

Bids received prior to the time of the opening will be kept securely unopened. Bids received after the time specified in the Invitation to Bid shall be considered late and shall be returned unopened. The person whose duty it is to open the bids will decide when the specified time has arrived for the opening of the bids. No responsibility will be attached to an officer of the City for the premature opening of a bid not properly addressed and identified. No oral, telegraphic, telephonic, e-mailed or facsimile bids will be considered.

4. SIGNATURES ON BIDS SUBMITTED IN HARD COPY

All Bid responses submitted in hard copy are required to be signed by an authorized representative of the bidding entity. Bid responses received unsigned will result in the bid being declared unresponsive to specification and may not be further evaluated.

5. BID ALTERATION/WITHDRAWAL

Bids cannot be altered or amended after the Bid Deadline. For Bids submitted via hard copy, the signer of the bid, guaranteeing authenticity, must initial any interlineations, alteration, or erasure made before the Bid Deadline. Hard copy bids may be withdrawn by written request signed by the bidder prior to the Bid Deadline; however, such written request must be received by the City in the normal course of business and prior to the Bid Deadline. Negligence on the part of the bidder in preparing the bid represents no right for withdrawal after the Bid Deadline. No bids may be withdrawn for a period of ninety (90) calendar days after the Bid Deadline.

6. DISQUALIFICATIONS OF BIDDERS

The bidders may be disqualified and their bids and proposals not considered for the following reasons, including, but not limited to:

- Reason for believing collusion exists between bidders.
- The bidder being an interested party in any litigation against the City.
- Failure to use the Bid Form furnished by the City.
- The bidder lacks necessary experience, qualifications or financial capability to complete the project in the manner required by these bid documents.
- Failure to comply with any of the requirements contained herein.
- Lack of signature by an authorized representative on the Bid Form for bids submitted via hard copy.
- Failure to properly complete the Bid Form.
- Bidder is indebted to the City.
- Communicating with an elected official regarding this bid or its award.

Bidders may be required to show evidence that they have successfully completed an equivalent project within the past three (3) years to qualify for this work.

7. BID OPENINGS

All bids submitted in compliance with the Bid Deadline will be opened publicly and read via teleconference via Zoom, at the date and time shown in the Invitation to Bidders. A link to the Zoom meeting will be provided through www.CivCastUSA.com. However, the reading of a bid at bid opening should not be construed as a comment on the responsiveness of such bid or as any indication that the City accepts such bid as responsive. The City will make a determination as to the responsiveness of bids submitted based upon compliance with all applicable laws, City of Lytle Purchasing Guidelines, and project documents, including, but not limited to, the project specifications and contract documents. The City will notify the successful bidder upon award of the contract, and, according to State law, all bids received will be available for inspection at that time, unless otherwise provided by law.

8. BASIS OF AWARD

It is the intent of the City to award the Contract to the lowest responsible bidder in compliance with Section 252.043 of the Texas Local Government Code. It shall be based on all factors which have a bearing on price and performance of the items in the user environment. All bids are subject to re-tabulation. Compliance with all bid requirements, delivery and needs of the using department are considerations in evaluating bids.

The City of Lytle reserves the right to contact any offer, or at any time, to clarify, verify or request information with regard to any bid. The City reserves the right to waive any formality or irregularity, to make awards to more than one offer or, or to reject any or all bids.

9. BID TABULATION

Bidders desiring a copy of the bid tabulation may download a copy from www.CivCastUSA.com.

10. PROTESTS

All protests regarding the bid solicitation process must be submitted in writing to the City within five (5) working days following the opening of the bids. This includes all protests relating to advertising of bid notices, deadlines, bid opening, and all other related procedures under the Texas Local Government Code, as well as any protests relating to alleged improprieties or ambiguities in the specifications.

This limitation does not include protests relating to staff recommendations as to award of this bid. Protests relating to staff recommendations may be directed to the City Administrator within five (5) working days of the staff recommendation memo. Unless otherwise provided by law, all staff recommendations will be made available for public review prior to consideration by the City Council.

THIS PAGE LEFT BLANK INTENTIONALLY

GENERAL CONDITIONS OF BIDDING

This Bid does not commit the City of Spring Valley Village to award a contract or to pay any costs incurred as a result of preparing such a response. The City reserves the right to accept or reject any and all responses received in response to this request, to negotiate with all qualified respondents or to cancel in part or in its entirety this Bid if it is in the best interest of the City.

A contract based on the awarded bid will be executed. This should be considered and reflected in the proposal.

BIDDING

1. PRICING: Price(s) quoted must be held firm for a minimum of ninety (90) days from the date of bid closing. In the case of estimated requirement contract bid, the prices must remain firm for the period as specified in the bid. “Discount from list” bids are not acceptable unless specifically requested in the bid.

2. QUANTITIES: In the case of estimated requirements contract bid, quantities appearing are estimated as realistically as possible. However, the City reserves the right to increase, decrease or delete any item or items of material to be furnished while continuing to pay the price quoted on this bid regardless of quantity. The successful bidder shall have no claim against the City for anticipated profits for the quantities called for, diminished, or deleted.

3. ERROR-QUANTITY: Bids must be submitted on units of quantity specified, extended, and show total. In the event of discrepancies in extension, the unit prices shall govern.

4. F.O.B./DAMAGE: Quotations shall be bid freight on board (F.O.B.) delivered to the designated job site in Lytle, Texas and shall include all delivery and packaging costs. The City assumes no liability for goods delivered in damaged or unacceptable condition. The successful bidder shall handle all claims with carriers, and in case of damaged goods, shall ship replacement goods immediately upon notification by the City.

5. DELIVERY PROMISE-PENALTIES: Bids MUST show the number of calendar days required to place the material in the possession of the City. Do not quote shipping dates. When delivery delay can be foreseen, the bidder shall give prior written notice to the City, who shall have the right, in its sole discretion, to extend the delivery date if reasons for delay appear acceptable. Default in promised delivery, without acceptable reasons, or failure to meet specifications, authorizes the City to purchase the goods elsewhere, and charge any increase in cost and handling to the defaulting bidder.

6. DESCRIPTIONS: Any reference to model and/or make/manufacturer used in bid/proposal specifications is descriptive, not restrictive. It is to be used to indicate the type and quality desired. Qualifications on items of like quality will be considered.

7. EXCEPTIONS/SUBSTITUTIONS: All submittals meeting the intent of this bid/request for proposal will be considered for award. Bidders taking exception to the specifications, or offering substitutions, shall state these exceptions in the section provided or by attachment as part of the qualifications. The absence of such a list shall indicate that the Bidder has not taken exceptions and shall hold the Bidder responsible to perform in strict accordance with the specifications of the invitation. The City of Lytle reserves the right to accept any and all or none of the exception(s)/substitution(s) deemed to be in the best interest of the City.

8. PROPRIETARY INFORMATION: If a bid/proposal contains proprietary information, the respondent must declare such information as proprietary if respondent does not want information to become public. Any proprietary information must be indicated in the index and clearly identified in the qualifications.

9. CORRESPONDENCE: This bid number must appear on ALL correspondence, inquiries, bid submittal documents, etc. pertaining to this Invitation for Bid.

10. ADDENDA: Any interpretations, corrections or changes to this Invitation for Bid and specifications will be made via www.CivCastUSA.com. Sole issuing authority of addenda shall be vested in the City of Lytle's Engineer.

11. CHANGE ORDERS: No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in the resulting contract. All change orders to the contract will be made in writing by the City.

12. INQUIRIES: Any inquiries concerning the bid documents shall be submitted to the City's Engineer through www.CivCastUSA.com. Inquiries are permitted until the deadline as indicated in the Bid Schedule Summary. Necessary replies will be issued to bidders of record as addenda, which become a part of the bidding documents. Oral instructions do not form a part of the bidding documents. Any attempt on the part of a bidder or his representative to contact an elected official regarding this bid or its award will disqualify the bidder.

PERFORMANCE

13. MINIMUM STANDARDS FOR RESPONSIBLE PROSPECTIVE BIDDERS: A prospective bidder must affirmatively demonstrate bidders' responsibility. A prospective bidder must meet the following requirements:

    A. Have adequate financial resources, or the ability to obtain such resources as required;
    B. Be able to comply with the required or proposed delivery schedule;
    C. Have a satisfactory record of performance;

D. Have a satisfactory record of integrity and ethics; and
E. Be otherwise qualified and eligible, as determined by the City, to receive an award.

The City may request representation and other information sufficient to determine bidders' ability to meet these minimum standards listed above.

14. ASSIGNMENT: The successful bidder shall not sell, assign, transfer or convey this Contract in whole or in part, without the prior written consent of the City.

15. SPECIFICATION-SAMPLES: Any catalog, brand name, or manufacturer's reference used is considered to be descriptive, not restrictive, and is indicative of the type and quality the City desires to purchase. Bids on brands of like nature and quality may be considered unless specifically excluded. If bidding on other than reference, bid must certify article offered is equivalent to specifications and it is subject to approval by the using department and the Purchasing Division. Samples, if required, shall be furnished free of expense to the City. SAMPLES SHOULD NOT BE ENCLOSED WITH BID UNLESS REQUESTED.

16. LABATORY TESTING: An agent so designated by the City, without expense to the City, may perform testing at the request of the City or any participating entity.

17. PACKAGING: Unless otherwise indicated, items will be new, unused, and in first class condition in containers suitable for damage-free shipment and storage.

18. DELIVERY: Deliveries will be acceptable only during normal working hours at the designated City Municipal Facility or Job Site. The place of delivery shall be set forth in the purchase order. The terms of this agreement are "no arrival, no sale".

19. TITLE AND RISK OF LOSS: The title and risk of loss of goods shall not pass to the City until the City actually receives and takes possession of the goods at the point(s) of delivery.

20. PATENT RIGHTS: The Bidder agrees to indemnify and hold the City harmless from any claim involving patent right infringement or copyrights on goods supplied.

21. ETHICS: The respondent shall not offer or accept gifts or anything of value nor enter into any business arrangement with any employee, official or agent of the City of Lytle.

PURCHASE ORDERS AND PAYMENT

22. PURCHASE ORDERS: A purchase order(s) shall be generated by the City to the successful bidder. The purchase order number must appear on all itemized invoices and packing slips. The City will not be held responsible for any work orders placed and/or performed without a valid current purchase order number. Payment will be made for all services rendered and accepted by the contract administrator for which a valid invoice has been received.

23. BID SECURITY/BOND REQUIREMENTS: If required, bid security shall be submitted with bids. Any bid submitted without bid bond, or cashiers/certified check, shall be considered non-responsive and will not be considered for award. Performance and/or payment bonds, when required, shall be submitted to the City, prior to commencement of any work pursuant to the agreement provisions.

24. APPROPRIATION CLAUSE: The City of Lytle is a Texas type A municipal City operated and funded on an October 1 to September 30 basis. Accordingly, the City reserves the right to terminate, without liability to the City, any contract for which funding is not available.

25. TAXES: The City is exempt from Federal Manufacturer's Excise, and State sales taxes. TAX MUST NOT BE INCLUDED IN the PROPOSAL PRICING. Tax exemption certificates will be executed by the City and furnished upon request by the Finance Director.

26. PAYMENT TERMS: Payment terms are Net 30 upon receipt and acceptance by the City for item(s) and/or service(s) ordered and delivered after receipt of a valid invoice, in accordance with the State of Texas Prompt Payment Act, Chapter 2251, Texas Government Code. Prompt payment discounts may be used by the City in determining the lowest responsible bidder. Successful respondent is required to pay subcontractors within ten (10) days of work performed.

27. INVOICES: Invoices must be submitted electronically to City of Lytle, Attn: LaNet Hester, Finance Director, lanet.hester@lytletx.org. The respondent awarded the proposal must fill out a Vendor Packet provided by the City and returned to the City before invoices can be processed.

CONTRACT

28. CONTRACT PERIOD/RENEWAL OPTIONS: In the case of an annual contract bid, the contract shall be for a predetermined period as specified in the Invitation for Bids. If a clause for option to renew for additional period(s) is(are) included, renewal(s) will be based solely upon the option and written agreement between both the City and the Contractor. Either party dissenting will terminate the contract in accordance with its initial specified term.

29. INTERLOCAL AGREEMENT: Successful bidder agrees to extend prices to all entities that have entered into or will enter into joint purchasing Interlocal Cooperation Agreements with the City. The City has executed Interlocal Agreements, as permitted under Section 791.025 of the Texas Government Code with certain other governmental entities. The successful bidder may be asked to provide products/services, based upon bid price, to any other participant in which the City has entered into an Interlocal Agreement for purchasing.

30. ELECTRONIC PROCUREMENT: The City of Lytle has adopted policies and procedures complying with Local Government Code Section 252.0415, Section 271.906 and Section 2155.062 of the Texas Government Code. The City of Lytle may receive submittals in electronic form in response to procurement requests. However, a proposal that is submitted non-electronically by the due date and time will be accepted and then entered electronically by Purchasing after the proposal opening.

31. AUDIT: The City reserves the right to audit the records and performance of successful bidder during the term of the contract and for three (3) years thereafter.

32. SUCCESSFUL BIDDER SHALL: Defend, indemnify and save harmless the City and all its officers, agents and employees and all entities, their officers, agents and employees who are participating in this contract from all suits, actions or other claims of any character, name and description brought for or on account of any injuries, including death, or damages received or sustained by any person, persons, or property on account of any negligent act or fault of the successful bidder, or of any agent, officer, director, representative, employee, subcontractor or supplier in the execution of, or performance under, any contract which may result from bid award. Successful bidder shall pay any judgment with cost which may be obtained against the City and participating entities growing out of such injury or damages.

33. TERMINATION FOR DEFAULT: The City reserves the right to enforce the performance of this contract in any manner prescribed by law or deemed to be in the best interest of the City in the event of breach or default of this contract. The City reserves the right to terminate the contract immediately in the event the successful bidder fails to: (1) meet delivery schedules; or (2) otherwise perform in accordance with these specifications.

    In the event the successful respondent shall fail to perform, keep or observe any of the terms and conditions to be performed, kept or observed, the City of Lytle shall give the successful respondent written notice of such default; and in the event said default is not remedied to the satisfaction and approval of the City within seven (7) working days of receipt of such notice by the successful respondent, default will be declared and all the successful Respondent's rights shall terminate. Respondent, in submitting this bid, agrees that the City of Lytle shall not be liable to prosecution for damages in the event that the City declares the respondent in default.

    Breach of contract or default authorizes the City to, among other things, award to another bidder, purchase elsewhere and charge the full increase in cost and handling to the defaulting successful bidder.

34. ACCEPTABILITY: All articles enumerated in the bid shall be subject to inspection by a City officer or employee designated for the purpose. If found inferior to the quality called for, or not equal in value to the specifications, deficient in workmanship or otherwise, this fact shall be certified to the City Administrator who shall have the right to reject the whole or any part of the same. Work determined to be contrary to specifications must be replaced by the bidder and at its expense. All disputes concerning quality of supplies utilized in the performance of this bid will be determined solely by the City Administrator or designated representative.

35. REMEDIES: The successful bidder and the City agree that each party has all rights, duties, and remedies available as stated in the Uniform Commercial Code and any other available remedy, whether in law or equity.

36. VENUE: This contract will be governed and construed according to the laws of the State of Texas. This contract is performable in Atascosa County, Texas.

37. SILENCE OF SPECIFICATION: The apparent silence of these specifications as to any detail or to the apparent omission from it of a detailed description concerning any point shall be regarded as meaning that only the best commercial practices are to prevail. All interpretations of these specifications shall be made on the basis of this statement.

38. NO PROHIBITED INTEREST: The bidder acknowledges and represents they are aware of the laws regarding conflicts of interest. In compliance with Local Government Code §176.006, as amended, all respondents shall submit a completed conflict of interest questionnaire as provided herein with their bid submittal.

39. DECEPTIVE TRADE PRACTICES/UNFAIR BUSINESS PRACTICES: By submission of a bid response, the respondent represents and warrants that it has not been the subject of allegations of Deceptive Trade Practices violations under Tex. Bus. & Com. Code Chapter 17 or allegations of any unfair business practice in any administrative hearing or court suit that the respondent has not been found to be liable for such practices in such proceedings.

40. FELONY CRIMINAL CONVICTIONS: The respondent represents and warrants that neither the Respondent nor the Respondent's employees have been convicted, or have a pending felony criminal offense, or that, if such a conviction has occurred, the Respondent has fully advised the City of Lytle as to the facts and circumstances surrounding the conviction.

41. SEVERABILITY**:** If any section, subsection, paragraph, sentence, clause, phrase or word of these requirements or specifications shall be held invalid, such holding shall not affect the remaining portions of these requirements and the specifications and it is hereby declared that such remaining portions would have been included in these requirements and the specifications as though the invalid portion had been omitted.

42. FORCE MAJEURE: If, by reason of Force Majeure, either party hereto shall be rendered unable wholly or in part to carry out its obligations under this contract, then such party shall give notice and full particulars of such Force Majeure in writing to the other party within a reasonable time after occurrence of the event or cause relied upon, and the obligation of the party giving such notice, so far as it is affected by such Force Majeure, shall be suspended during the continuance of the inability then claimed, except as hereinafter provided, but for no longer period, and such party shall endeavor to remove or overcome such inability with all reasonable dispatch. The term Force Majeure as employed herein, shall mean acts of God, strikes, lockouts, or other industrial disturbances, act of public enemy, orders of any kind of government of the United States or the State of Texas or any civil or military authority, insurrections, riots, epidemics, landslides, lightning, earthquake, fires, hurricanes, storms, floods, washouts, droughts, arrests, restraint of government and people, civil disturbances, explosions, breakage or accidents to machinery, pipelines, or canals, or other causes not reasonable within the control of the party claiming such inability. It is understood and agreed that the settlement of strikes and lockouts shall be entirely within the discretion of the party having the difficulty, and that the above requirement that any Force Majeure shall be remedied with all reasonable dispatch shall not require the settlement of strikes and lockouts by acceding to the demands of the opposing party or parties when such settlement is unfavorable in the judgment of the party having the difficulty.

43. CERTIFICATE OF INTERESTED PARTIES (FORM 1295): Section 2252.908 of the Texas Government Code states that a governmental entity or state agency may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency. The law applies only to a contract of a governmental entity or state agency that either (1) requires an action or vote by the governing body of the entity or agency before the contract may be signed or (2) has a value of at least $1 million.

    A business entity must enter the required information on Form 1295 online at https://www.ethics.state.tx.us/File/ and print a copy of the completed form, which will include a certification of filing that will contain a unique certification number. An authorized agent of the business entity must sign the printed copy of the form and have the form notarized. The completed Form 1295 with the certification of filing must be filed with City.

THIS PAGE LEFT BLANK INTENTIONALLY

CITY OF LYTLE CONTRACTOR INSURANCE REQUIREMENTS

Contractors providing good, materials and services for the City of Lytle shall, during the term of the contract with the City or any renewal or extension thereof, provide and maintain the types and amounts of insurance set forth herein. All insurance and certificate(s) of insurance shall contain the following provisions:

1. Name the City, its officers, agents, representatives, and employees as additional insureds as to all applicable coverage with the exception of workers compensation insurance.
2. Provide for at least thirty (30) days prior written notice to the City for cancellation, non-renewal, or material change of the insurance.
3. Provide for a waiver of subrogation against the City for injuries, including death, property damage, or any other loss to the extent the same is covered by the proceeds of insurance.

Insurance Company Qualification: All insurance companies providing the required insurance shall be authorized to transact business in Texas and rated at least “A” by AM Best or other equivalent rating service.

Certificate of insurance: A certificate of insurance evidencing the required insurance shall be submitted with the contractor’s bid or response to proposal. If the contract is renewed or extended by the City, a certificate of insurance shall also be provided to the City prior to the date the contract is renewed or extended.

Type of Contract	Type and amount of Insurance
Public Works and Construction	General Liability insurance for personal injury (including death) and property damage with a minimum of $1 Million Dollars per occurrence and $2 Million Dollars aggregate, including advertising injury, products coverage and (XCU) Explosion, collapse and underground (If high risk or dangerous activities) Umbrella Coverage or Excess Liability Coverage of $2 Million Dollars Statutory Workers compensation insurance as required by state law
Professional Services	Professional Liability Insurance with a minimum of $1 Million Dollars per occurrence and $2 Million Dollars aggregate. (If size or scope of project warrant) Umbrella Coverage or Excess Liability Coverage of $2 Million Dollars

Special Events	General Liability insurance for personal injury (including death) and property damage with a minimum of $1 Million Dollars per occurrence and $2 Million Dollars aggregate, including coverage for advertising injury and products coverage Statutory Workers compensation insurance as required by state law (If the contractor serves alcoholic beverages) Liquor Liability with a minimum of $1 Million Dollars per Occurrence and $2 Million Aggregate. (If high risk or dangerous activities) Umbrella Coverage or Liability Excess Coverage of $ 2 Million Dollars (If automobile or limousine service is involved even if volunteers) Automobile Liability with a minimum of $1 Million Dollars combined single limit.

SCHEDULE OF DRAWINGS
CBS – 2025-02-02

RAILROAD STREET/MCDONALD STREET 12” WATER MAIN LOOP

Sheet No.	Drawing Title
1	Cover Sheet
2	General Construction Notes I
3	General Construction Notes II
4	Legends, Symbols & Abbreviations
5	Overall Site Plan
6	12” WL-A Sta 0+00 to 5+00
7	12” WL-A Sta 5+00 to 10+00
8	12” WL-A Sta 10+00 to 15+00
9	12” WL-A Sta 15+00 to 20+00
10	12” WL-A Sta 20+00 to 25+00
11	12” WL-A Sta 25+00 to 30+00
12	12” WL-A Sta 30+00 to 35+00
13	12” WL-A Sta 35+00 to 40+00
14	12” WL-A Sta 40+00 to 45+00
15	12” WL-A Sta 45+00 to 50+00
16	12” WL-A Sta 50+00 to 55+00
17	12” WL-A Sta 55+00 to End
18	12” WL-B Sta 0+00 to End

19	**12” WL-C Sta 0+00 to End**
20	**6” Water Mains**
21	**4” Water Mains**
22	**Details 1**
23	**Details 2**
24	**Erosion Control Plan**
25	**Erosion Control Details**
26	**TCP Overall Layout**
27	**Railroad St TCP 1**
28	**Railroad St TCP 2**
29	**McDonald Street (FM 2790) TCP 1**
30	**McDonald Street (FM 2790) TCP 2**
31	**Lytle Somerset St TCP**
32	**TxDOT Traffic Control Details 1**
33	**TxDOT Traffic Control Details 2**
34	**TxDOT Traffic Control Details 3**
35	**TxDOT Traffic Control Details 4**
36	**TxDOT Traffic Control Details 5**
37	**TxDOT Traffic Control Details 6**

SUPPLEMENTAL INFORMATION

Texas Government Code Section 2252.002 Non-resident bidders. A governmental entity may not award a governmental contract to a nonresident bidder unless the nonresident underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located.

In order to make this determination, please answer the following questions:

1. Address and phone number of your principal place of business:

   _____
   _____
   _____
   _____

2. Name and address of principal place of business, and phone number of your company's majority owner:

   _____
   _____
   _____
   _____

3. Name and address of principal place of business, and phone number of your company's ultimate parent company:

   _____
   _____
   _____
   _____

MINORITY/WOMAN-OWNED BUSINESS PARTICIPATION

It is the policy of the City of Spring Valley Village to involve small businesses and qualified minority/women-owned businesses to the greatest extent possible in the procurement of goods, equipment, services and construction projects. To assist us in our record keeping, please list below the names of the minority or woman-owned firms you would be utilizing in this bid, and note the monetary involvement:

NAME OF FIRM	TELEPHONE #	$ INVOLVEMENT

THIS PAGE LEFT BLANK INTENTIONALLY

BID FORM

CITY OF LYTLE, TEXAS

Railroad Street/McDonald Street 12” Water Main Loop

CSB – 2025-02-02

DATE: _____

Gentlemen:

Having carefully examined the Instructions to Bidders, the General Conditions of the Contract, and Detailed Plans and Specifications, the undersigned Bidder hereby proposes to do all the work and furnish all necessary superintendence, labor, machinery, equipment, tools and materials, and to complete all the work this refers to, for the construction of all items listed at the prices shown for each item on the following bid schedule.

The bid schedule attached lists the various divisions of construction contemplated in the Plans and Specifications. Bid prices must be shown in Words and Figures for each item listed in the Bid, and in the event of a discrepancy, the words shall control.

Receipt is hereby acknowledged of the following addenda to the Contract Documents:

Addendum No. 1 dated_____ Received_____

Addendum No. 2 dated_____ Received_____

Addendum No. 3 dated_____ Received_____

All the various phases of work enumerated in the detailed specifications with their individual jobs and overhead, whether specifically mentioned, included by implication or appurtenant thereto, are to be performed by the Contractor under one of the items listed in the bid schedule, irrespective of whether it is named in said list.

Bidder agrees to perform all of the work listed in the bid and as described in the specifications and shown on the plans, for the following unit prices:

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.1.	1	LS	For furnishing the required **Performance and Payment Bonds** for the entirety of the construction contract, as described in these specifications, for the sum of: _____ _____ Dollars _____ Cents ($) per lump sum	$_____
P.2.	1	LS	For furnishing the **Mobilization** to the site at project commencement and **De-mobilization** from the site at project end for the entirety of the construction contract, as described in these specifications, for the sum of (cannot exceed five percent (5%) of Total Bid amount): _____ _____ Dollars _____ Cents ($) per lump sum	$_____
P.3.	1	LS	For furnishing the required **Stormwater Pollution Prevention Plan** and maintaining the plan requirements for the entirety of the construction contract, as described in these specifications, for the sum of: _____ _____ Dollars _____ Cents ($) per lump sum	$_____

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.4.	14	MO	For installing **barricades, signs and traffic handling** and furnishing a **traffic control plan**, as detailed and directed, at the location shown on the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per month	$_____
P.5.	1	LS	For furnishing all labor, materials, supervision, and equipment necessary to provide complete **topographical survey and GIS files** in Texas State Plan Coordinate System NAD 83 (93), South Central Zone, information of the site improvements and provide as-built drawing for all new structures and changes made during construction, for the entirety of the construction contract, for the sum of: _____ _____ Dollars _____ Cents ($) per lump sum	$_____
P.6.	1	LS	For **protecting, removing, and disposing of vegetation of the site, grubbing, stripping, and replacing topsoil**, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per lump sum	$_____

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.7.	1	LS	For **protecting, removing, and replacing trees and landscaping**, as shown in the construction plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per lump sum	$_____
P.8.	9,745	SY	For furnishing and installing **seeding (hydro-mulching**) Bermuda grass, for erosion control, as detailed and directed, at locations shown on the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per square yard	$_____
P.9.	6,145	LF	For furnishing all material, labor, and equipment to install **silt fence** at location shown on the plans, complete in place, for the sum of : _____ _____ Dollars _____ Cents ($) per linear foot	$_____

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.10.	4	EA	For furnishing all material, labor, and equipment to install **temporary construction entrance**, per the details in and at location shown on the Plans, complete in place, for the sum of : _____ _____ Dollars _____ Cents ($) per each	$_____
P.11.	4	EA	For **existing signage removal and replacement**, at locations shown on the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per each	$_____
P.12.	30	LF	For **existing curb and gutter removal, disposal, and replacement**, at locations shown on the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.13.	366	LF	For **concrete pavement removal, disposal, and replacement**, at locations shown on the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.14.	15	LF	For **concrete flume removal, disposal, and replacement**, at locations shown on the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.15.	325	LF	For **asphalt pavement removal, disposal, and replacement**, to facilitate construction of water line under streets, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.16.	4	EA	For **removal and disposal of existing Fire Hydrant Assembly,** as described in the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per each	$_____
P.17.	3	EA	For **removal and reinstallation of existing Mailboxes,** as described in the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per each	$_____

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.18.	350	LF	For **Connecting New Service Lines to Existing Water Meter,** as described in the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per each	$_____
P.19.	3,000	LF	For **abandonment of existing 6" water main (Grout Fill)** as detailed and directed at locations shown on the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.20.	30	LF	For **abandonment of existing 12" water main (Grout Fill)** as detailed and directed at locations shown on the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.21.	4,200	LF	For furnishing and installing **12" DR 18 C900 PVC water distribution main**, **by OPEN CUT**, including excavation, bedding, backfill, offsite disposal of excess spoil material in accordance with TCEQ requirements, & density testing, at locations as shown on the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.22.	100	LF	For furnishing and installing **6" DR 18 C900 PVC water distribution main**, **by OPEN CUT**, including excavation, bedding, backfill, offsite disposal of excess spoil material in accordance with TCEQ requirements, & density testing, at locations as shown on the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.23.	40	LF	For furnishing and installing **4" DR 18 C900 PVC water distribution main**, **by OPEN CUT**, including excavation, bedding, backfill, offsite disposal of excess spoil material in accordance with TCEQ requirements, & density testing, at locations as shown on the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.24.	200	LF	For furnishing and installing **12" DR 18 Certa-Lok PVC**, **by BORE**, as described in these specifications, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.25.	18	LF	For furnishing and installing **12" Ductile Iron (*250 pressure class*) transmission main**, **by OPEN CUT**, including excavation, bedding, backfill, offsite disposal of excess spoil material in accordance with TCEQ requirements, & density testing, at locations as shown on the Plans, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.26.	1,330	LF	For furnishing and installing **24" OD x 1/4" wall smooth steel casing by BORE** including 12" Ductile iron (pressure class 250) carrier pipe with restrained joints, as described in these specifications, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.27.	18	LF	For furnishing and installing **18" OD x 1/4" wall smooth steel split casing by OPEN CUT**, as described in these specifications, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.28.	300	LF	For furnishing and installing **2" OD x 1/4" wall smooth steel casing by OPEN CUT**, with water service lines, as described in these specifications, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.29.	12	EA	For furnishing all equipment, personnel, and materials, to **Brace Overhead Electric Poles,** for the locations shown in the Plans and coordination with CPS Energy, for the sum of: _____ _____ Dollars _____ Cents ($) per each	$_____

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.30.	20	EA	For furnishing and installing **12" AWWA C519 Resilient Seat Gate Valves** to include **meg-a-lug glands**, as described in these specifications, for the sum of: _____ _____ Dollars _____ Cents ($) per each	$_____
P.31.	5	EA	For furnishing and installing **6" AWWA C519 Resilient Seat Gate Valves** to include **meg-a-lug glands**, as described in these specifications, for the sum of: _____ _____ Dollars _____ Cents ($) per each	$_____
P.32.	1	EA	For furnishing and installing **4" AWWA C519 Resilient Seat Gate Valves** to include **meg-a-lug glands**, as described in these specifications, for the sum of: _____ _____ Dollars _____ Cents ($) per each	$_____
P.33.	6,165	LF	For furnishing all labor, materials, and equipment for the inductive **Water Tracer Detection Wire** for the water mains, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.34.	4,345	LF	For furnishing all labor, materials, and equipment for the inductive **Water Tracer Detection Tape** for the water mains, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.35.	7	TON	For furnishing and **installing Ductile Iron Compact Main Line Fittings** for the proposed water lines to include **mega-lug glands**, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per ton	$_____
P.36.	700	LF	For installing street trench **flowable fill for trenches** within TxDOT rights-of-way, complete in place, for the sum of: _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.37.	1	EA	For furnishing and installing **12"x12" Tapping Sleeve and Valve,** per the locations shown in the plans and per the detail including all appurtenances as described in these specifications, for the sum of: _____ _____ Dollars _____ Cents ($) per each	$_____

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.38.	3	EA	For furnishing and installing **Air Release Valves,** per detail including all appurtenances as described in these specifications, for the sum of: _____ _____ Dollars _____ Cents ($) per each	$_____
P.39.	18	EA	For furnishing and installing **Fire Hydrant Assembly,** to include **valve and 6" D.I. Lead,** as described in these specifications, for the sum of: _____ _____ Dollars _____ Cents ($) per each	$_____
P.40.	4,700	LF	For furnishing and installing **OSHA required trench excavation protection on all waterlines**, complete in place, for the sum of _____ _____ Dollars _____ Cents ($) per linear foot	$_____
P.41.	1	EA	For furnishing all labor, materials, and equipment for the **Connection to Existing 18" Water Main**, complete in place, for the sum of _____ _____ Dollars _____ Cents ($) per each	$_____

CITY OF LYTLE RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP CSB - 2025-02-02				
ITEM NO.	NO. OF UNITS	UNIT	ITEM AND UNIT PRICE (FILL IN BOTH SCRIPT AND FIGURES)	TOTAL AMOUNT
P.42.	2	EA	For furnishing all labor, materials, and equipment for the **Connection to Existing 12" Water Main**, complete in place, for the sum of _____ _____ Dollars _____ Cents ($) per each	$_____
P.43.	3	EA	For furnishing all labor, materials, and equipment for the **Connection to Existing 6" Water Main**, complete in place, for the sum of _____ _____ Dollars _____ Cents ($) per each	$_____
P.44.	1	EA	For furnishing all labor, materials, and equipment for the **Connection to Existing 2" Water Main**, complete in place, for the sum of _____ _____ Dollars _____ Cents ($) per each	$_____
TOTAL BASE BID PROPOSAL: **(SUMMATION OF ITEMS P.1. THROUGH P.44)** _____ _____**Dollars** _____**Cents**				**$**_____

The above prices shall include all labor, materials, overhead, profit, insurance, etc. to cover the finished work of the several kinds called for.

The work proposed to be done shall be accepted when fully completed and finished in accordance with the plans and specifications to the satisfaction of the Engineer.

The undersigned Bidder hereby declares that he has visited the site of the work and has carefully examined the contract documents pertaining to the work covered in the above bid, and that the bid prices contained in the bid form have been carefully checked and are submitted as correct and final.

The Contractor agrees to complete the project on which he has bid, as specified and shown on the plans, within 400 consecutive calendar days as provided in the General Conditions of the Agreement.

In submitting this Bid, Bidder represents the following:

a. Bidder has examined copies of these bidding and contract documents and of the following Addenda (receipt of which is hereby acknowledged):

   Addenda: _____

   Date: _____ Signature: _____

b. Bidder has familiarized itself with the nature and extent of these documents, and all local conditions and Laws and Regulations that in any manner may affect cost of fulfilling the terms of contract.
c. Bidder has given the owner written notice of all conflict, errors, or discrepancies that it has discovered in these documents and the written resolution thereof by the City is acceptable to Bidder.
d. 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 titles of any group, association, organization or corporation. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid. Bidder has not solicited or induced any person, firm, or corporation to refrain from bidding. Bidder has not sought by collusion to obtain for itself any advantage over any other bidder or over the City.
e. Bidder hereby certifies that the bid prices contained in this bid have been carefully reviewed and are submitted as correct and final.
f. This Bid will remain open and subject to acceptance for sixty (60) days after the day of Bid opening.
g. As required by Chapter 2270, Government Code, Contractor hereby verifies that it does not boycott Israel and will not boycott Israel through the term of this Agreement. For purposes of this verification, “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.
h. Foreign Terrorists Organizations. Pursuant to Chapter 2252, Texas Government Code, Contractor represents and certifies that, at the time of execution of this Agreement neither Contractor, nor any wholly owned subsidiary, majority-owned subsidiary, parent company or affiliate of the same (i) engages in business with Iran, Sudan, or any foreign terrorist organization as described in Chapters 806 or 807 of the Texas Government Code, or Subchapter F of Chapter 2252 of the Texas Government Code, or (ii) is a company listed by the Texas Comptroller of Public Accounts under Sections 806.051, 807.051, or 2252.153 of the Texas Government Code. The term "foreign terrorist organization" in this paragraph has the meaning assigned to such term in Section 2252.151 of the Texas Government Code.
i. Bidder further certifies and agrees to furnish any and/or all product/service upon which prices are extended at the price offered; and accepts all of the terms and conditions of the Invitation to Bid, Specifications, Instructions to Bidders, General Conditions for Bidding and any Special Conditions contained herein.
j. Bidder hereby certifies that, if this bid is accepted, the undersigned Bidder shall enter into a contract with the City of Lytle to furnish the services as specified or indicated in these Bid documents for the price indicated in this Bid and in accordance with the other terms and conditions of such contract documents.

(Signature on next page)

BIDDER:
Company: _____ Date: _____

Signature: _____

Printed Name: _____ Title: _____

Address: _____

City, State & Zip: _____

Telephone Number: _____ Fax: _____

E-mail address: _____

Federal EID #/SSN #: _____

THIS PAGE LEFT BLANK INTENTIONALLY

REFERENCES

Each Bidder is to provide a minimum of three (3) verifiable commercial business references fro which the Bidder has performed work.

1. Company Name: _____

   Address: _____

   Contact Person: _____

   Telephone: _____

   Brief description of project: _____

   _____

   _____

2. Company Name: _____

   Address: _____

   Contact Person: _____

   Telephone: _____

   Brief description of project: _____

   _____

   _____

3. Company Name: _____

   Address: _____

   Contact Person: _____

   Telephone: _____

   Brief description of project: _____

   _____

   _____

THIS PAGE LEFT BLANK INTENTIONALLY

SUPPLEMENTAL INFORMATION – CONTRACT DEVELOPMENT

Please provide the following information for contract development.

Is your firm?

1. Sole Proprietorship _____YES _____NO
2. Partnership _____YES _____NO
3. Corporation _____YES _____NO

If company is a sole proprietorship, list the owner's full legal name:

_____

If company is a partnership, list the partner's full legal name(s):

_____
_____
_____
_____

If company is a corporation, list the full legal name as listed on the corporate charter:

_____
_____

Is this firm a minority, or woman-owned business enterprise?

____ NO ____ YES If yes, specify (____) MBE (____) WBE

Has this firm been certified as a minority/woman-owned business enterprise by any governmental agency? _____ NO _____ YES

If yes, specify governmental agency: _____
_____

Date of certification: _____

THIS PAGE LEFT BLANK INTENTIONALLY

CONFLICT OF INTEREST QUESTIONNAIRE

CONFLICT OF INTEREST QUESTIONNAIRE **FORM CIQ**

	OFFICE USE ONLY
This questionnaire is being filed in accordance with Chapter 176 of the Local Government Code by a person who has a business relationship as defined by Section 176.001(1-a) with the City of Spring Valley Village and the person meets the requirements under Section 176.006(a). By law this questionnaire must be filed with the City Secretary of the City of Spring Valley Village 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.	Date Received:

1. **Name of person who has a business relationship with the City of Spring Valley Village**.

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 City Secretary 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 other business relationship.**

Name of Officer

This section 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.

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

Yes _____ No _____

A. 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 from the City of Spring Valley Village?

Yes _____ No _____

B. 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 _____

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

4.

_____ _____

Signature of person doing business with the government entity Date

FORM 1295

CONFLICT OF INTERESTED PARTIES — FORM 1295

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

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

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

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

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

5 Check only if there is NO Interested Party. ☐

6 AFFIDAVIT

I swear, or affirm, under penalty of perjury, that the above disclosure is true and correct.

_____
Signature of authorized agent of contracting business entity

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.

STATEMENT OF BIDDER'S QUALIFICATIONS

All questions must be answered, and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information they desire.

Name of Bidder: _____ Date Organized: _____

Address: _____ Date Incorporated: _____

Number of Years in contracting business under present name: _____

CONTRACTS ON HAND:

Contract	Amount $	Completion Date

Type of work performed by your company: _____

Have you ever failed to complete any work awarded to you? _____

Have you ever defaulted on a contract? _____

List the projects most recently completed by your firm (include project of similar importance):

Project	Amount $	Mo/Yr Completed

Major equipment available for this contract: _____
_____
_____

Attach resume(s) for the principal member(s) of your organization, including the officers as well as the proposed superintendent for the project.

Credit available: $_____ Bank reference: _____

(Signature on next page)

The undersigned hereby authorized and requests any person, firm, or corporation to furnish any information requested by the _____ in verification of the recitals comprising this Statement of Bidder's Qualifications.

Executed this _____ day of _____ 2025

By: (signature) _____ Title: _____

(print name) _____

FORM CONTRACT
AGREEMENT FOR PROJECT

COUNTY OF ATASCOSA	**§ AGREEMENT BETWEEN THE**
	§ CITY OF LYTLE, TEXAS
	§ AND _____
	§ FOR Railroad Street/McDonald Street
STATE OF TEXAS	**12" Water Main Loop**
	§ 2025-02-02

This Agreement is made and entered into by and between the City of Lytle, Texas, a municipal corporation situated in Atascosa County, Texas ("The City") and _____, the "Contractor" hereinafter identified.

I. SCOPE OF WORK

Contractor shall provide all supervision, labor, materials and equipment necessary for the project identified as City of Lytle "Railroad Street/McDonald Street 12" Water Main Loop, CSB – 2025-02-02 (hereinafter "Work"). Such Work shall be performed in accordance with the terms and conditions of the City's Specifications for same, a copy of which is attached hereto and incorporated herein for all purposes as Exhibit "A", and the Contractor's Proposal in response thereto, (hereinafter "Contractor's Proposal"), a copy of which is attached hereto and incorporated herein for all purposes as Exhibit "B". The Contract consists of the following:

a) This Contract by and between the City and Contractor (hereinafter "Contract");
b) The City's Specifications for the Work, (Exhibit "A")
c) The Contractor's Proposal dated _____ (Exhibit "B")
d) The Contractor's Payment Bond for the Work (Exhibit "C")
e) The contractor's Performance Bond for the Work (Exhibit "D")
f) Construction Schedule Established for the Work (Exhibit "E").

In the event there exists a conflict between any of the terms, clauses, or phrases in the foregoing documents, priority of interpretation shall be in the following order: this Contract, BID TYPE, and Contractor's Proposal. These documents shall be referred to collectively as "Contract Documents."

II. SCHEDULE FOR COMPLETION / LIQUIDATED DAMAGES / DELAYS

SCHEDULE FOR COMPLETION. Prior to starting Work, the Contractor and the City shall meet to develop a Construction Schedule for the Work pursuant to Scope of Work and Special Conditions contained in Exhibit "A." **The Contractor shall ensure the work between along McDonald Street, between SH 132/Main Street and IH-35, including the bore under IH-35, is completed before September 30, 2025.** The Construction Schedule shall be signed by the

Contractor and the City and become a part of this Contract as Exhibit "E." The Contractor shall submit any major revisions to the approved Construction Schedule as the Work progresses to the City for review. The approved Construction Schedule may only be modified upon the written approval of City. A written notice to proceed will be issued to the Contractor by the City for the Work. The Work to be performed under this Contract shall be commenced within ten (10) calendar days after the date the written notice to proceed for a particular street has been issued to Contractor by the City. Contractor shall sign on the notice to proceed that acknowledges their agreement to the number of days established by the Construction Schedule. Contractor shall fully complete the entire Scope of Work to the satisfaction of the City within **400** calendar days after the date of the first written notice to proceed has been issued by the City.

LIQUIDATED DAMAGES. The parties acknowledge that adherence by Contractor to the approved Construction Schedule and times set forth herein for completion of the Project is essential to this Contract. It is agreed by the parties that the actual damages which might be sustained by City by reason of the breach by Contractor of its promise to timely complete the Work in accordance with the provisions hereof are uncertain and would be difficult to ascertain. It is further agreed that the sum of **($2,000.00)** for each day that completion of the Project or any portion of the Work is overdue according to the Construction Schedule would be reasonable and just compensation for such breach, and Contractor hereby promises to pay such sum as liquidated damages, and not as a penalty, in the event of such breach. Any liquidated damages shall be deducted from Contractor's final payment under this Contract.

DELAYS. The Contractor shall be entitled to an extension of time specified in the Construction Schedule under this Contract only when claim for such extension is submitted to the City in writing by the Contractor within seven (7) calendar days from and after the time when any alleged cause of delay shall occur; and then only when such extension of time is approved by the City. In adjusting the Contract working time for the completion of the Work, unforeseeable causes defined herein shall be taken into consideration. No allowances shall be made for delays or suspension of the performance of the Work due to the fault of the Contractor. Unforeseeable Cause is defined as:

a) An act of God in the form of unusually severe weather conditions, including storms, flood, fire or similar event, that could not have been anticipated or guarded against and which materially affects the work site, including access or egress thereto; or

b) A riot or war situation actually involving the site or actually preventing the Contractor from working on the site, but not including any situation involving suppliers off-site other than those essential suppliers as identified to City.

No event shall be deemed an Unforeseeable Cause for the purposes of this Contract unless it actually and directly necessitates a delay in the Work which could not be otherwise remedied by taking reasonably prudent steps, and the Contractor could not reasonably adjust the schedule of the remaining Work to deal with, make up for, or otherwise work around the delays resulting from the Unforeseeable Cause(s).

Notwithstanding any other term contained in the Contract Documents, no adjustment to working time shall be made if, concurrently with the equitable cause for delay, there existed a cause for delay due to the fault or negligence of the Contractor, his agents, employees or subcontractors; and no adjustment shall be made to the Contract price and the Contractor shall not be entitled to claim or receive any additional compensation as a result of or arising out of any delay resulting in adjustment to the working time hereunder, including delays caused by the acts or

negligence of the City. Notwithstanding any other provision of the Contract Documents, all claims for extension of working time must be submitted in accordance with the terms specified in the Contract Documents, and no act of the City shall be deemed a waiver or entitlement of such extension.

III. CONTRACT PRICE

Compensation for Work satisfactorily performed hereunder shall be in an amount not to exceed the sum of $_____. City shall issue progress payments in accordance with the terms of this Contract.

IV. PROGRESS PAYMENTS

Progress payments for Work completed shall be paid in the following manner: Percentage of completion for materials and labor satisfactorily completed on a monthly basis: ninety (90%) percent of amount billed with ten (10%) percent retained until the entire Contract is completed. Contractor shall furnish City with appropriate documentation evidencing Contractor's payment for all work performed or materials provided by subcontractors. If Contractor is unable to produce such documentation evidencing payment, City may withhold that portion of the payment due to such subcontractor(s), without penalty, until Contractor provides documentation evidencing to City that Contractor has paid all such costs and that there is no existing claim by such subcontractors.

The final payment request from Contractor shall include the release of ten percent (10%) retainage and shall be submitted to the City upon final completion and acceptance of the Work.

Release of Liens. A partial release of liens must be provided with each payment application. A final release of liens must be provided to the City by the Contractor for the entire Work prior to release of the final ten percent (10%) retainage.

V. GENERAL PROVISIONS

QUALITY OF WORK. All Work shall be completed in a workman-like manner to the satisfaction of City and in compliance with all codes, ordinances, and other applicable federal, state, and local laws. Contractor shall be responsible for initial core testing of the Work. However, if any section of the Work fails such core testing, Contractor shall be required to tear out and replace such failing sections of the Work at its sole expense any and all costs associated with retesting such failing sections of the Work. Upon satisfactory completion of all Work hereunder as determined by City and prior to payment of final invoice by City, Contractor shall provide City with a release of all liens and waiver of claims from subcontractors. Contractor's requirement to provide such release shall be a condition precedent to City's remittance of final payment under this Contract.

PLAN AND SCALE DRAWING. The Contractor shall utilize the construction plans and drawings furnished by City to complete the Work.

LICENSES REQUIRED. To the extent required by law, all Work shall be performed by individuals duly licensed and authorized by law to perform such Work. The City specifically prohibits the use of subcontractors without written authorization. In the event Contractor receives written authorization from the City to engage subcontractors to perform Work

hereunder, Contractor shall fully pay such subcontractor and in all instances remain responsible for the proper completion of the Work hereunder.

CHANGE ORDERS. All change orders shall be in writing and signed by the project Engineer, City and Contractor and shall be incorporated in and become part of the Contract Documents.

INSURANCE. Contractor warrants that it has obtained and will maintain throughout the duration of the Work, insurance covering injury to its employees and third parties, including coverage for bodily injury and property damage resulting from, related to or arising out of Contractor's Work. Such insurance shall cover acts and omissions of Contractor, its employees, agents, and subcontractors. Contractor shall provide a certificate of insurance showing the City as additional insured and providing such types and amounts of coverage as required in the City's Specifications for the Work attached hereto as Exhibit "A". Such certificate of insurance shall provide that the City is to receive thirty (30) days written notice of cancellation.

PERMITS. Contractor shall at its own expense obtain all permits necessary for the Work to be performed.

REMOVAL OF DEBRIS. Contractor agrees to remove all debris and leave the premises in a clean condition acceptable to the City.

DAMAGES. Contractor shall make every reasonable effort to protect the work area from loss or damage. Any portion of the work area damaged by Contractor during the course of the Work must be repaired by Contractor at no additional cost to the City. Damages shall include, but not be limited to, any damage caused by the Contractor to fences, yards, shrubs, or open public spaces. Any repair work shall match the existing condition of the items and area damaged.

DISPUTE RESOLUTION. The parties agree that they shall first attempt to resolve disputes hereunder by the use of non-binding mediation.

WARRANTY. Contractor warrants all Work for a period of twenty-four (24) months following the date of final acceptance of the Work by the City.

TERMINATION. City may terminate this Contract upon ten (10) days prior written notice to Contractor.

TAXES. The Contractor shall pay sales, consumer, use, and similar taxes that are legally required when the Contract is executed.

SAFETY. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs, including all those required by law in connection with performance of the Contract. The Contractor shall promptly remedy damages and loss to property caused in whole or in part by the Contractor, its employees, agents, subcontractors, or by any other third party for whose acts the Contractor may be liable.

VENUE. The laws of the State of Texas shall govern the interpretation, validity, performance and enforcement of this Contract. The parties agree that this Contract is performable in Atascosa County, Texas, and that exclusive venue shall lie in Atascosa County, Texas.

INDEPENDENT CONTRACTOR. Contractor covenants and agrees that Contractor is an independent contractor and not an officer, agent, servant or employee of City; that Contractor

shall have exclusive control of and exclusive right to control the details of the Work performed hereunder and all persons performing same, and shall be responsible for the acts and omissions of its officers, agents, employees, contractors, subcontractors and consultants and shall indemnify City from all claims and damages resulting from this Work; that the doctrine of respondent superior shall not apply as between City and Contractor, its officers, agents, employees, contractors, subcontractors and consultants, and nothing herein shall be construed as creating a partnership or joint enterprise between City and Contractor.

SEVERABILITY. The provisions of this Contract are severable. If any paragraph, section, subdivision, sentence, clause, or phrase of this Contract is for any reason held to be contrary to the law or contrary to any rule or regulation having the force and effect of the law, such decisions shall not affect the remaining portions of the Contract. However, upon the occurrence of such event, either party may terminate this Contract by giving the other party thirty (30) days written notice.

ENTIRE AGREEMENT. This Contract and its attachments embody the entire agreement between the parties and may only be modified in writing if executed by both parties.

CONTRACT INTERPRETATION. Although this Contract is drafted by City, should any part be in dispute, the parties agree that the Contract shall not be construed more favorably for either party.

SUCCESSORS AND ASSIGNS. This Contract shall be binding upon the parties hereto, their successors, heirs, personal representatives and assigns.

HEADINGS. The headings of this Contract are for the convenience of reference only and shall not affect in any manner any of the terms and conditions hereof.

IN WITNESS WHEREOF, the parties have executed this Contract by signing below. The effective date of this Contract shall be the date of City Council approval.

CITY OF LYTLE, TEXAS

By: _____

Printed Name: _____

Title: Mayor

Date: _____

ATTEST:

_____
Paola L. Rios
City Secretary

CONTRACTOR

By: _____

Printed Name: _____

Title: _____

Date: _____

ATTEST:

_____
Corporate Secretary

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, _____ as PRINCIPAL, and _____, as SURETY are held and firmly bound unto hereinafter called the "Owner", in the penal sum of Dollars, ($_____), lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the Accompanying Bid, dated _____, for _____

NOW, THEREFOR, if the Principal shall not withdraw said Bid within the period specified therein after the opening of the same, or, if no period be specified, within thirty (30) days after the said opening, and shall within the period specified therefor, or if no period be specified, within ten (10) days after the prescribed forms are presented to him for signature, enter into a written contract with the Owner in accordance with the Bid as accepted, and give bond with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such contract; or in the event of the withdrawal of said Bid within the period specified, or the failure to enter into such Contract and give such bond within the time specified, if the Principal shall pay the Owner the difference between the amount specified in said Bid and the amount for which the local Public Agency may procure the required work or supplies or both, if the latter be in excess of the former, then the above obligation shall be void and of no effect, otherwise to remain in full force and virtue.

IN WITNESS THEREOF, the above-bounded parties have executed this instrument under their several seals this _____ day of _____, the name and corporate seal of each corporate party being hereto affixed and these present signed by its undersigned representative, pursuant to authority of its governing body.

Attest: By: _____
Affix Corporate Seal

Attest: By: _____
Affix Corporate Seal

Attest: By: _____
Affix Corporate Seal

Countersigned
By: _____
* Attorney-in Fact, State _____

THIS PAGE LEFT BLANK INTENTIONALLY

PAYMENT BOND

STATE OF TEXAS

CITY OF LYTLE, ATASCOSA COUNTY

KNOW ALL MEN BY THESE PRESENTS: That _____ _____ of the City of _____, County of _____, and State of _____, as Principal, and _____ authorized under the laws of the State of Texas to act as Surety on bonds for Principals, are held and firmly bound unto City of Lytle (OWNER) in the penal sum of _____ Dollars ($_____), for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, officers, directors, shareholders, partners, successors and assigns, jointly and severally, by these presents.

WHEREAS, the Principal has entered into a certain written contract with the OWNER, dated the _____ day of _____, 2025, for

RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP
CSB – 2025-2-02
CITY OF LYTLE, ATASCOSA COUNTY, TEXAS

which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the work provided for in said contract, then, this obligation shall be void; otherwise to remain in full force and effect. Provided, however, that this bond is executed pursuant to provisions of Chapter 2253, Texas Government Code as amended and all liabilities on this bond shall be determined in accordance with provisions of said Article to same extent as if it were copied at length herein.

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

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 2025.

_____	_____
Principal	Surety
By _____	By _____
Name _____	Name _____
Title _____	Title _____
Address _____	Address _____
_____	_____
_____	_____
_____	_____

Email address _____

Telephone _____

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

_____

_____

_____

Telephone _____

Note: Bond shall be issued by a solvent Surety company authorized to do business in Texas and shall meet any other requirements established by law or by OWNER pursuant to applicable law. A copy of surety agent's "Power of Attorney" must be attached hereto.

PERFORMANCE BOND

STATE OF TEXAS

CITY OF LYTLE, ATASCOSA COUNTY

KNOW ALL MEN BY THESE PRESENTS: That _____ _____ of the City of _____, County of _____, and State of _____, as Principal, and _____ authorized under the laws of the State of Texas to act as Surety on bonds for Principal, are held and firmly bound unto City of Lytle (OWNER) in the penal sum of _____ Dollars ($_____), for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, officers, directors, shareholders, partners, successors and assigns, jointly and severally, by these presents.

WHEREAS, the Principal has entered into a certain written contract with the OWNER, dated the _____ day of _____, 2025, for

RAILROAD STREET/MCDONALD STREET 12" WATER MAIN LOOP
CSB – 2025-02-02
CITY OF LYTLE, ATASCOSA COUNTY, TEXAS

which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform said Contract and shall in all respects fully and faithfully observe and perform all and singular the covenants, conditions and agreements in and by said Contract agreed and covenanted by the Principal to be observed and performed during the original term of the Contract and any extensions thereof that may be granted by Owner, and during the life of any guaranty or warranty required under the Contract, and according to the true intent and meaning of said Contract and the Contract Documents and the Plans and Specifications related thereto, then this obligation shall be void; otherwise to remain in full force and effect. Provided, however, that this bond is executed pursuant to provisions of Chapter 2253, Texas Government Code as amended and all liabilities on this bond shall be determined in accordance with provisions of said Article to same extent as if it were copied at length herein.

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

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 2025.

_____	_____
Principal	Surety
By _____	By _____
Name _____	Name _____
Title _____	Title _____
Address _____	Address _____
_____	_____
_____	_____
_____	_____

Email address _____

Telephone _____

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

_____

_____

_____

Telephone _____

Note: Bond shall be issued by a solvent Surety company authorized to do business in Texas and shall meet any other requirements established by law or by OWNER pursuant to applicable law. A copy of surety agent's "Power of Attorney" must be attached hereto.

END OF DOCUMENT

SPECIFICATIONS
TABLE OF CONTENTS

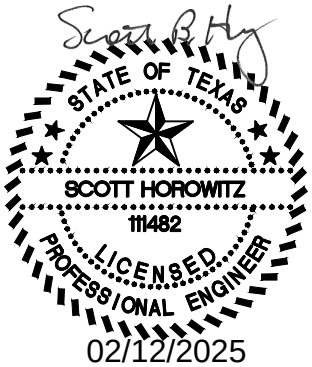
TxDOT Specifications (Work in TxDOT Rights-of-Way) (Continued)

Barricades, Signs, and Traffic Handling ..... Item 502
Temporary Erosion, Sedimentation, and Environmental Controls..... Item 506
Casing Pipe.....Special Specifications Section 5202

City of Lytle
Railroad Street/McDonald Street 12-Inch Water Main Loop

SPECIFICATION CERTIFICATIONS

Division 1 (All Sections)
Division 2 (All Sections)
Division 3 (All Sections)
Division 31 (All Sections)
Division 32 (All Sections)
Division 33 (All Sections)



02/12/2025

THIS PAGE LEFT BLANK INTENTIONALLY

PREVAILING WAGE SCALE

THIS PAGE LEFT BLANK INTENTIONALLY

"General Decision Number: TX20250007 01/03/2025

Superseded General Decision Number: TX20240007

State: Texas

Construction Types: Heavy and Highway

Counties: Atascosa, Bandera, Bastrop, Bell, Bexar, Brazos, Burleson, Caldwell, Comal, Coryell, Guadalupe, Hays, Kendall, Lampasas, McLennan, Medina, Robertson, Travis, Williamson and Wilson Counties in Texas.

HEAVY (excluding tunnels and dams, not to be used for work on Sewage or Water Treatment Plants or Lift / Pump Stations in Bell, Coryell, McClennon and Williamson Counties) and HIGHWAY Construction Projects

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at

http://www.dol.gov/whd/govcontracts.

Modification Number | Publication Date
0 | 01/03/2025

SUTX2011-006 08/03/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving and Structures)	$ 12.56 **	
ELECTRICIAN	$ 26.35	
FORM BUILDER/FORM SETTER		
Paving & Curb	$ 12.94 **	
Structures	$ 12.87 **	
LABORER		
Asphalt Raker	$ 12.12 **	
Flagger	$ 9.45 **	
Laborer, Common	$ 10.50 **	
Laborer, Utility	$ 12.27 **	
Pipelayer	$ 12.79 **	
Work Zone Barricade Servicer	$ 11.85 **	
PAINTER (Structures)	$ 18.34	
POWER EQUIPMENT OPERATOR:		
Agricultural Tractor	$ 12.69 **	
Asphalt Distributor	$ 15.55 **	
Asphalt Paving Machine	$ 14.36 **	
Boom Truck	$ 18.36	
Broom or Sweeper	$ 11.04 **	
Concrete Pavement Finishing Machine	$ 15.48 **	
Crane, Hydraulic 80 tons or less	$ 18.36	
Crane, Lattice Boom 80 tons or less	$ 15.87 **	
Crane, Lattice Boom over 80 tons	$ 19.38	
Crawler Tractor	$ 15.67 **	
Directional Drilling Locator	$ 11.67 **	
Directional Drilling Operator	$ 17.24 **	
Excavator 50,000 lbs or Less	$ 12.88 **	
Excavator over 50,000 lbs	$ 17.71 **	
Foundation Drill, Truck Mounted	$ 16.93 **	
Front End Loader, 3 CY or Less	$ 13.04 **	
Front End Loader, Over 3 CY	$ 13.21 **	
Loader/Backhoe	$ 14.12 **	
Mechanic	$ 17.10 **	
Milling Machine	$ 14.18 **	
Motor Grader, Fine Grade	$ 18.51	
Motor Grader, Rough	$ 14.63 **	
Pavement Marking Machine	$ 19.17	
Reclaimer/Pulverizer	$ 12.88 **	

```
     Roller, Asphalt.............$ 12.78 **
     Roller, Other...............$ 10.50 **
     Scraper.....................$ 12.27 **
     Spreader Box................$ 14.04 **
     Trenching Machine, Heavy....$ 18.48

Servicer.........................$ 14.51 **

Steel Worker
     Reinforcing.................$ 14.00 **
     Structural..................$ 19.29

TRAFFIC SIGNALIZATION:
Traffic Signal Installation
     Traffic Signal/Light Pole
     Worker......................$ 16.00 **

TRUCK DRIVER
     Lowboy-Float................$ 15.66 **
     Off Road Hauler.............$ 11.88 **
     Single Axle.................$ 11.79 **
     Single or Tandem Axle Dump
     Truck.......................$ 11.68 **
     Tandem Axle Tractor w/Semi
     Trailer.....................$ 12.81 **

WELDER...........................$ 15.97 **
---------------------------------------------------------------

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

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

** Workers in this classification may be entitled to a higher
minimum wage under Executive Order 14026 ($17.75) or 13658
($13.30).  Please see the Note at the top of the wage
determination for more information. Please also note that the
minimum wage requirements of Executive Order 14026 are not
currently being enforced as to any contract or subcontract to
which the states of Texas, Louisiana, or Mississippi, including
their agencies, are a party.

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

Unlisted classifications needed for work not included within
the scope of the classifications listed may be added after
award only as provided in the labor standards contract clauses
```

(29CFR 5.5 (a) (1) (iii)).

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

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date,

6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

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

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

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

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

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

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

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

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

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

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

==========

END OF GENERAL DECISION"

SECTION 00800

SPECIAL INSTRUCTIONS

PART 1 - GENERAL

1.01 TRAFFIC CONTROL

A. The CONTRACTOR will be responsible for furnishing and using all barricades, warning lights, signs, etc. necessary to protect his work and maintain traffic flow satisfactory to the OWNER, ENGINEER, and TxDOT (if applicable). Warning devices shall be as required in the Texas Manual on Uniform Traffic Control Devices. Construction shall be scheduled to cause the least amount of disruption to traffic. All work scheduling shall be coordinated with the City or County staff, and be approved by the City or County staff before work can proceed. No separate payment will be made for traffic control required to be added to the project to address health and safety issues.

B. Traffic Control plans and details provided (if applicable) in the plans are to show a minimum expectation required by the CONTRACTOR and may not cover all specific construction means and methods proposed by the CONTRACTOR. Alternate plans may be presented for approval by the OWNER and ENGINEER by the CONTRACTOR. All plans shall be sealed by a professional engineer registered in the State of Texas. The OWNER or ENGINEER may require additional warning devices be installed at any time on the project to address health and safety issues at no additional cost to the OWNER.

1.02 STAKING FOR CONSTRUCTION

A. The CONTRACTOR will provide all construction staking services for the project. The cost of these services will be reflected in the unit price amount bid in the Bid Form. No separate payment will be made.

B. TRC Engineers, Inc. provided topographical surveying services for the design portion of this project. Information to the CONTRACTOR for construction staking may be available from TRC Engineers, Inc.

1.03 OFFICE AT SITE OF WORK

1. During the performance of this contract, CONTRACTOR shall maintain a suitable office at the project site. The office shall be the headquarters of his representative authorized to receive drawings, instructions, or other communication or articles. Any communication given to the said representative or delivered at CONTRACTOR's office at the site of the work in his absence shall be deemed to have been delivered to CONTRACTOR.

2. Copies of the Drawings, Specifications, and other Contract Documents shall be kept at CONTRACTOR's office at the site of the work and available for use at all times.

3. CONTRACTOR shall provide all power for heating, lighting, operation of CONTRACTOR's plant or equipment, or for any other use by CONTRACTOR. Temporary heat, lighting and air conditioning shall be maintained until the work is accepted. CONTRACTOR shall work with the OWNER to establish temporary power to the site, however all costs required shall be borne by the CONTRACTOR.

4. CONTRACTOR shall be responsible for protection of the site, and all work, materials,

equipment, and existing facilities thereon, against vandals and other unauthorized persons.

5. No claim shall be made against ENGINEER or OWNER by reason of any act of an employee or trespasser.

6. CONTRACTOR shall provide and maintain suitable parking areas for the use of all construction workers and others performing work or furnishing services in connection with the Project, as required, to avoid any need for parking personal vehicles where they may interfere with public traffic, OWNER's operations, or construction activities.

1.04 WATER

A. Water required for water jetting, flooding, testing and construction will be provided by OWNER at no cost to the CONTRACTOR. The CONTRACTOR shall provide temporary water piping, valves, transportation, etc. to the project location as required.

1.05 POWER FOR CONSTRUCTION

A. The electrical service to the site will be provided by the CONTRACTOR. The CONTRACTOR shall furnish and install all necessary temporary wiring, and furnish and install area distribution boxes so located that the individual trades may use their own construction type extension cords to obtain adequate power and artificial lighting at all points where required by inspectors and for safety. All necessary permits shall be acquired by the CONTRACTOR.

1.06 CONSTRUCTION ORDER

A. The CONTRACTOR shall complete the various projects in order of priority (Item 1. being highest priority), as follows:

1. Work along McDonald Street between SH 132/Main Street and IH-35, inclusive of boring under IH-35, by September 30, 2025.

2. Work along Railroad Street and McDonald Street between Railroad Street and SH 132/Main Street.

B. Each consecutive priority item shall be completed as soon as possible. This is not to preclude work on lesser priority items if there are long lead delivery requirements on materials for the higher priority items. However, as materials become available, the higher priority item shall be completed first.

1.07 SUBMITTAL DATA

A. Submittal Procedure

1. The CONTRACTOR shall furnish Submittals for any and all such parts of the work and equipment as set forth in the specifications and indicated on the plans. The procedures for review of the submittals shall be as follows:

a. The CONTRACTOR shall submit to the ENGINEER for his review, four (4) prints of drawings, plus whatever number of prints the CONTRACTOR desires to be returned to himself. The submitted prints shall be accompanied by a letter of transmittal, in duplicate of drawings, titles, and other requirements. The letter of transmittal shall be of the form supplied by or approved by the ENGINEER. If

advance approval is obtained by OWNER and ENGINEER, electronic submission of certain submittals may be acceptable.

b. When a drawing is satisfactory to the ENGINEER, the number of prints the CONTRACTOR desires returned to him will be stamped or marked, "No Exceptions Taken" or "Make Corrections Noted", will be dated, and will be returned to the CONTRACTOR by letter.

c. Should a drawing be unsatisfactory to the Engineer, he will stamp thereon "Revise and Resubmit", or "Rejected", and will return one (1) or more copies thereof to the CONTRACTOR with the necessary corrections and changes indicated. The CONTRACTOR must make such corrections and changes, and again submit at least four (4) prints of the drawings for approval. The CONTRACTOR shall revise and resubmit the working drawings, as required by the ENGINEER, until satisfactory review thereof is obtained.

d. The CONTRACTOR shall allow sufficient time for preliminary review, correction, and resubmission, and final review of all working (shop) drawings. The CONTRACTOR should allow not less than fourteen (14) days for each review. Drawings of items critical to job progress, when requested in writing by the CONTRACTOR, will be given priority review.

B. Submittal Format

1. Submittals shall be printed on heavy, first quality paper, 8-1/2” x 11” size with standard 3-hole punching. If pre-approved, electronic submittals may be acceptable. Drawings and diagrams shall be reduced to 8-1/2” x 11” or 11” x 17”.

2. All materials and equipment submitted for review shall meet the following criteria: Each sheet of descriptive literature submitted shall be marked by the CONTRACTOR to identify the material or equipment as follows:

a. Equipment and materials descriptive literature and drawings shall show the specification paragraph for which the equipment applies, and shall list equipment tag numbers applicable.

b. Submittal sheets or drawings showing more than the particular item under consideration shall have crossed out all but the pertinent description of the item for which review is requested.

c. Equipment and materials descriptive literature not readily cross-referenced with the drawings or specifications shall be identified by a suitable notation.

C. Submittal Content

1. The submittals shall show that all requirements of the specification section have been met. The submittals shall contain the following information as applicable:

a. Equipment, function, normal operating characteristics, and limiting conditions.

b. Assembly, installation, alignment, adjustment, and checking instructions.

c. Outline, cross-section, and assembly drawings; and engineering data.

d. Test data and performance curves, where applicable.

e. Working Drawings:

1) Items for which working drawings are required and as set forth elsewhere within these specifications.

2) The drawings shall be numbered consecutively and shall accurately and distinctly present the following:

a) All working and erection dimensions.

b) Arrangement and sectional views.

c) Necessary details, including complete information for making connections between functional parts.

d) Kinds of materials and finishes.

e) Parts list and description thereof.

3) Each drawing shall be dated and shall bear the name of the project, names of equipment or materials, and the location where the equipment or materials are to be installed in the project. The Engineer may decline to consider any working drawings, which do not contain complete data on the work and full information on related matters.

4) If working drawings show departures from the contract requirements, the CONTRACTOR shall make specific mention thereof in a letter attached to the submittal form; otherwise, review of such submittals will not constitute acceptance of the departure from the contract.

5) No Work called for by working drawings shall be initiated until the said drawings have been accepted by the ENGINEER.

END OF SECTION

SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other DIVISION 01 - GENERAL REQUIREMENTS sections, apply to this Section:

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: The project consists of the installation of 12" PVC and Ductile Iron water distribution main pipe and appurtenances, 6" and 4" PVC water distribution main pipe and appurtenances, abandonment of 6" PVC pipe and 12" PVC pipe, street repair, temporary erosion control, and traffic control.

1. Project Location: Southeast corner of the IH-35 and FM 2790/McDonald Street intersection, north along McDonald Street to Railroad Street, and west along Railroad Street to S. Prairie Street.

2. Owner: City of Lytle, Texas

B. ENGINEER Identification: The Contract Documents, dated **February 12, 2025**, were prepared for the project by TRC Companies, Inc., 505 E. Huntland Drive, Suite 250, Austin, TX 78752.

C. The Work includes, but is not limited to:

1. Furnish all labor, materials, equipment and superintendence for the installation of approximately 6,121 linear feet (LF) of 12" DR 18 PVC pipe, 164 LF of 12" Certa-Lock PVC pipe, 36 LF of 12" DI (pressure class 250) pipe, and all appurtenances for the water main.

2. Furnish all labor, materials, equipment and superintendence for the installation of approximately 190 linear feet of 6" PVC, and all appurtenances for the water main.

3. Furnish all labor, materials, equipment and superintendence for the installation of approximately 40 linear feet of 4" PVC, and all appurtenances for the water main.

4. Furnish all labor, materials, equipment and superintendence for the abandonment of approximately 3,310 linear feet of existing 6" water main, and approximately 25 linear feet of existing 12" water main.

5. Furnish all labor, materials, equipment, and superintendence for the removal and replacement of asphalt and concrete pavement throughout the project limits.

6. Furnish all labor, materials, equipment, and superintendence for temporary erosion control throughout the project limits.

7. Furnish all labor, materials, equipment, and superintendence for traffic control throughout the project limits.

8. All other appurtenances necessary for the complete Project.

1.03 CONTRACTS

A. Project will be constructed under one single contract.

1.04 USE OF PREMISES:

A. General: The CONTRACTOR shall have such use of the property as designated by the OWNER. The CONTRACTOR'S use of premises is limited only by OWNER'S right to perform work or to retain other contractors on portions of Project.

1.05 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 48-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by CONTRACTOR. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by CONTRACTOR or by others when so noted.

END OF SECTION

SECTION 01 12 25

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Compile specified warranties and bonds.

B. Co-execute submittals when so specified.

C. Review submittals to verify compliance with Contract Documents.

D. Submit to the ENGINEER for review and transmittal to OWNER.

1.02 RELATED REQUIREMENTS

A. Section 01 77 00 “Closeout Procedures.”

1.03 SUBMITTAL REQUIREMENTS

A. Assemble warranties and bonds, executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Number of Copies: Submit six (6) copies of each submittal, unless otherwise indicated. ENGINEER will return two (2) copies.

C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.

1. Product or work item.

2. Firm, with name of principal, address and telephone number.

3. Scope.

4. Date of beginning of warranty, bond or service and maintenance contract.

5. Duration of warranty, bond or service maintenance contract.

6. Provide information for OWNER'S personnel:

a. Proper procedure in case of failure.

b. Instances that might affect the validity of warranty or bond.

7. CONTRACTOR, name of responsible principal, address and telephone number.

1.04 FORMS OF SUBMITTALS

A. Prepare in duplicate packets.

B. Format:

1. Size 8-1/2 in. x 11 in., punch sheets for standard 3-post binder.

a. Fold larger sheets to fit into binders.

2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:

a. Title of Project.

b. Name of CONTRACTOR.

C. Binders: Commercial quality, three-post binder, with durable and cleanable plastic covers and maximum post width of two (2) inches.

1.05 WARRANTY SUBMITTAL REQUIREMENTS

A. For all materials, submit a warranty from the manufacturer. The manufacturer's warranty period shall be concurrent with the CONTRACTOR for two (2) years, unless otherwise specified, commencing at the time of final acceptance by the OWNER.

B. For certain pieces of equipment, the OWNER may require a warranty of longer duration. The requirement for a warranty of longer duration shall be specified in individual sections of the Specifications.

END OF SECTION

SECTION 01 29 00

PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 ADMINSITRATIVE SUBMITTALS

A. Schedule of Values: Submit schedule on CONTRACTOR'S standard form.

B. Schedule of Estimated Progress Payments

1. Submit with initially acceptable schedule of values.

2. Submit adjustments thereto with Application for Payment.

C. Application for Payment: In accordance with the General Conditions and any modifications there to as specified herein.

D. Final Application for Payment: As specified herein.

PART 2 - PRODUCTS

2.01 SCHEDULE OF VALUES

A. Reference the General Conditions.

B. Format:

1. Prepare a separate schedule of values for each schedule of work under the Agreement.

2. Lump Sum Work:

a. Provide separate value for each item or task on the progress schedule.

b. An unbalanced or front-end loaded schedule will not be acceptable.

c. List separately such items as Bonds and insurance premiums, mobilization, demobilization and contract closeout, facility startup, and other appropriate activities included herein.

d. The maximum percentage of mobilization/demobilization (combined) cost shall be no greater than 5% (five percent) of the total contract value, unless noted otherwise.

3. Summation of the complete schedule of values representing all work under the Agreement to equal the Contract Price.

2.02 SCHEDULE OF ESTIMATED PROGRESS PAYMENTS

A. Show estimated payment requests throughout Contract Times aggregating initial Contract Price.

B. Base estimated progress payments on initially acceptable progress schedule. Adjust to reflect subsequent adjustments in progress schedule and Contract Price as reflected by modifications to the Contract Documents.

2.03 APPLICATION FOR PAYMENT

A. Reference the General Conditions.

B. Transmittal Summary Form: Provided by CONTRACTOR. Attach one Summary Form with each Application for Payment for each schedule, include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized Officer of CONTRACTOR.

C. Use Application for Payment Form acceptable to OWNER and ENGINEER.

1. Provide separate form for each schedule as applicable.

2. Include accepted schedule of values for each schedule or portion of work, the price breakdown for work, a listing of OWNER-selected equipment, if applicable, and allowances, as appropriate.

D. Preparation

1. List each Change Order and written Amendment executed prior to date of submission as separate line item. Totals to equal those shown on the Summary sheet for each schedule as applicable.

2. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form for each schedule as applicable, a listing of materials on hand for each schedule as applicable, and such supporting data as may be requested by ENGINEER.

PART 3 - EXECUTION

3.01 MEASUREMENT- GENERAL

A. Reference Article 11 of the General Conditions for additional requirements on Unit Price work.

3.02 PAYMENT

A. General: Progress payment will be made monthly on the date established at the preconstruction meeting.

B. Payment for all work shown or specified in the Contract Documents is included in the Contract Price.

C. Payment for Mobilization/Demobilization: Partial payment for mobilization will be as follows. The adjusted contract amount for construction items as used below is defined as the Total Contract Amount less the amount for mobilization.

1. When 1% (one percent) of the adjusted contract amount for construction items is earned, 33 percent of the mobilization/demobilization amount or 1% (one percent) of the Total Contract Amount.

2. When 5% (five percent) of the adjusted contract amount for construction items is earned, 50 percent of the mobilization/demobilization amount of 1.5 percent of the Total Contract Amount, whichever is less, will be paid less any previous payments under this item.

3. When 10% (ten percent) of the adjusted contract amount for construction items is earned, 67 percent of the mobilization/demobilization amount of 2% (two percent) of the Total Contract Amount, whichever is less, will be paid less any previous payments under this item.

4. Upon completion of all work under this contract, payment for the remainder of mobilization/demobilization amount will be made.

3.03 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:

1. Loading, hauling, and disposing of rejected material.

2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.

3. Rejected loads of material, including material rejected after it has been placed by reason of failure of CONTRACTOR to conform to provisions of Contract Documents.

4. Material not unloaded from transporting vehicle.

5. Defective work not accepted by OWNER.

6. Material remaining on hand after completion of work.

3.04 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

A. Partial Payment: Reference the General Conditions. No partial payments will be made for materials and equipment delivered or stored on site unless Shop Drawings or preliminary operation and maintenance manuals are acceptable to ENGINEER.

B. Final Payment: Will be made only for materials incorporated in work; remaining materials for which partial payments have been made, to revert to CONTRACTOR unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

3.05 FINAL APPLICATION FOR PAYMENT

A. Reference the General Conditions.

B. Prior to submitting final application, make acceptable delivery of required documents.

1. Affidavit of Bills Paid.

2. Certification of Completion

3. Other documentation that may be required elsewhere in the Contract Documents.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 31 19

PROGRESS SCHEDULES AND MEETINGS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. During construction, the CONTRACTOR will be required to submit monthly progress reports to the OWNER and attend monthly construction meetings at the project location.

1.02 NARRATIVE PROGRESS REPORT

A. The CONTRACTOR shall prepare and submit to the OWNER a written report, on a monthly basis, to include, as a minimum:

1. Summary of Work completed during the past period between Narrative Progress Reports.

2. Work planned during the next period.

3. Explanation of differences between summary of Work completed and Work planned in previously submitted Narrative Progress Report.

4. Current and anticipated delaying factors and their estimated impact on other activities and completion Milestones.

5. Corrective action taken or proposed.

6. The report format shall be submitted by the CONTRACTOR and approved by the OWNER and ENGINEER.

7. The report shall be submitted to the OWNER at the Monthly Progress Meetings.

1.03 PRECONSTRUCTION MEETING

A. Schedule: Meeting shall be prior to the start of work at a time and place designated by the CONTRACTOR and agreed upon by OWNER and ENGINEER.

B. Attendance

1. OWNER Representative

2. ENGINEER

3. Project Manager

4. CONTRACTOR & Key Subcontractors

C. Agenda

1. Health & Safety

2. Roles and Responsibilities

3. General contract terms

4. Supervision

5. Schedules and seasonal limitations

6. Submittals

7. Approvals and testing

8. Clearances and notices

9. Construction procedures

10. Payments and estimates

11. Labor requirements

12. Construction Completion Documentation

1.04 PROGRESS MEETINGS

A. The CONTRACTOR will schedule and administer the progress meetings and specially called meetings throughout the progress of the work.

1. Prepare or designate preparer of the agenda for the meetings.

2. Distribute written notice of each meeting four (4) days in advance of meeting date.

3. Make physical arrangements for meetings.

4. Preside at meetings.

5. Record or designate recorder of the minutes; include significant proceedings and decisions.

6. Reproduce and distribute copies within seven (7) days after each meeting.

a. To participants in the meeting.

b. To parties affected by decisions made at the meeting.

B. Schedule: Meetings will be scheduled a minimum of once each month at a time and place designated by the CONTRACTOR and agreed upon by OWNER and ENGINEER.

C. Attendance

1. ENGINEER

2. CONTRACTOR

3. Subcontractor's as pertinent to agenda

4. OWNER Representative

D. Agenda

1. Review and approve minutes of previous meeting.
2. Review of work progress since previous meeting.
3. Field observations, problems, and conflicts.
4. Problems which impede constructing schedule.
5. Review of off-site fabrication and delivery schedules.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to construction schedule.
8. Progress schedule during the succeeding work period.
9. Coordination of schedules.
10. Review of submittal schedules.
11. Review of Request for Information Status.
12. Review of proposed changes for effect on construction schedule and on completion date.
13. Review of Quality Assurance / Quality Control (QA/QC) reports.
14. Review of Punch List.
15. Safety report.
16. Review new business.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 32 33

CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Photographic requirements for construction photographs and submittals.

1.02 DEFINITIONS

A. Pre-construction Photographs: Photographs taken, in sufficient numbers and detail, prior to date of commencement of the Work, to show original construction site conditions.

B. Progress Photographs: Photographs, taken throughout the duration of construction at regular intervals and from fixed vantage points, pre-approved by the ENGINEER, that document progress of the Work.

C. Finished Photographs: Photographs, taken by a professional photographer near Date of Substantial Completion and before OWNER'S acceptance of the Work, that are suitable for framing and for use in brochures or on the Internet.

D. Aerial Photographs: Photographs, taken from an aircraft by a professional aerial photographer near Date of Substantial Completion and before OWNER'S acceptance of the Work, that are suitable for framing and for use in brochures or on the Internet.

1.03 SUBMITTALS

A. Format and Media. Digital photography shall be used. Submit color photographs, unless otherwise specified.

1. Prints. Submit each Progress or Pre-construction Photograph print in a three-hole plastic pocket or sleeve, bound in a three-ring notebook. Produce prints on photographic-quality paper approved by Project Manager. Minimum size for Pre-construction Photograph prints shall be 3 in. by 5 in. Progress Photograph prints shall be 4 in. by 6 in.

2. Digital Photography. Use 10.1-megapixel density or greater for photographs. Scanned photographs must equal or exceed 400 dots per inch when scanned from 4 in. by 6 in. prints. Submit digital photographic files on DVDs. Format disks for Windows operating system and in JPEG (Joint Photographic Experts Group) format.

B. Submittal Quantities and Frequencies

1. Pre-construction Photographs

a. Preconstruction photographs of the entire project site, shall be required.

b. Submit two sets of Pre-construction Photographs prior to first Application for Payment.

2. Progress Photographs

a. Progress photographs shall be taken each month as work progresses.

b. Submit progress photographs with each Application for Payment. Monthly Applications for Payment shall be deemed incomplete if not accompanied by the required Progress Photographs. The CONTRACTOR'S failure or election to not submit a monthly Application for Payment shall not affect the requirement for monthly Progress Photographs.

3. Finished Photographs

a. All photos that were taken at the beginning (pre-construction) shall be taken after all work (including re-vegetation) has been completed.

b. Submit the Finished Photographs after Date of Substantial Completion and prior to final payment.

C. Labeling. Place a label on the back of each photographic print, applied so as to not to show through on the front. Labels shall contain the following information:

1. Name of Project, and Project Number.

2. Name and address of CONTRACTOR.

3. Date photograph was taken.

4. Location photo was taken from and short description of photo subject.

5. Name and address of professional photographer who took the photograph, if applicable.

D. Hand-deliver or transmit prints in standard photographic mailers marked "Photographs - Do Not Bend".

E. Photographic prints, photographic files and disks become the property of the OWNER. Photographs specified herein shall not be published without written consent by the OWNER.

1.04 QUALITY ASSURANCE

A. CONTRACTOR shall be responsible for the quality of and timely execution and submittal of photographs.

B. For Finished Photographs, CONTRACTOR shall use a professional photographer, with five years minimum professional experience in the Central Texas area. CONTRACTOR shall submit name, address and credentials of professional photographer for Project Manager's review and approval.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION PHOTOGRAPHS

A. Prior to commencement of construction operations, photograph the site to include initial construction corridor, detour routes, and staging or storage areas.

B. Prepare Pre-construction Photographs as follows:

1. Show the following information on a non-reflective chalkboard placed within the picture frame:

a. Job number.

b. Project Number.

c. Date and time photographs were taken (Automatic date/time is acceptable).

d. Baseline station, direction of view (i.e., N, S, NW, etc.) and house number or street address and street name.

2. Pre-construction Photographs shall indicate condition of the following:

a. Roads, streets, highways.

b. Yards (near side and far side of street).

c. Sidewalks.

d. Curbs and gutters.

e. Areas between sidewalks and curbs.

f. Above-ground utilities and appurtenance.

g. Particular features (e.g., yard lights, shrubs, fences, trees).

3. Show date photographs were taken.

C. Show the location of vantage points and direction of shots on a key plan of the site.

3.02 PROGRESS PHOTOGRAPHS

A. Progress Photographs document monthly advancement of the Work. Select vantage points for each shot to best show status of construction and progress since last photograph submittal. Select camera stations that will require little or no movement or adjustment over the duration of construction.

B. Take monthly Progress Photographs at regular intervals to coincide with cutoff dates associated with each Application for Payment.

3.03 FINISHED PHOTOGRAPHS

A. Finished Photographs shall be "staged" and taken by a professional photographer to depict the most flattering images of a finished facility. Two vantage points, from which Finished Photographs will be taken, shall be agreed to in advance by the ENGINEER. Photographer shall consider lighting, time of day, height of eye, landscaping and placement of vehicles, people and other props in each picture. Filters and post-photography processing may be utilized to achieve a finished product acceptable to the ENGINEER.

3.04 LOCATION

A. Vantage points, times and conditions for camera stations and photography for Progress and Finished Photographs shall be mutually agreed upon by the ENGINEER, CONTRACTOR and Photographer. Progress Photograph vantage points may be changed by mutual agreement as the Work progresses, at no additional cost to the OWNER.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, and City of Lytle requirements apply to this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

B. Related Sections include the following:

1. Section 00 61 00 "Warranties and Bonds" for submitting warranties.

2. Section 01 29 00 "Price and Payment Procedures" for submitting Applications for Payment.

3. Section 01 31 19 "Progress Schedules and Meetings" for submitting schedules and reports, including CONTRACTOR's Construction Schedule and the Submittals Schedule.

4. Section 01 32 33 “Construction Photographs” for submitting periodic construction photographs.

5. Section 01 43 00 "Quality Assurances Quality Control" for submitting test and inspection reports and Delegated-Design Submittals.

6. Section 01 77 00 “Closeout Procedures” for submitting Record Drawings, and Record Product Data.

1.03 DEFINITIONS

A. Action Submittals: Written and graphic information that requires ENGINEER’S responsive action.

B. Informational Submittals: Written information that does not require ENGINEER’S approval. Submittals may be rejected for not complying with requirements.

1.04 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. ENGINEER reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Submittals Schedule: Comply with requirements Section 01 31 19 "Progress Schedules and Meetings" for list of submittals and time requirements for scheduled performance of related construction activities.

C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on ENGINEER'S receipt of submittal.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if processing must be delayed to permit the coordination with subsequent submittals. ENGINEER will advise CONTRACTOR when a submittal being processed must be delayed for coordination.

2. If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Allow 15 days for processing each resubmittal.

4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

D. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 5 inches on label or beside title block to record CONTRACTOR's review and approval markings and action taken by ENGINEER.
3. Include the following information on label for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name and address of ENGINEER.
    d. Name and address of CONTRACTOR.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Unique identifier, including revision number.
    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Other necessary identification.

E. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

F. Coordinate first paragraph and subparagraph below with office policy. Marking numerous copies of submittals can be time consuming.

G. Additional Copies: Unless additional copies are required for final submittal, and unless ENGINEER observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.

1. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.

H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. ENGINEER will return submittals, without review, received from sources other than CONTRACTOR.

1. Include CONTRACTOR's certification stating that information submitted complies with requirements of the Contract Documents.
2. Transmittal Form: Use sample form at end of Section.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals with mark indicating action taken by ENGINEER in connection with construction.

PART 2 - PRODUCTS

2.01 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. ENGINEER will return two copies. Mark up and retain one returned copy as a Project Record Document.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's written recommendations.
b. Manufacturer's product specifications.
c. Manufacturer's installation instructions.
d. Manufacturer's catalog cuts.
e. Wiring diagrams showing factory-installed wiring.
f. Printed performance curves.
g. Operational range diagrams.
h. Compliance with recognized trade association standards.
i. Compliance with recognized testing agency standards.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Include the following information, as applicable:

a. Dimensions.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
f. Shopwork manufacturing instructions.
g. Templates and patterns.
h. Schedules.
i. Notation of coordination requirements.
j. Notation of dimensions established by field measurement.

2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.

D. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location.

E. Delegated-Design Submittal: Comply with requirements in Division 01 Section 01 43 00 "Quality Assurance Quality Control."

F. Application for Payment: Comply with requirements in Division 01 Section 01 29 00 "Price and Payment Procedures."

G. Schedule of Values: Comply with requirements in Division 01 Section 01 29 00 "Price and Payment Procedures."

H. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use sample form at end of Section.

2.02 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit **two** copies of each submittal, unless otherwise indicated. ENGINEER will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements in Division 01 Section 01 43 00 "Quality Assurance Quality Control."

B. CONTRACTOR's Construction Schedule: Comply with requirements in 01 31 19 "Progress Schedules and Meetings."

C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.

E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.

G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.

H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.

I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

J. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

K. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

L. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

Coordinate individual Specification Sections with first paragraph below by including specific model code organization in that Section. If all are same, insert name below.

M. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

N. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 01 Section "Closeout Procedures."

O. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

P. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

Q. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections.

R. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

S. Construction Photographs: Comply with requirements in Division 01 Section "Construction Photographs."

PART 3 - EXECUTION

3.01 CONTRACTOR'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to ENGINEER.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of CONTRACTOR's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.02 ENGINEER'S ACTION

A. General: ENGINEER will not review submittals that do not bear CONTRACTOR's approval stamp and will return them without action.

B. Action Submittals: ENGINEER will review each submittal, make marks to indicate corrections or modifications required, and return it. ENGINEER will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. Revise and Resubmit

2. Approved as Noted: Exceptions Taken

3. Approved: No Exceptions Taken

C. Informational Submittals: ENGINEER will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. ENGINEER will forward each submittal to appropriate party.

D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 40 00

QUALITY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Specific quality control requirements for the Work are indicated throughout the Contract Documents. Quality control provisions for manufactured products are specified in individual work sections.

1.02 CODES AND STANDARDS

A. Perform testing to meet the requirements of pertinent codes and regulations and with selected standards as specified elsewhere in the Specifications.

1.03 TEST REPORTS

A. Process and distribute test reports and related instructions promptly to ensure necessary retesting and replacement of materials with the least possible delay in the Work.

1.04 PAYMENT FOR LABORATORY TESTING SERVICES

A. Testing to be paid by CONTRACTOR. All standard testing to be paid in this manner. All additional testing required due to a CONTRACTOR failure shall be paid by CONTRACTOR.

1. The CONTRACTOR shall furnish, at his own expense, materials or specimens for testing.

2. The CONTRACTOR shall furnish at his own expense, suitable evidence that the materials he proposes to incorporate into the work are in accordance with the specifications. Mill tests for reinforcing steel and cement will be acceptable if it is definite that the test sheets apply to the material being furnished. Manufacturer's or supplier's test results will be acceptable for such items as pipe, valves, etc. when it is definite that the material being furnished is in accordance with the manufacturer's or supplier's specifications to which the test results apply. Supplier's evidence of quality will be acceptable as long as the material is secured from the sources to which the evidence applies.

B. The ENGINEER may have further inspection and tests made by the laboratory or may make tests himself, to insure that the CONTRACTOR is complying with the specifications. The correction or removal of such unsatisfactory work and the replacement with satisfactory work shall be performed by the CONTRACTOR at his own expense and is understood to be fully included in his CONTRACTOR requirements, without any additional compensation or claims upon the OWNER.

C. Tests indicating non-compliance with the Contract Documents shall be paid for by the CONTRACTOR.

D. Inspection or testing performed exclusively for the CONTRACTOR'S convenience shall be borne by the CONTRACTOR.

E. The CONTRACTOR shall submit to the ENGINEER, for approval, the name of the testing company to the used by the CONTRACTOR.

F. No separate payment will be made for testing.

1.05 EQUIPMENT TESTING

A. Upon completion of the Work and prior to final acceptance and payment, test equipment as specified or required for compliance with Contract Documents. Manufacturer's authorized representative(s) shall be present at site to inspect, check and approve equipment and installation prior to start-up and test; and to supervise testing of equipment.

B. Adjust or replace equipment which does not meet requirements of Contract Documents during test at no additional cost to OWNER.

C. Include costs of equipment testing in the price of equipment to be installed when applicable.

1.06 MATERIAL TESTING

A. Representatives of the testing laboratory shall have access to the Work at all times. Provide facilities for access in order that laboratory may perform its functions properly.

B. Testing Schedules

1. Consult testing laboratory in advance to determine time required to perform tests and issue each of the findings. Include required time within construction schedule.

2. When changes of the construction schedule are necessary, coordinate such changes with the testing laboratory as required.

C. All samples for testing, unless otherwise provided elsewhere in these Specifications, shall be taken by the testing laboratory. All sampling equipment and personnel shall be provided by the testing laboratory unless otherwise specified. All deliveries of samples to the testing laboratory shall be performed by the testing laboratory unless otherwise specified.

END OF SECTION

SECTION 01 43 00

QUALITY ASSURANCE QUALITY CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve CONTRACTOR of responsibility for compliance with the Contract Document requirements.

1. Specified tests, inspections, and related actions do not limit CONTRACTOR'S quality-control procedures that facilitate compliance with the Contract Document requirements.

2. Requirements for CONTRACTOR to provide quality-control services required by ENGINEER, OWNER, or authorities having jurisdiction are not limited by provisions of this Section.

C. See Divisions 02 through 48 Sections for specific test and inspection requirements.

1.02 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by ENGINEER.

C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.03 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of CONTRACTOR by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to ENGINEER.

1.04 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to CONTRACTOR to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

C. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.

2. Project title and number.

3. Name, address, and telephone number of testing agency.

4. Dates and locations of samples and tests or inspections.

5. Names of individuals making tests and inspections.

6. Description of the Work and test and inspection method.

7. Identification of product and Specification Section.

8. Complete test or inspection data.

9. Test and inspection results and an interpretation of test results.

10. Ambient conditions at time of sample taking and testing and inspecting.

11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.

12. Name and signature of laboratory inspector.

13. Recommendations on retesting and reinspecting.

D. Permits, Licenses, and Certificates: For OWNER'S records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by the latest ASTM standards that specializes in types of tests and inspections to be performed.

1.06 QUALITY CONTROL

A. OWNER Responsibilities: Where quality-control services are indicated as OWNER'S responsibility, OWNER will engage a qualified testing agency to perform these services.

1. OWNER will furnish CONTRACTOR with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.

2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to CONTRACTOR**.**

B. CONTRACTOR Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.

1. Where services are indicated as CONTRACTOR'S responsibility, engage a qualified testing agency to perform these quality-control services.

a. CONTRACTOR shall not employ the same entity engaged by OWNER, unless agreed to in writing by OWNER.

2. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.

3. Where quality-control services are indicated as CONTRACTOR'S responsibility, submit a certified written report, in duplicate, of each quality-control service.

4. Testing and inspecting requested by CONTRACTOR and not required by the Contract Documents are CONTRACTOR'S responsibility.

5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Special Tests and Inspections: OWNER will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of OWNER.

1. Testing agency will notify ENGINEER and CONTRACTOR promptly of irregularities and deficiencies observed in the Work during performance of its services.

2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to ENGINEER with copy to CONTRACTOR and to authorities having jurisdiction.

3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

5. Testing agency will retest and reinspect corrected work.

D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were CONTRACTOR'S responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with ENGINEER and CONTRACTOR in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify ENGINEER and CONTRACTOR promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through CONTRACTOR.

4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.

5. Do not perform any duties of CONTRACTOR.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify

agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.

2. Incidental labor and facilities necessary to facilitate tests and inspections.

3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.

4. Facilities for storage and field-curing of test samples.

5. Delivery of samples to testing agencies.

6. Preliminary design mix proposed for use for material mixes that require control by testing agency.

7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 TESTING OF PAVEMENT

A. GENERAL

1. All concrete work for pavement shall be tested by cylinder breaks at an approved testing laboratory. Three (3) standard test cylinders shall be taken during each continuous pour. Costs for these cylinder breaks will be borne by the CONTRACTOR.

2. Density tests will be taken of the CONTRACTOR'S finished subgrade, each base course lift, and asphalt at 100' intervals along the length of streets. Costs for the subgrade and base course densities will be per the bid item in the proposal. The cost for the asphalt densities will be borne directly by the CONTRACTOR. Densities by a nuclear density gauge will be accepted for asphalt testing. The cost of retesting cause by failure of initial test will be paid by the CONTRACTOR. Any other materials, testing and batch designs required by these specifications will be paid by the CONTRACTOR.

3. All testing of materials required under these specifications shall be performed by an approved agency for testing materials. The nomination of the laboratory and the payment for such services shall be made by the CONTRACTOR. The ENGINEER shall approve the laboratory nominated to do the testing of material.

a. Concrete

1) Testing and control of concrete to be used in the work shall be done by a commercial laboratory employed and paid for by the CONTRACTOR.

2) The CONTRACTOR shall furnish the concrete and concrete materials for such testing at his expense, as provided hereinafter in these specifications.

b. HMAC

1) Testing and design of hot mix asphaltic concrete (HMAC) shall be performed by an independent laboratory employed and paid for by the CONTRACTOR.

2) The CONTRACTOR shall furnish all labor and materials necessary for such testing at his expense, as provided in these specifications.

3) As a minimum, the CONTRACTOR shall perform one (1) sample (three (3) test specimens) for determination of Proctor density and stability and one (1) sample for determination of proportioning of materials. These samples shall be daily during HMAC construction activities.

c. Density

1) Testing of subgrade, fill, and/or backfill layers shall be performed by an independent geotechnical testing agency employed and paid for by the CONTRACTOR.

2) The CONTRACTOR shall furnish all labor and materials necessary for such testing at his expense, as provided in these specifications.

3) CONTRACTOR shall proceed with subsequent work only after test results for previously completed work comply with requirements.

4) All failed tests shall be retested by the CONTRACTOR at the CONTRACTOR'S expense.

B. UTILITY BACKFILL

1. Backfill shall be tested at a frequency of one test per lift for every 200 linear feet of trench backfill. The CONTRACTOR shall be responsible for all costs associated with retesting due to noncompliance.

C. REPAIR AND PROTECTION

1. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

a. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.

b. Retain subparagraph above or below. Above is for simple projects that do not include a "Cutting and Patching" Section and relies on patching and repair materials being the same as for new construction.

c. Comply with the Contract Document requirements for Section 32 01 26 "Asphalt Pavement Restoration."

2. Protect construction exposed by or for quality-control service activities.

3. Repair and protection are CONTRACTOR'S responsibility, regardless of the assignment of responsibility for quality-control services

3.02 TESTING OF PIPES

A. See Section 33 01 12 "Testing of Pipelines".

3.03 FINAL ACCEPTANCE

A. No pipe installation will be accepted until all known leaks have been repaired whether or not leakage is within allowable limits. Locating and repairing of leaks shall be performed by the CONTRACTOR at no additional cost to the OWNER.

B. The OWNER will certify that all required pressure and leakage tests have been successfully completed before the pipeline is accepted.

3.04 WATER SOURCE

A. Water shall be made available by the OWNER for testing and other work on this project as specified. The CONTRACTOR shall install temporary connections to the OWNERS supply pipe, including supply/installation of RPZ backflow preventer and meter. Any additional water, if necessary, shall be provided at the CONTRACTOR'S expense.

PART 4 -

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. This section will be attached to a bid item that includes supplying and testing for quality assurance quality control.

4.02 PAYMENT

A. The bid items include all components of the work required for the completion of the job in every respect except as may be otherwise provided in these specifications. CONTRACTOR shall include the furnishing of all materials and labor, including any incidental labor, in its bid prices.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section covers the Project requirements for field offices, utilities, site security, access roads and parking, and related items to be provided by the CONTRACTOR throughout the duration of the Project.

B. The CONTRACTOR shall obtain and pay for all permits required for the Field Offices specified herein. The Contactor shall pay all costs associated with maintaining the Field Offices, including all insurance.

C. Water and electricity for construction shall be provided by the OWNER. The CONTRACTOR shall coordinate and install, at his expense, any meters required for water and electrical service.

D. The CONTRACTOR shall prepare and install Project Signs.

E. Temporary utilities include, but are not limited to, the following:

1. Water service and distribution.

2. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.

3. Heating and cooling facilities.

4. Ventilation.

5. Electric power service.

6. Lighting.

7. Telephone service.

F. Support facilities include, but are not limited to, the following:

1. Temporary roads and paving.

2. Dewatering facilities and drains.

3. Project identification and temporary signs.

4. Waste disposal facilities.

5. Field offices.

6. Storage and fabrication sheds.

7. Temporary stairs.

8. Construction aids and miscellaneous services and facilities.

G. Security and protection facilities include, but are not limited to, the following:

1. Environmental protection.

2. Stormwater control.

3. Tree and plant protection.

4. Site enclosure fence.

5. Security enclosure and lockup.

6. Barricades, warning signs, and lights.

7. Fire protection.

1.02 QUALITY ASSURANCE

A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.

1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.

2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.03 PROJECT CONDITIONS

A. Temporary Utilities: At earliest feasible time, when acceptable to OWNER, change over from use of temporary service to use of permanent service.

1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before OWNER'S acceptance, regardless of previously assigned responsibilities.

B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the work:

1. Keep temporary services and facilities clean and neat.

2. Relocate temporary services and facilities as required by progress of the Work.

1.04 USE CHARGES

A. General: Cost or use charges for temporary facilities are not chargeable to OWNER or ENGINEER and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:

1. OWNER'S construction forces.

2. Occupants of Project.

3. ENGINEER.

4. Testing agencies.

5. Personnel of authorities having jurisdiction.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 TEMPORARY LIGHT AND POWER

A. The CONTRACTOR shall furnish all temporary light and power, complete with wiring, lamps, and similar equipment as required to adequately light all work areas and with sufficient power capacity to meet the needs of the OWNER and ENGINEER. The CONTRACTOR shall make all necessary arrangements with the OWNER for temporary electric service and pay all expenses in connection therewith.

B. Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. For connection of power tools and equipment, provide outlets equipped with ground-fault circuit interrupters, reset button and pilot light.

C. Provide grounded extension cords. Use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if more than one length is required.

D. Provide general service incandescent lamps as required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.

3.02 TEMPORARY AIR AND WATER

A. The CONTRACTOR shall provide all air and water, including temporary piping and appurtenances required therefore, as may be required for the cleaning and testing of pipelines and equipment necessary for the work. Temporary piping and appurtenances shall be removed upon approval of equipment being tested. A reasonable quantity of water is available to the CONTRACTOR at no cost for construction purposes. Water will be delivered at a rate and at a location as determined by the OWNER. CONTRACTOR shall meter all water used. Coordinate use and quantity of water with OWNER'S personnel.

B. All water required for and in connection with the Work to be performed shall be furnished by the OWNER through meters installed on hydrants. Meters will be available from OWNER. All costs for obtaining a water meter shall be the responsibility of the CONTRACTOR. The CONTRACTOR shall contact the OWNER and arrange to pick up the meter. The CONTRACTOR shall install a reduced pressure zone (RPZ) valve assembly on the fire hydrant between the hydrant and the meter, to prevent backflow in the event of pressure failure. The CONTRACTOR shall supply all necessary tools, hose and pipe, and shall make necessary arrangements for securing and transporting such water and shall take water in such a manner, and at such times, that will not produce a harmful drain or decrease of pressure in the OWNER'S water system. It shall be the CONTRACTOR'S responsibility to make arrangements with the OWNER for the metering and reporting of the amount of water used. Water shall not be used in a wasteful manner. Standard hydrant wrenches shall be used for opening and closing of fire hydrants. Temporary lines shall be removed when no longer required.

3.03 TEMPORARY SANITARY FACILITIES

A. The CONTRACTOR shall furnish temporary sanitary facilities at the site, as provided herein, for the needs of all construction workers and others performing Work or furnishing services on the Project.

B. Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.

1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
2. Toilets: Install self-contained toilet units.

C. Sanitary facilities shall be of reasonable capacity, properly maintained throughout the construction period, and obscured from public view to the greatest practical extent. If toilets of the chemically treated type are used, at least one toilet shall be furnished for each twenty (20) employees. The CONTRACTOR shall enforce the use of such sanitary facilities by all personnel at the site.

D. At no time shall the CONTRACTOR or subcontractors use the sanitary facilities for the OWNER/ENGINEER'S Field Office.

3.04 FIRE EXTINGUISHERS

A. Provide portable UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide portable UL-rated Class ABC dry chemical extinguishers or a combination of NFPA recommended Classes for the exposure. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

3.05 LAYOUT OF TEMPORARY FACILITIES

A. Before starting the work, the CONTRACTOR shall submit to the ENGINEER his requirements for space for temporary structures and storage of materials. The CONTRACTOR shall submit to the ENGINEER for approval, his proposed plan and layout for all temporary offices, sanitary facilities, temporary construction roads, storage buildings, storage yards, temporary water

service and distribution, temporary power service and distribution, and temporary telephone service.

3.06 STORAGE BUILDINGS

A. The CONTRACTOR shall erect, or provide as approved, temporary storage buildings of the various sizes as required for the protection of mechanical and electrical equipment and materials as recommended by manufacturers of such equipment and materials. The buildings shall be provided with such environmental control systems that meet recommendations of manufacturers of all equipment and materials stored in the buildings. The buildings shall be of sufficient size and so arranged or partitioned to provide security for their contents and provide ready access for inspection and inventory. At or near the completion of the work, and as directed by the ENGINEER, the temporary storage buildings shall be dismantled, removed from the site, and remain the property of the CONTRACTOR.

B. Combustible materials (paints, solvents, fuels, etc.) shall be stored in a well-ventilated building removed from other buildings.

3.07 STORAGE YARDS

A. The CONTRACTOR shall construct temporary storage yards for the storage of materials that are not subject to damage by weather conditions. Materials such as pipe and reinforcing and structural steel shall be stored on pallets or racks, off the ground, and in a manner that allows ready access for inspection and inventory.

3.08 CONTRACTOR'S WORK AREA

A. The CONTRACTOR shall limit his operations and storage of equipment and materials to the areas designated and as directed by the ENGINEER.

B. The CONTRACTOR shall erect a suitable fence around each tree or group of trees shown as "protected" or "to be saved" on the plans. Any such trees damaged shall be repaired or replaced, as directed by the ENGINEER, at the CONTRACTOR'S expense.

C. Except as provided herein, no private property, or other area adjacent to the plant site shall be used for storage of the CONTRACTOR'S equipment and materials unless prior written approval is obtained from the legal property owner.

D. The CONTRACTOR shall maintain the area during construction and shall proceed with his work in an orderly manner, maintaining the construction site free of debris and unnecessary equipment or materials.

E. At all times, maintain areas covered by the Contract and public properties free from accumulations of waste, debris, and rubbish caused by construction operations.

F. Cleaning and disposal operations shall comply with local ordinances and antipollution laws. Do not burn or bury rubbish and waste materials on the project site. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Do not dispose of wastes into streams or waterways.

G. Wet down dry materials and rubbish to minimize dust and prevent blowing dust.

H. Provide approved containers for collection and disposal of waste materials, debris, and rubbish and make arrangements for appropriate periodic emptying of the containers.

3.09 PROTECTION OF PUBLIC AND PRIVATE PROPERTY

A. The CONTRACTOR shall protect, shore, brace, support and maintain all underground pipes conduits, drains, and other underground construction uncovered or otherwise affected by the CONTRACTOR'S operations. All pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, fences, and other surface structures affected by construction operations, together with all sod and shrubs in yards, parkways, and medians, shall be restored to their original condition, whether within or outside the easement/right-of-way. All replacements shall be made with new materials.

B. The CONTRACTOR shall be responsible for all damage to streets, roads, curbs, sidewalks, highways, shoulders, ditches, embankments, culverts, bridges, or other public or private property, which may be caused by transporting equipment, materials, or men to or from the Work, whether by him or his Subcontractors. The CONTRACTOR shall make satisfactory and acceptable arrangements with the OWNER of, or the agency having jurisdiction over, the damaged property concerning its repair or replacement, or payment of costs incurred in connection with the damage.

C. All fire hydrants and water control valves shall be kept free from obstruction and available for use at all times.

3.10 TEMPORARY ACCESS ROADS AND PARKING SPACE

A. The CONTRACTOR shall construct temporary construction access roads and detours as are required to execute the work. The roads shall meet with the approval of the ENGINEER and be maintained in good condition until no longer needed; at which time the temporary roads shall be removed, and the area left in a condition satisfactory to the ENGINEER.

B. The CONTRACTOR shall construct temporary parking facilities for his employees, his Sub-contractor's employees, other employees and the ENGINEER.

3.11 PROTECTION OF THE FINISHED CONSTRUCTION

A. The CONTRACTOR shall assume the responsibility for the protection of all finished construction and shall repair and restore any and all damage to finished work to its original or better state.

B. Where responsibility can be determined, the cost for replacement or repair of damaged work shall be charged to the party responsible. If responsibility cannot be fixed, the cost shall be borne by the CONTRACTOR.

C. Wheeling of any loads over finished floors, either with or without plank protection, shall not be permitted in anything except rubber-tired wheelbarrows, buggies, trucks, or dollies. This applies to all finished floors and to all exposed concrete floors as well as those covered with composition tile or other applied surfacing and shall apply to all trades.

D. Where structural concrete has the finished surface, care shall be taken to avoid marking or damaging those surfaces.

3.12 TEMPORARY SIGNS

A. Furnish and install the project signs indicated in the Contract Documents. Signs shall be placed as directed by the ENGINEER; and shall be maintained in good condition for the life of the construction period.

B. Remove signs at final acceptance, unless otherwise directed.

3.13 SECURITY

A. The CONTRACTOR shall be responsible for protection of the site, and all work, materials, equipment, and existing facilities thereon, against vandals and other unauthorized persons.

B. No claim shall be made against the OWNER by reason of any act of an employee or trespasser, and CONTRACTOR shall make good all damage to the OWNER'S property resulting from CONTRACTOR'S failure to provide security measures.

3.14 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.

2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide a reasonably level, graded, well-drained subgrade of satisfactory soil material, compacted to not less than 95 percent of maximum dry density in the top 6 inches.

C. Dewatering Facilities and Drains: Comply with requirements in applicable DIVISION 02 - SITE CONSTRUCTION sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding the project or adjoining property(ies), nor endanger permanent work or temporary facilities.

2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.

D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste.

E. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished, permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.

3.15 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.

B. Stormwater Control: Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.

C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage. Protect tree root systems from damage, flooding, and erosion.

D. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

E. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.

F. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.

    a. Field Offices: Class A stored-pressure water-type extinguishers.

2. Store combustible materials in containers in fire-safe locations.

3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.

4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

3.16 REMOVAL OF TEMPORARY FACILITIES AND UTILITIES

A. At such time or times any temporary construction facilities and utilities are no longer required for the work, the CONTRACTOR shall notify the ENGINEER of his intent and schedule for removal of the temporary facilities and utilities and obtain the ENGINEER'S approval before

removal. As approved, the CONTRACTOR shall disconnect and/or dismantle the temporary facilities and utilities and remove them from the site as his property. Leave the site in such condition as specified, as directed by the ENGINEER, and/or as shown on the Plans.

B. In unfinished areas, the condition of the site shall be left in a condition that will restore original drainage, evenly graded, seeded or planted as necessary, and left with an appearance equal to, or better than original.

C. Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

D. Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the property of CONTRACTOR.

2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in the Contract Documents.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT

A. The work specified in this Section shall be considered incidental and payment will be included as part of the appropriate lump sum or unit prices stated in the Proposal.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 57 19

ENVIRONMENTAL PROTECTION MEASURES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The work covered by this Section consists of furnishing all labor, materials and equipment and performing all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract.

B. For the purpose of this Specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes.

C. The control of environmental pollution requires consideration of air, water and land, and involves management of noise and solid waste, as well as other pollutants.

D. Schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. Provide erosion control measures such as sedimentation or filtration systems, berms, silt fences, seeding, mulching or other special surface treatments as are required to prevent silting and muddying of streams, rivers, impoundments, lakes, etc. All erosion control measures shall be in place in an area prior to any construction activity in that area.

E. These Specifications are intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and its surroundings. These are general guidelines. It is the CONTRACTOR'S responsibility to determine the specific construction techniques to meet these guidelines.

F. All phases of sedimentation and erosion control shall comply with and be subject to the approval of the **Texas Commission on Environmental Quality (TCEQ)** and the U.S. EPA.

1.02 APPLICABLE REGULATIONS

A. Comply with all applicable Federal, State and local laws and regulations concerning environmental pollution control and abatement.

1.03 NOTIFICATIONS

A. The ENGINEER will notify the CONTRACTOR in writing of any observed non-compliance with the foregoing provisions or of any environmentally objectionable acts and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements shall notify the CONTRACTOR in writing, through the ENGINEER, of any non-compliance with State or local requirements. The CONTRACTOR shall, after receipt of such notice from the ENGINEER or from the regulatory agency through the ENGINEER, immediately take corrective action. Such notice, when delivered to the CONTRACTOR or its authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the CONTRACTOR fails or refuses to comply promptly, the OWNER may issue an order stopping all or part of the work until satisfactory corrective action

has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the CONTRACTOR unless it is later determined that the CONTRACTOR was in full compliance.

1.04 IMPLEMENTATION

A. Prior to commencement of the work, meet with the OWNER to develop mutual understandings relative to compliance with this provision and administration of the environmental pollution control program.

B. Remove temporary environmental control features, when approved by the ENGINEER, and incorporate permanent control features into the project at the earliest practicable time.

1.05 PROTECTION OF WATERWAYS

A. The CONTRACTOR shall observe the rules and regulations of the State of Texas and agencies of the U.S. Government prohibiting the pollution of any lake, stream, river, or wetland by the dumping of any refuse, rubbish, dredge material, or debris therein.

B. CONTRACTORS are specifically cautioned that disposal of materials into any waters of the State must conform with the requirements of the Texas Commission on Environmental Quality, and an applicable permit from the U.S. Army Corps of Engineers.

C. The CONTRACTOR shall be responsible for providing holding ponds or an approved method which will handle, carry through, or divert around his work all flows, including storm flows and flows created by construction activity, so as to prevent silting of waterways or flooding damage to the property or adjacent properties.

1. Any materials removed from water bodies are to be dewatered in a manner that prevents silting or return of material to water body.

2. Liquid/solid separation to be performed mechanically, by gravity separation in holding ponds or by other means that comply with the requirements. Holding ponds to incorporate means to remove liquid such as filtered riser pipes, decant pipes, underdrains, etc.

D. The CONTRACTOR is responsible for researching the need for a U.S. EPA NPDES (Stormwater Pollution Prevention Plan) permit for the construction site. If one is required, the CONTRACTOR is responsible for obtaining the permit and for monitoring the site per the permit requirements until final completion. Costs associated with this activity shall be included in the CONTRACTOR'S bid.

1.06 DISPOSAL OF EXCESS EXCAVATION AND OTHER WASTE MATERIALS

A. Material not suitable for backfill and other waste material must be disposed of at sites approved by the OWNER and ENGINEER. Excess excavated material suitable for backfill, but not used, shall be spread and compacted in the designated spoils area as shown on the Drawings.

B. Unacceptable disposal sites include, but are not limited to, sites within a wetland or critical habitat and sites where disposal will have a detrimental effect on surface water or groundwater quality.

C. The CONTRACTOR may make his own arrangements for disposal subject to submission of proof to the ENGINEER that the OWNER of the proposed site(s) has a valid fill permit issued by the appropriate governmental agency and submission of a haul route plan including a map of the proposed route(s).

D. The CONTRACTOR shall provide watertight conveyance of any liquid, semi-liquid, or saturated solids which tend to bleed or leak during transport. No liquid loss from transported materials will be permitted whether being delivered to the construction site or being hauled away for disposal. Fluid materials hauled for disposal must be specifically acceptable at the selected disposal site.

1.07 USE OF CHEMICALS

A. All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture or any other applicable regulatory agency. Use of all such chemicals and disposal of residues shall be in conformance with the manufacturer's instructions.

B. Any oil or other hydrocarbon spilled or dumped on the OWNER'S site during construction must be excavated and completely removed from the site prior to final acceptance. Soil contaminated by the CONTRACTOR'S operations shall become the property of the CONTRACTOR, who will bear all costs of testing and disposal.

C. If the OWNER is using or storing any chemicals on-site, the following steps shall be completed before a CONTRACTOR commences work:

1. The OWNER will inform CONTRACTOR of his rights under the Texas Hazards Communication Act.

2. The OWNER will provide a copy of the Chemical List giving the hazardous chemicals to which the CONTRACTOR, his employees and agents may be exposed to on the project site.

3. The OWNER will provide copies of all MSDSs to the CONTRACTOR for the hazardous chemicals which he may be exposed to on the project site.

4. The OWNER will inform the CONTRACTOR of his obligation to inform his employees and agents of each of the above requirements.

5. The CONTRACTOR shall provide MSDSs for all hazardous chemicals he may bring onto the project site that OWNER'S employees may be exposed to.

6. The CONTRACTOR shall sign a Contractor Acknowledgement certifying that he has received the information provided by the OWNER on hazardous chemicals and maintain the Acknowledgement with the original Contract.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 EROSION CONTROL

A. Comply with Section 01 57 23 “Storm Water Pollution Prevention Plan.”

3.02 PROTECTION OF STREAMS

A. Care shall be taken to prevent, or reduce to a minimum, any damage to any stream from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such streams. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in the stream, shall not be directly returned to the stream. Such waters shall be diverted through a settling basin or filter before being directed into the streams.

B. The CONTRACTOR shall not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water or any storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water.

C. All preventative measures shall be taken to avoid spillage of petroleum products and other pollutants. In the event of any spillage, prompt remedial action shall be taken in accordance with a contingency action plan approved by the Texas Commission on Environmental Quality. CONTRACTOR shall submit two copies of approved contingency plans to the ENGINEER.

D. Water being flushed from structures or pipelines after disinfection, with a chlorine residue of 1 mg/L or greater, shall be treated with a dechlorination solution, in a method approved by the ENGINEER, prior to discharge.

3.03 PROTECTION OF LAND RESOURCES

A. Land resources within the project boundaries and outside the limits of permanent work shall be restored to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to areas shown on the Drawings.

B. Outside of areas requiring earthwork for the construction of the new facilities, the CONTRACTOR shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the ENGINEER. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The CONTRACTOR shall in any event be responsible for any damage resulting from such use.

C. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the CONTRACTOR'S equipment, dumping or other operations, protect such trees by placing boards, planks, or poles around them. Monuments and markers shall be protected similarly before beginning operations near them.

D. Any trees or other landscape feature scarred or damaged by the CONTRACTOR'S equipment or operations shall be restored as nearly as possible to its original condition. The ENGINEER will decide what method of restoration shall be used and whether damaged trees shall be treated and healed or removed and disposed of.

1. All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1 in. in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.

2. Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the CONTRACTOR and are beyond saving in the opinion of the ENGINEER, shall be immediately removed and replaced.

E. The locations of the CONTRACTOR'S storage, and other construction buildings, required temporarily in the performance of the work, shall be cleared portions of the job site or areas to be cleared as shown on the Drawings and shall require written approval of the ENGINEER and shall not be within wetlands or floodplains. The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the construction of buildings. Drawings showing storage facilities shall be submitted for approval of the ENGINEER.

F. If the CONTRACTOR proposes to construct temporary roads or embankments and excavations for plant and/or work areas, he/she shall submit the following for approval at least ten days prior to scheduled start of such temporary work.

1. A layout of all temporary roads, excavations and embankments to be constructed within the work area.

2. Details of temporary road construction.

3. Drawings and cross sections of proposed embankments and their foundations, including a description of proposed materials.

4. A landscaping drawing showing the proposed restoration of the area. Removal of any trees and shrubs outside the limits of existing clearing area shall be indicated. The drawing shall also indicate location of required guard posts or barriers required to control vehicular traffic passing close to trees and shrubs to be maintained undamaged. The drawing shall provide for the obliteration of construction scars as such and shall provide for a natural appearing final condition of the area. Modification of the CONTRACTOR'S approved drawings shall be made only with the written approval of the ENGINEER. No unauthorized road construction, excavation or embankment construction including disposal areas will be permitted.

G. Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction as directed by the ENGINEER. It is anticipated that excavation, filling and plowing of roadways will be required to restore the area to near natural conditions which will permit the growth of vegetation thereon. The disturbed areas shall be prepared and seeded as described in SECTION 32 91 13 – SEEDING AND SOIL SUPPLEMENTS, or as approved by the ENGINEER.

H. All debris and excess material shall be disposed of outside wetland or floodplain areas in an environmentally sound manner.

3.04 PROTECTION OF AIR QUALITY

A. Burning. The use of burning at the project site for the disposal of refuse and debris will not be permitted, unless approved by the OWNER.

B. Dust Control. The CONTRACTOR will be required to maintain all excavations, embankment, stockpiles, access roads, plant sites, waste areas, borrow areas, and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded, and which would cause a hazard or nuisance to others.

C. An approved method of stabilization consisting of sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides may be permitted with approval from the ENGINEER.

D. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the CONTRACTOR must have sufficient suitable equipment on the job to accomplish this if sprinkling is used. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs, as determined by the ENGINEER.

3.05 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

A. During the life of this Contract, maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

3.06 NOISE CONTROL

A. The CONTRACTOR shall make every effort to minimize noises caused by its operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with State and Federal regulations.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT

A. The work specified in this Section shall be considered incidental and payment will be included as part of the appropriate lump sum or unit prices specified in the Bid Form.

END OF SECTION

SECTION 01 57 23

STORM WATER POLLUTION PREVENTION PLAN

PART 1 - GENERAL

1.01 PREPARATION AND NOTIFICATION PHASE

A. Storm Water Pollution Prevention Plan (SWP3)

1. The CONTRACTOR shall be responsible for preparation of the Storm Water Pollution Prevention Plan (SWP3). The CONTRACTOR shall incorporate as a part of the SWP3 all necessary erosion control details and notes required by applicable law, **including all necessary materials and labor necessary to construct the items called for in the SWP3**. The SWP3 shall include all elements required by TPDES General Permit No. TXR150000 as issued by the Texas Commission on Environmental Quality, effective date, March 5, 2023. The SWP3 must be retained on-site at all times during the construction of the project. The CONTRACTOR shall complete the document in Attachment 1 and insert into the SWP3.

B. Notice of Intent and Construction Site Notice

1. The CONTRACTOR shall submit a Notice of Intent (NOI) to the Texas Commission on Environmental Quality. The application fee and annual Water Quality Fee shall be paid for by the CONTRACTOR. A Construction Site Notice and NOI are required for areas where the land disturbed is equal to or greater than five (5) acres. For disturbed areas where the acreage is between one (1) and five (5) acres, only a Construction Site Notice is required. A copy of the NOI (and/or Construction Site Notice) shall be given to the City. Both forms shall be posted at the project site in a location where it is readily available for viewing by the general public, local, state, and federal authorities.

2. An Authorized Representative of the CONTRACTOR shall sign the NOI and/or Construction Site Notice, and Attachment 1. The authorized representative must be someone at or near the top of the management chain, such as the president, vice president, or a general partner, who has been delegated the authority to sign and certify this type of document. See 30 TAC, 305.44 of the TCEQ Rules and Regulations for requirements related to Application for Permit.

3. A NOI must be postmarked at least seven (7) days before construction begins. If the NOI form is submitted electronically via the STEERS Program, construction may begin the same day as the NOI is submitted.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 CONSTRUCTION/IMPLEMENTATION PHASE

A. Once the NOI has been mailed, the CONTRACTOR may start construction of the project as early as seven (7) days after the NOI is postmarked, or immediately if the NOI is submitted electronically through STEERS. The CONTRACTOR must: (a) implement the controls, (b)

inspect and maintain the controls, (c) maintain records of construction activities, (d) update/change the plan to keep it current, and (e) have plans accessible as outlined in the SWP3.

1. Implement Controls

    a. The first action that should be taken is to construct or perform the controls that were selected for the SWP3. The controls must be installed and/or constructed in the order indicated in the sequence of major activities. Stabilization measures must be applied within the time frame specified in the permit.

    b. To ensure that controls are adequately implemented, it is important that the work crews who install the measures are experienced and/or adequately trained. Improperly installed controls can have little or no effect and may actually increase the pollution of storm water. It is also important that all other workers on the construction site be made aware of the controls so that they do not inadvertently disturb or remove them.

2. Inspect and Maintain Controls

    a. Inspection and maintenance of the protective measures that are part of this plan are as important to pollution prevention as proper planning, design/selection, and installation. The CONTRACTOR shall provide for the systematic inspection of the SWP3 Controls.

    b. Inspection - Inspection shall be at least every fourteen (14) days and within 24-hours after the end of a storm of 0.5 in. or more, or every seven (7) days. All disturbed areas of the site, areas for material storage, locations where vehicles enter or exit the site, and all of the erosion and sediment controls that were identified as part of the plan must be inspected. Controls must be in good operating condition until the area they protect has been completely stabilized and the construction activity is complete. The inspector for the CONTRACTOR shall sign all inspection reports.

    c. Maintenance/repairs - The inspector must record any damages or deficiencies in the control measures on an inspection report form provided for this purpose. These reports document the maintenance and repair and to prove that inspection and maintenance were performed. The CONTRACTOR shall correct damages or deficiencies as soon as practicable after the inspection but in no case later than seven (7) days after the inspection. Any changes that may be required to correct deficiencies in the SWP3 shall also be completed and dated in the document as soon as practicable after the inspection but in no case later than seven (7) days after the inspection.

3. Maintain Records of Construction Activities

    a. In addition to the inspection and maintenance reports, the inspector shall keep records of the construction activity on the site. In particular, the inspector shall keep a record of the following information:

        1) The dates when major grading activities occur in a particular area.

2) The dates when construction activities cease in an area, temporarily or permanently.

3) The dates when an area is stabilized, temporarily or permanently.

b. These records can be used to make sure that areas where there is no construction activity will be stabilized within the required time frame.

4. Update/Change the Plan

a. For a construction activity to be in full compliance with its TPDES Construction General Permit, and for the SWP3 to be effective, the plan must accurately reflect site features and operations. When it does not, the plan must be changed. The plan must also be changed if the operators observe that it is not effective in minimizing pollutant discharge from the site.

5. Provide for Plan Location and Access

a. The General Permit has specific requirements regarding plan location and access.

b. Plan location: A copy of the SWP3 must be kept at the construction site from the time construction begins until the site is finally stabilized.

c. Access: Although plans and associated records are not necessarily required to be submitted to the State, these documents must be made available upon request to the State or local agency who is approving erosion and sediment control plans, or storm water pollution prevention plans. If site storm water runoff is discharged to a municipal separate storm sewer system, the plans must be made available upon request to the municipal operator of the system.

3.02 FINAL STABILIZATION/TERMINATION PHASE

A. Operators of a construction site must continue to comply with permit conditions until:

1. They no longer meet the definition of an Operator of a construction site; or

2. The construction activity is complete, all disturbed soils have been finally stabilized, and temporary erosion and sediment controls have been or will be removed.

B. A permittee should submit a Notice of Termination (NOT) to inform TCEQ that he/she is no longer an Operator of the construction activity.

C. Final Stabilization

1. Final stabilization is defined by the General Permit as meaning that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70 percent of the native background vegetated cover (i.e., original conditions) for unpaved areas not covered by permanent structures has been established or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

D. Notice of Termination

1. A NOT should be completed and submitted to TCEQ and the City when the site has been finally stabilized or when an Operator of a construction activity changes. Information to be included on the NOT includes the location of the construction site; the name, address, and telephone number of the Operator terminating coverage; the TPDES General Permit number; an indication of why coverage under the permit should be terminated for the Operator; and a signed certification statement.

2. Note that when there is a change in operators of a construction activity, the new Operator must submit a NOI to be covered by the permit at least seven (7) days before the change in Operator.

E. Record Retention

1. Following the termination of construction activities, the permittees must keep a copy of the SWP3, all reports and actions required by the General Permit, and all the data used to complete the NOI for a period of at least three years following final stabilization. Prior to submitting the NOT, the CONTRACTOR shall furnish the City copies of all NOIs, certificates, and inspection forms for record retention purposes.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. The NOI, SW3P and all erosion control measures called for in the SW3P (e.g., rock berms, silt fence, construction entrances, etc.) shall be measured as a Lump Sum. All incidental erosion, sediment and water pollution control devices and measures required, both temporary and permanent, shall be considered subsidiary to the bid item “Storm Water Pollution Prevention Plan” and no direct measurement will be made. Preparation and updating of the “Storm Water Pollution Prevention Plan” including all reports and records to be maintained shall not be measured but shall be considered subsidiary to the bid item “Storm Water Pollution Prevention Plan”.

4.02 PAYMENT

A. All erosion, sediment and water pollution control devices and measures required, both temporary and permanent, shall be bid as a lump sum price for the bid item “Storm Water Pollution Prevention Plan”. Preparation and updating of the “Storm Water Pollution Prevention Plan” including all reports and records to be maintained shall be included in the lump sum price for the bid item “Storm Water Pollution Prevention Plan”. The lump sum bid price for the “Storm Water Pollution Prevention Plan” will be full compensation for furnishing all labor, materials and equipment necessary to install, maintain, and remove (if required) all items and actions necessary to maintain and complete the “Storm Water Pollution Prevention Plan” requirements for this project.

B. Costs for the CONTRACTOR’S Application Fee for the NOI and the annual Water Quality Fee shall be included in the lump sum bid for the “Storm Water Pollution Prevention Plan”.

C. Costs for personnel to inspect the protective measures that are a part of the “Storm Water Pollution Prevention Plan” shall be included in the lump sum bid for the “Storm Water Pollution Prevention Plan”.

D. Pollution control measures may be applicable to CONTRACTOR operations outside the right of way and easement area where such work is necessary as a result of roadway related construction such as construction and haul roads, field offices, equipment and supply areas, and material sources. Pollution control measures outside the right of way will not be measured for payment but shall be performed at the CONTRACTOR'S expense.

THIS PAGE LEFT BLANK INTENTIONALLY

ATTACHMENT 1

Storm Water Pollution Prevention Plan
Roles and Responsibilities

STORM WATER POLLUTION PREVENTION PLAN

ROLES AND RESPONSIBILITIES

This is a shared Storm Water Pollution Prevention Plan (SWP3) between the below Primary Operators. The role of each Operator is listed below.

PRIMARY OPERATOR (CITY OF LYTLE):

SIGNATURE: _____
PRINTED NAME: _____
ADDRESS: _____
_____
_____

RESPONSIBILITIES:

✓ Operational control over plans and specifications, including the ability to make modifications to those plans.

___ Day-to-day operational control of activities necessary to ensure compliance with the SWP3 for the site.

PRIMARY OPERATOR (CONTRACTOR):

SIGNATURE: _____
PRINTED NAME: _____
ADDRESS: _____
_____
_____

RESPONSIBILITIES:

__ Operational control over plans and specifications, including the ability to make modifications to those plans.

✓ Day-to-day operational control of activities necessary to ensure compliance with the SWP3 for the site.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Project Record Documents.
3. Warranties.
4. Instruction of OWNER'S personnel.
5. Final cleaning.

B. See Section 01 29 00 "Price and Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.

C. See Section 01 32 33 "Construction Photographs" for submitting Final Completion construction photographs and negatives.

D. See Divisions 02 through 48 Sections for specific closeout and special cleaning requirements for products of those Sections.

1.02 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise OWNER of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting OWNER unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver spare parts, extra materials, and similar items to location designated by OWNER. Label with manufacturer's name and model number where applicable.
7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
8. Complete final cleaning requirements, including touchup painting.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, ENGINEER will either proceed with inspection or notify CONTRACTOR of

unfulfilled requirements. ENGINEER will prepare the Certificate of Substantial Completion after inspection or will notify CONTRACTOR of items, either on CONTRACTOR'S list or additional items identified by ENGINEER, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.03 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Section 01 29 00 "Price and Payment Procedures."
2. Submit certified copy of ENGINEER'S Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by ENGINEER. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Instruct OWNER'S personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, ENGINEER will either proceed with inspection or notify CONTRACTOR of unfulfilled requirements. ENGINEER will prepare a final Certificate for Payment after inspection or will notify CONTRACTOR of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.04 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for ENGINEER'S reference during normal working hours.

B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.

b. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
4. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
5. Contractor is required to GIS all the water line pipes and appurtenances and shall provide all GIS files of all pipes and appurtenances to the ENGINEER prior to final acceptance.

C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Note related Change Orders and Record Drawings, where applicable.

D. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.05 WARRANTIES

A. See Section 00 61 00 “Warranties and Bonds” for warranty requirements.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Clean exposed exterior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
f. Remove debris and surface dust from limited access spaces, including trenches, , manholes, and similar spaces.
g. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on OWNER'S property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION

SECTION 02 06 10

GEOTECHNICAL DATA

PART 1 - GENERAL

1.01 DESCRIPTION

A. Depending on Project requirements, OWNER may have obtained geotechnical information, which may include laboratory test results, logs of borings, and recommendations from geotechnical consultants. That information is included as an Appendix and/or on the Drawings. The CONTRACTOR shall be familiar with the subsurface materials and conditions on the Project and shall be knowledgeable of how they will affect the Work. The following is a partial listing of sources of information available to the CONTRACTOR about subsurface materials and conditions: the geotechnical information provided by the OWNER; geologic maps, publications and reports available from the **University of Texas Bureau of Economic Geology at the J.J. Pickle Research Center in Austin, Texas**; subcontractors familiar with local ground conditions; and local consulting geologists and geotechnical engineers. The CONTRACTOR may make their own subsurface investigations.

B. The soil information provided in the geotechnical report is representative of the specific bore locations only. Neither the OWNER or ENGINEER guarantee the soil conditions where bores were not acquired. For preparation of the bid costs, it shall be the CONTRACTOR'S responsibility to determine the soil conditions for the project.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 03 01 00

CONCRETE PAVEMENT RESTORATION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes repair, replacement, or restoration of exterior cement concrete pavement for the following:

1. Roadways.
2. Curbs and gutters.
3. Sidewalks.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete pavement mixture.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

PART 2 - PRODUCTS

2.01 STEEL REINFORCEMENT

A. Per Section 32 13 13 “Cement Concrete Paving.”

2.02 CONCRETE MATERIALS

A. Per Section 32 13 13 “Cement Concrete Paving.”

2.03 CURING MATERIALS

A. Per Section 32 13 13 “Cement Concrete Paving.”

2.04 RELATED MATERIALS

A. Per Section 32 13 13 “Cement Concrete Paving.”

PART 3 - EXECUTION

3.01 CONSTRUCTION

A. Submit for approval all materials and methods of application at least 2 weeks before beginning any repair work. Repair locations will be as indicated on the plans or as directed. Repair areas may be adjusted after removing distressed concrete. Switch the half-depth repair to the full-repair if exposed existing longitudinal bars are deficient, as approved. Compensation will be made for unexpected volumes of repair areas or changes in scope of work.

3.02 HALF-DEPTH REPAIR

A. Repair locations will be as indicated on the plans or as directed. Repair boundaries should be square or rectangular with a minimum length and width of 12 in.

B. Saw-cut repair boundaries to a minimum depth of 1-1/2 in. Do not saw-cut longitudinal or transverse steel. If the longitudinal steel is cut, a full-depth repair may be required as directed without additional compensation.

C. Remove concrete from the repair area as designated. Start at the center of the repair area. Ensure all loose concrete materials are removed and only sound concrete is left in place. Increase the repair area and perform a full-depth repair as directed if longitudinal steel bars were damaged by the removal operations. No additional compensation will be made.

D. Clean the area to be repaired by approved methods. Remove all loose particles, dirt, deteriorated concrete, or other substances that would impair the bond of the repair material.

E. Mix, place, and cure concrete in accordance with Section 32 13 13 “Cement Concrete Paving.”

F. Match the grade and alignment of existing concrete pavement unless otherwise shown on the plans. Concrete pavement may be opened to traffic when specified strength is achieved.

3.03 FULL-DEPTH REPAIR

A. Repair areas identified by the ENGINEER. Make repair areas rectangular, at least 6 ft. long and at least 1/2 a full lane in width unless otherwise shown on the plans. Accept ownership of all removed material, and dispose of it in accordance with federal, state, and local regulations unless otherwise shown on the plans. Saw-cut and remove existing asphalt concrete overlay at least 2 ft. longer than the repair patch in each longitudinal direction when there is existing asphalt concrete overlay over the repair area.

B. Saw-cut the full depth through the concrete around the perimeter of the repair area before removal. Schedule work so that concrete placement follows full-depth saw-cutting by no more than 7 days unless otherwise shown on the plans or approved.

C. Remove the slab by lifting the slab with a minimum disturbance to the base materials and surrounding concrete. Do not spall or fracture concrete adjacent to the repair area. Saw-cut and remove additional concrete as directed, after slab removal, if distresses are found in the surrounding concrete pavement. Repair damages to concrete pavement caused by the CONTRACTOR’S operation without additional compensation. Perform repairs as directed.

D. Remove loose or damaged base material completely, leaving no loose base material. Recompact base materials to the satisfaction of the ENGINEER. Level the base layer with cold-mix asphalt

to the original bottom line and grade of the concrete slab before repair concrete is placed when shown on the plans. Place concrete directly onto the compacted base layer unless otherwise directed.

E. Use tie bars to restore the continuity of the concrete pavement. Demonstrate, through simulated job conditions, that the bond strength of the epoxy-grouted tie bars meets a pullout strength of at least 3/4 of the yield strength of the tie bar when tested in accordance with ASTM E488 within the epoxy manufacturer's recommended curing time. Increase embedment depth and retest when necessary to meet testing requirements. Perform tie bar testing before starting repair work.

F. Place tie bars as shown on the plans. Drill holes into the existing concrete at least 10 in. deep unless otherwise directed. Use a drill bit with a diameter that is 1/8 in. greater than that of tie bars. Clean the holes with a wire brush and compressed air to remove all the dust and moisture. Follow the epoxy manufacturer's instructions to apply the epoxy. Insert the tip of the epoxy cartridge or the tip of the machine applicator to the end of the tie bar hole, and inject Type III, Class C epoxy to fill the entire hole. Insert tie bars.

G. Place new deformed reinforcing steel bars of the same size and spacing as shown on the plans for Continuously Reinforced Concrete Pavement (CRCP) repairs. Lap all longitudinal reinforcing steel at least 25 in. Provide and place approved supports to firmly hold the new reinforcing steel in place when needed.

H. Place dowel bars as shown on the plans for Concrete Pavement Contraction Design (CPCD) repairs. Provide and place approved supports to firmly hold the dowel bars in place.

I. Mix, place, and cure concrete in accordance with Section 32 13 13 "Cement Concrete Paving." Broom-finish the concrete surface unless otherwise shown on the plans.

J. Perform a timely saw-cut over the dowel bars and restore the transverse contraction joint for CPCD. Restore the existing longitudinal joints to their original conditions.

K. Match the grade and alignment of existing concrete pavement. Replace any asphalt overlay and shoulder material removed with new asphalt concrete material after concrete strength requirements have been met.

L. Remove repair area debris from the right of way each day. Concrete pavement may be opened to traffic when specified strength is achieved.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. This section will be measured in the bid for supplying, installing, and testing per linear foot concrete pavement restoration.

4.02 PAYMENT

A. The bid items include all components of the work, including testing for concrete pavement restoration, required for the completion of the job in every respect except as may be otherwise provided in these specifications. CONTRACTOR shall include the furnishing of all materials and labor, including any incidental labor, in its bid prices.

END OF SECTION

SECTION 03 60 00

GROUT

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This section specifies requirements for nonmetallic non-shrink grout for the abandonment of existing pipes, and at all other locations shown or reasonably implied by the drawings.

1.02 RELATED WORK (NOT APPLICABLE)

1.03 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):

1. ASTM C 309 - Liquid Membrane-Forming Compounds for Curing Concrete.

2. ASTM C 33 - Standard Specifications for Concrete Aggregates.

3. ASTM C 1107/C 1107M – Packaged Dry, Hydraulic-Cement Grout (nonshrink)

1.04 SUBMITTALS

A. Submit the following information on proposed products for approval by the ENGINEER before delivery to the project.

1. Manufacturer's technical literature including manufacturer's specifications for mixing and placing of the grout.

2. Test results of test performed by a certified independent testing laboratory showing conformance to the following:

a. ASTM C 1107/C 1107M

b. The requirements of this specification.

B. Number of Copies: Submit six (6) copies of each submittal, unless otherwise indicated. ENGINEER will return two (2) copies.

1.05 MANUFACTURER'S ASSISTANCE

A. Manufacturers of proprietary products shall make available, at no additional cost to the OWNER and upon seventy-two (72) hours notification, the service of a qualified, full time employee to aid in assuring proper use of the product under job conditions.

1.06 DELIVERY AND STORAGE

A. Non-shrink grout shall be delivered to the project in unopened containers and shall bear intact manufacturer's labels.

B. Store all non-shrink grout material in dry shelter and protect from moisture.

C. Containers that are torn or damaged such that the non-shrink grout material has been exposed to the elements shall be discarded.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Non-shrink grout shall be a pre-blended factory-packaged material manufactured, under rigid quality control, specifically for use in transferring heavy loads. The non-shrink grout shall conform to the following requirements:

1. Grout shall contain nonmetallic natural aggregate and shall be non-staining and non-corrosive.

2. Acceptable products are Gifford-Hill "Supreme," Master Builders' "Masterflow 713," or approved equal.

3. Corps of Engineers CRD C-621.

4. Resist attack by oil and water.

5. Have a minimum initial setting time of approximately one (1) hour at 70°F.

6. Have a minimum compressive strength of 5,000 psi at twenty-eight (28) days.

7. Free of gas-producing or gas-releasing agents.

B. Water used for mixing the grout shall be potable.

C. Clean pea gravel conforming to ASTM C 33 coarse aggregate graded so that at least 90 percent passes a 3/8 in. sieve and 90 percent is retained by a No. 4 sieve.

D. Membrane-Forming Curing Compound: Commercial curing compound conforming to ASTM C 309, which will not permanently discolor the grout.

PART 3 - EXECUTION

3.01 PROCEDURES

A. Installation methods and procedures shall conform to the printed instructions of the grout manufacturer and these specifications. Where there is a conflict between these specifications and the printed instructions of the grout manufacturer, the printed instructions of the grout manufacturer shall take precedence.

3.02 SURFACE PREPARATIONS

A. Remove all defective concrete, laitance, dirt, oil, grease, and other foreign material from concrete surfaces by bush-hammering, chipping, or other similar means, until a sound, clean concrete surface is achieved.

B. Lightly roughen the concrete, but not enough to interfere with the proper placement of grout.

C. Remove foreign materials from all surfaces in contact with grout.

D. Align, level and maintain final positioning of all components to be grouted. Coat shims with a thin film of grease or wax to facilitate removal.

E. Provide relief holes, if required, to avoid trapping air beneath the base plate.

F. Take special precautions during extreme weather conditions according to the manufacturer's written instructions.

G. Saturate all concrete surfaces with clean water for the period of time specified by the manufacturer. Remove excess water and leave none standing.

H. Immediately before grouting clean any contaminated surfaces.

3.03 FORMWORK

A. Build leak-proof forms that are strong and securely anchored and shored to withstand grout pressures. Forms shall be built high enough to provide a "head" of grout where it is required to force grout into difficult locations.

B. Provide enough clearance between the formwork and the area to be grouted to permit proper placement of grout.

3.04 MIXES

A. For less than a 4 in. clearance, or where size or shape of space makes grouting difficult, grout mix shall consist of grout material and water.

B. For greater than 4 in. clearances where coarse aggregate will not obstruct free passage of the grout, the grout may be extended by adding clean pea gravel if allowed or recommended by the grout manufacturer. Follow the manufacturer's recommendation for the maximum amount of pea gravel that may be added.

C. Use the minimum amount of water necessary to produce a flowable grout without causing either segregation or bleeding.

3.05 MIXING

A. Mixing of non-shrink grout shall be in strict conformance to the recommendations of the grout manufacturer.

B. Mix grout as close to the work area as possible and transport the mixture quickly and in a manner that does not permit segregation of materials.

C. After the grout has been mixed, DO NOT add more water for any reason.

3.06 PLACING

A. Place non-shrink grouting material quickly and continuously by the most practical means permissible: pouring, pumping or under gravity pressure. Do not use either pneumatic-pressure or dry packing methods without written permission of the ENGINEER.

B. Follow established concreting procedures observing precautions for hot and cold weather concreting.

C. When practical, apply grout from one side only to avoid entrapping air.

D. Final installation shall be thoroughly compacted and free from air pockets. To facilitate placement, a 1/2 in. to 1 in. chain or metal strap may be pulled back and forth during grouting. Remove chain or strap before initial set takes place.

E. Do not vibrate the placed grout mixture or allow it to be placed if the area is being vibrated by nearby equipment, except when approved by the grout manufacturer.

3.07 CURING

A. Cure grout for three days after placing by keeping wet and covering with curing paper by coating with a concrete membrane-forming curing compound or by other approved method.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT

A. Grout will be measured and paid for on a linear foot basis.

END OF SECTION

SECTION 07 91 00

PAVEMENT JOINT SEALANTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and DIVISION 01 - GENERAL REQUIREMENTS sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

1. Expansion and contraction joints within cement concrete pavement.

1.03 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

C. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.

2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for sealants.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

B. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing of current sealant products within a thirty-six (36) months period preceding the commencement of the Work.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 for testing indicated.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.06 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.

2. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40°F (4.4°C).

3. When joint substrates are wet or covered with frost.

4. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

5. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.

2.02 JOINT SEALANTS

A. Multicomponent Sealant for Concrete: Pourable, chemically curing elastomeric formulation complying with the following requirements for formulation and with ASTM C 920 for type, grade, class, and uses indicated:

1. Urethane Formulation: Type M; Grade P; Class 12-1/2; Uses T, M, and, as applicable to joint substrates indicated, O.

a. Products

1) Pecora Corporation; Urexpan NR-300.

2. Coal-Tar-Modified Polymer Formulation: Type M; Grade P; Class 25; Uses T and, as applicable to joint substrates indicated, O.

a. Products

1) Meadows, W. R., Inc.; Sealtight Gardox.

3. Bitumen-Modified Urethane Formulation: Type M; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.

a. Products

1) Tremco Sealant/Waterproofing Division; Vulkem 202.

B. Single-Component Urethane Sealant for Concrete: Single-component, pourable, coal-tar-modified, urethane formulation complying with ASTM C 920 for Type S; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.

1. Products

a. Sonneborn, Div. of ChemRex, Inc.; Sonomeric 1.

C. Type NS Silicone Sealant for Concrete: Single-component, low-modulus, neutral-curing, nonsag silicone sealant complying with ASTM D 5893 for Type NS.

1. Products

a. Crafco Inc.; RoadSaver Silicone.

b. Dow Corning Corporation; 888.

D. Type SL Silicone Sealant for Concrete: Single-component, low-modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.

1. Products

a. Crafco Inc.; RoadSaver Silicone SL.

b. Dow Corning Corporation; 890-SL.

2.03 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

B. Round Backer Rods: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Backer Strips: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

D. Round Backer Rods: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

2.04 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.03 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of backer materials.

2. Do not stretch, twist, puncture, or tear backer materials.

3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses provided for each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads

of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealants from surfaces adjacent to joint.

2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.

G. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.04 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. This section will be measure in the bid for supplying, installing, and testing per linear foot of pavement joint sealant.

4.02 PAYMENT

A. The bid items include the work of every nature, including testing of pavement joint sealant, required for the completion of the job in every respect except as may be otherwise provided in these specifications. CONTRACTOR shall include the furnishing of all materials and labor, including any incidental labor, in its bid prices.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 31 00 00

EARTHWORK

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Excavating and backfilling for utility trenches pits for buried utility structures.

1.02 RELATED SECTIONS INCLUDE THE FOLLOWING:

A. Section 01 50 00 – "Temporary Facilities and Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities,

B. Section 01 57 23 – "Storm Water Pollution Prevention Plan" for temporary erosion and sedimentation control procedures.

C. Section 31 50 00 – "Excavation Support and Protection." for trench safety and protection.

D. Section 31 10 00 – "Site Clearing" for preparing conditions for excavation and grading.

1.03 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

B. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

C. Final Backfill: Backfill placed over initial backfill to fill a trench.

D. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

E. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

G. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by ENGINEER. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

H. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by ENGINEER. Unauthorized excavation, as well as remedial work directed by ENGINEER, shall be without additional compensation.

I. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

J. Topsoil: On-site material, 4 inches in depth stripped from designated borrow areas as shown by ENGINEER. If no approved material is available, CONTRACTOR shall import material approved by ENGINEER.

K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.04 SUBMITTALS

A. Product Data: For the following:

1. Each type of plastic warning tape.

2. Geotextile.

3. Controlled low-strength material, including design mixture.

1.05 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

1.06 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by OWNER or others unless permitted in writing by ENGINEER and then only after arranging to provide temporary utility services according to requirements indicated.

1. Notify ENGINEER not less than four (4) days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without ENGINEER's written permission.

3. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies or OWNER to shut off services if lines are active.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. General: Provide all borrow soil materials from on-site borrow areas if available and approved by ENGINEER. Off-site material, if necessary, shall be imported by the CONTRACTOR, as approved by ENGINEER.

B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM, or a combination of these groups; free of rock or gravel larger than 3 in. dimension in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487 or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Pipe Bedding Course: #57 crushed stone per ASTM C-33, unless shown otherwise on the drawings. This material shall be used in the entirety of the pipe bedding envelope and where shown on the plans.

E. Select Fill: Satisfactory Soils possessing an Atterberg Plasticity index (P.I.) from 3% to 15%, and with a liquid limit of 30% or less.

2.02 CONTROLLED LOW-STRENGTH MATERIAL (FLOWABLE FILL)

A. Controlled Low-Strength Material: Low-density, self-compacting, flowable concrete material as follows:

1. Portland Cement: ASTM C 150, Type II.

2. Fly Ash: ASTM C 618, Class C or F.

3. Fine Aggregate: All fine aggregate shall conform to the grading and quality requirements of ASTM C33.

4. Coarse Aggregate: Coarse aggregate shall conform to the grading and quality requirements of ASTM C33 for size No. 476, No. 57, or No. 67.

5. Water: The batch mixing water and mixer washout water shall conform to the requirements of ASTM C94.

6. Chemical admixtures that do not contain calcium chloride and conform to ASTM C494/C494M for concrete may be used in the CLSM mix.

7. All chemical admixtures shall be compatible with the cement and all other admixtures in the batch.

B. Produce low-density, controlled low-strength material with the following physical properties:

1. Strength: CLSM shall have a minimum twenty-eight (28) day compressive strength of one hundred (100) psi when molded and cured as in conformance with ASTM D4832.

2. The CLSM shall have a minimum cement content of fifty (50) pounds per cubic yard. The water-cementitious materials ratio of the mix shall not exceed three and one-half to one (3.5:1).

3. Air-Entrainment: All CLSM shall be air entrained to a total air content of approximately five percent (5%).

4. Slump: The minimum slump shall be six (6) inches and the maximum slump shall be eight (8) inches when tested in accordance with ASTM D6103.

5. Aggregate: Fine aggregate shall be between fifty percent (50%) and sixty percent (60%) by volume of the total aggregates in the CLSM mix.

6. The consistency of the CLSM slurry shall be such that the material flows easily into all openings between the pipe and the lower portion of the trench.

   a. When trenches are on a steep slope, a stiffer mix of slurry may be required to prevent CLSM from flowing down the trench.

   b. When a stiffer mix is used, vibration shall be performed to ensure that the CLSM slurry completely fills all spaces between the pipe and the lower portion of the trench.

2.03 ACCESSORIES

A. Detectable Warning Tape: Acid and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 in. wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 in. deep; colored as follows:

   1. Red: Electric.

   2. Yellow: Gas, oil, steam, and dangerous materials.

   3. Orange: Telephone and other communications.

   4. Blue: Water systems.

   5. Green: Sewer systems

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in SECTION 31 10 00 – “Site Clearing”.

C. Protect and maintain erosion and sedimentation controls, which are specified in SECTION 01 57 23 – “Stormwater Pollution Prevention Plan”, during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

E. Dust Control

   1. Use all means necessary to control dust on the Work area or if resulting from the condition in which the CONTRACTOR leaves the site.

   2. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the neighbors.

3.02 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

C. Seepage waters may be encountered in portions of the work area. The CONTRACTOR shall design and construct temporary dewatering systems to such extend that the required construction can be accomplished.

D. The CONTRACTOR shall not be allowed to dam the existing drainage ditch or alter the movement of water within the drainage ditch.

E. Impacted water, as deemed by the OWNER or ENGINEER, shall be collected and contained. The CONTRACTOR shall remove impacted water offsite in accordance with local, state, and federal requirements.

3.03 EXPLOSIVES

A. Explosives: Do not use explosives.

3.04 EXCAVATION

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

a. 6 inches beneath pipe in trenches, and the greater of 24 in. wider than pipe or 42 inches wide.

B. Excavate for structures to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 in. Do not disturb bottom of excavations intended as bearing surfaces.

C. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

D. Excavation for Utility Trenches

1. Trenches shall be excavated by a trenching machine, backhoe or dragline, except in locations where hand trenching is required. The banks of trenches shall be vertical, to a point 1 ft. above the top of the pipe.

2. Trenches shall be excavated to the lines and grades laid out by the ENGINEER or as shown on the plans. No change in locations of the lines is contemplated, but should any changes be made in the lines not materially altering the amount or character of the trenching to be done, the CONTRACTOR shall proceed with the changed alignment. In case any change involves greater construction difficulties than the original alignment, the OWNER and the ENGINEER shall agree with the CONTRACTOR for extra compensation thereof, prior to the construction of the changed line or lines.

3. The width of the trench shall be as shown on the drawings.

4. Trenches for sanitary utility lines shall be of such depth so that the pipe may be laid at the invert elevation shown on the plans and/or established by the grade stakes set by the CONTRACTOR. Horizontal and vertical control points shall be furnished by OWNER.

5. The excavation shall not advance more than 300 ft. ahead of the completed backfilled line. Pipe shall be laid in all trenches that have been opened at the end of each day's work unless the CONTRACTOR secures written permission to do otherwise from the ENGINEER.

6. If the bottom of the trench becomes an unstable foundation for the pipe through the neglect of the CONTRACTOR to adequately shore or dewater the trench, the CONTRACTOR shall be required to remove the unstable material and backfill the trench to the proper grade with approved compacted gravel, and no extra compensation shall be granted for this material or work.

7. Also, if the trench is inadvertently excavated deeper than necessary, it shall be backfilled to the proper grade with approved compacted gravel at the CONTRACTOR'S expense.

8. However, if the undisturbed material encountered at the grade depth constitutes, in the opinion of the ENGINEER, an unstable foundation for the pipe, the CONTRACTOR shall be required to remove such unstable material and backfill the trench to the proper grade with approved compacted gravel. Compensation shall be made to the CONTRACTOR in accordance with the unit price bid for extra granular embedment or backfill.

9. The CONTRACTOR shall remove any water which collects in the trenches while utility pipes are being laid. In no case shall water be allowed to run over the invert or foundation or through the utility without permission from the ENGINEER. Water encountered shall be disposed of by the CONTRACTOR in a manner satisfactory to the ENGINEER.

10. The bottoms of the trenches for all utilities shall be carefully and truly graded, formed, and lined according to the grades and dimensions furnished by the ENGINEER. They shall be approved by the ENGINEER before any utility pipe is laid therein. Bell holes shall be excavated by hand.

11. The CONTRACTOR shall excavate all trenches, including work necessary in working around existing pipelines or other obstructions. The CONTRACTOR shall give notice to the Owners of any such lines or obstructions in order that they may have time to take the necessary precautions for protecting their property. The CONTRACTOR shall be responsible for protecting the OWNER from any damage from his operations in such work.

12. In rock, excavation shall be carried 3 in. below the bottom of the pipe, and loose earth or gravel, thoroughly tamped, shall be used for backfilling to the grade of the bottom of the pipeline.

13. After inspection of pipelines has been finished on any completed portion of the work, the trench may be backfilled. Backfilling shall be accomplished in compliance with the applicable portions of these specifications.

14. Trenches deeper than 5 ft. shall meet the requirements of Section 31 50 00 – "Excavation Support and Protection."

3.05 SUBGRADE INSPECTION

A. Notify ENGINEER when excavations have reached required subgrade.

B. If ENGINEER determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by ENGINEER, without additional compensation.

1. Remove damaged subgrade material to depth specified by ENGINEER. Backfill with engineered fill moisture conditioned and compacted in maximum 8 in. lifts as specified in Section 3.15.

3.06 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by ENGINEER.

1. Fill unauthorized excavations under other construction or utility pipe as directed by ENGINEER.

3.07 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

B. Stockpile soil materials away from edges of excavations. Do not store within drip line of remaining trees.

C. CONTRACTOR shall dispose off-site all stockpile soil materials that are not required for fill, grading, etc., in accordance with local and state regulations, unless otherwise directed by ENGINEER.

3.08 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Install bedding and backfill according to the dimensions shown in the Drawings.

C. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

D. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 in. in any dimension, to a height of 12 inches over the utility pipe or conduit, unless otherwise indicated in Drawings.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

F. Place and compact select backfill of satisfactory soil to final subgrade elevation.

G. Controlled Low-Strength Material: Where indicated, place final backfill of controlled low-strength material to final subgrade elevation.

H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 in. below subgrade under pavements and slabs.

3.09 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than one (1) vertical to four (4) horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.10 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.11 COMPACTION OF SOIL BACKFILL AND FILL

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.

2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.

3. Under unpaved areas, scarify and recompact top 4 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.

4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.12 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.

2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Unpaved Areas: Plus, or minus 1 inch.

2. Walks: Plus, or minus 1 inch.

3. Pavements: Plus, or minus 1/2 inch.

3.13 FIELD QUALITY CONTROL

A. Testing Agency: CONTRACTOR will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing, as approved by ENGINEER.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by ENGINEER.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 6938, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Trench Backfill: At each compacted initial and final backfill layer, at least one (1) test for each 100 ft. or less of trench length, but no fewer than two (2) tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.14 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to the specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by ENGINEER; reshape and recompact.

2. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

3. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.15 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Transport satisfactory surplus to designated storage areas on OWNER'S property. Stockpile or spread soil as directed by ENGINEER.

1. Remove waste material, including unsatisfactory fill soil, trash, and debris, and legally dispose of it off OWNER'S property.

2. CONTRACTOR shall remove all surplus material and dispose of off-site in accordance with local and state regulations if OWNER declines to keep such material on site. This cost shall be included in the CONTRACTOR'S bid price.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. This section will be measured by the cubic yard in its original position as computed by the method of average end areas.

4.02 PAYMENT

A. This price is full compensation for authorized excavation; draying; 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; and equipment, labor, materials, tools, and incidentals.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section includes the following:

1. Protecting existing trees and grass to remain.

2. Removing existing trees, plants and grass.

3. Clearing and grubbing.

4. Stripping and stockpiling topsoil.

5. Removing above- and below-grade site improvements.

6. Disconnecting, capping or sealing, and removing or abandoning site utilities.

1.02 RELATED SECTIONS:

A. Drawings and general provisions of the Contract, including General and Special Conditions and DIVISION 01 - GENERAL REQUIREMENTS sections, apply to this Section.

B. Section 01 50 00 – "Temporary Facilities and Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities,

C. Section 01 57 23 – "Strom Water Pollution Prevention Plan" for temporary erosion and sedimentation control procedures.

D. Section 31 00 00 – "Earthwork" for soil materials, excavating, backfilling, and site grading.

1.03 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 in. diameter; and free of subsoil and weeds, roots, toxic materials, or other non soil materials.

B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.04 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain OWNER'S property, cleared materials shall become CONTRACTOR'S property and shall be removed from Project site.

1.05 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining OWNER'S property will be obtained by OWNER before award of Contract.

1. Do not proceed with work on adjoining property until directed by ENGINEER.

C. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on OWNER'S premises where indicated.

D. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

E. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly flag trees and vegetation to remain or to be relocated.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to OWNER.

3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion and sedimentation control measures in accordance with Section 01 57 23 – “Storm Water Pollution Prevention Plan” to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.03 TREE PROTECTION

A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.

1. Do not store construction materials, debris, or excavated material within fenced area.

2. Do not permit vehicles, equipment, or foot traffic within fenced area.

3. Maintain fenced area free of weeds and trash.

B. Do not excavate within tree protection zones, unless otherwise indicated.

C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

1. Cover exposed roots with burlap and water regularly.

2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.

3. Coat cut faces of roots more than 1-1/2 in. diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.

4. Backfill with soil as soon as possible.

D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by ENGINEER.

1. Employ an arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.

2. Replace trees that cannot be repaired and restored to full-growth status, as determined by ENGINEER.

3.04 UTILITIES

A. OWNER will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by CONTRACTOR.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

2. OWNER will arrange to shut off indicated utilities when requested by CONTRACTOR.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify ENGINEER not less than two days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without ENGINEER'S written permission.

D. Excavate for and remove underground utilities indicated to be removed.

E. Removal of underground utilities is included in DIVISION 02 - SITE CONSTRUCTION sections covering site utilities.

3.05 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.

2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.

3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 18 in. below exposed subgrade.

4. Use only hand methods for grubbing within tree protection zone.

5. Chip removed tree branches and stockpile in areas approved by ENGINEER.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 in. and compact each layer to a density equal to adjacent original ground.

3.06 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to the depths that are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and non-soil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Limit height of topsoil stockpiles to 72 inches.

2. Do not stockpile topsoil within tree protection zones.

3. Dispose of excess topsoil as specified for waste material disposal.

4. Stockpile surplus topsoil to allow for re-spreading deeper topsoil.

3.07 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

3.08 DISPOSAL

A. Disposal: Remove surplus soil material and unsuitable topsoil and dispose of on site as directed by the ENGINEER. Obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off OWNER'S property.

1. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. This section will be measured in the bid as a lump sum for protecting, removing, and disposing of vegetation of the site, topsoil stripping, and grubbing.

4.02 PAYMENT

A. The bid items include all components of the work, required for the completion of the job in every respect except as may be otherwise provided in these specifications. CONTRACTOR shall include the furnishing of all materials and labor, including any incidental labor, in its bid prices.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 32 01 26

ASPHALT PAVEMENT RESTORATION

PART 1 - GENERAL

1.01 SUMMARY

A. This section shall govern the placing and furnishing of hot-mix asphalt pavement specifically as it applies to restoration after utility trenching.

B. Related Sections:

1. SECTION 01 33 00 – SUBMITTAL PROCEDURES.

2. SECTION 31 10 00 – SITE CLEARING.

1.02 SUBMITTALS

A. Submit in accordance with SECTION 01 33 00 – SUBMITTAL PROCEDURES.

B. Mix design and or product data of all materials shall be submitted for inspection and acceptance upon ENGINEER'S request.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Hot Mix Asphaltic Concrete Surface Course shall be plant mixed, hot laid Type D (Fine Graded Surface Course) 3.0 compacted inches thick, meeting the master specification requirements of TxDOT's Standard Specification's Item 340, and specific criteria for the job mix. The mix shall be designed for a stability of at least 40 when compacted to between 92 and 97 percent of the maximum theoretical density as measured by ASTM D2041.

B. Crushed Limestone Base shall be composed of crushed limestone. The Crushed Limestone shall meet the requirements of TxDOT's Standard Specifications, Item 247, Grade 1, Type A.

2.02 ACCESSORIES

A. Primer: MC-30 Medium curing, liquid asphalt meeting TxDOT's Item 300 for Medium Curing Cutback asphalt. CONTRACTOR shall apply at the rate of 0.2 gal./sq. yd. to seal base and at a rate of 0.05 gal./sq. yd. to "seal" to concrete surface of gutter and other concrete surfaces.

B. Tack Coat: If required, MC-30 Medium curing, liquid asphalt meeting TxDOT's Item 300 for Medium Curing Cutback asphalt. CONTRACTOR shall apply at the rate of 0.05 gal./sq. yd. to "bond" to a previous asphaltic surface.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Include a tack coat when the binder course has been used as a temporary construction road or when presence of organic material prevents proper adhesion of finish course. Thoroughly sweep

and clean or power wash before applying the tack coat.

B. Mixtures delivered to the site will be inspected and shall not possess signs of segregation of ingredients or surface crust. The temperature of the mix delivered to the spreader will be a minimum 250° F. Mixtures stored for any length of time in an asphalt storage silo will not be allowed to be placed on site.

C. The mixture will be thoroughly compacted using a mechanical drum roller, of sufficient capacity to accomplish the compaction, making a minimum of four (4) passes in each direction over the newly placed hot asphalt mat or until satisfied by the engineer in charge that it has been thoroughly compacted. All material placed shall receive final compaction before nightfall of the day placed, unless artificial light, satisfactory to the engineer, is provided. No mixture will be placed on wet or frozen surfaces or when wind conditions are such that rapid cooling will prevent satisfactory compaction. Mixtures will be placed as follows:

D. Binder – mid-April through mid-December, provided all conditions are favorable and approved by the Designer;

E. Finish – mid May up to Thanksgiving, with the same criteria as above. In no instance will any pavement be placed during the winter.

F. The density of all compacted completed paving will be 95% of the density obtained from laboratory compaction of a mixture composed of the same materials in like proportions. The Designer will be responsible for providing a testing laboratory experienced in these testing procedures and will provide copies of all lab and field test results to all concerned

3.02 CONSTRUCTION

A. All streets, sidewalks, gutters, and curbs damaged by the contractor's operations shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of operations.

B. Temporary paving will be placed in accordance with the requirements stated above and will be allowed to "weather" over the winter before final, permanent paving is placed. In any case, all structures located within the pavement area, i.e. rims, covers, gate boxes, etc, previously raised will be protected by "ramping up" with a layer of asphalt around each structure.

C. Prior to placement of final paving, the existing pavement will be inspected and any and all areas that have settled or are in need of repair, will be addressed under the supervision of the Designer and to his overall satisfaction. All loose or damaged material in the existing pavement shall be removed and a leveling course shall be installed at depths and locations as directed by the engineer to fill existing holes and depressions, or to improve roadway crowns.

D. All surfaces to receive final, new permanent paving shall be dry and thoroughly cleaned of foreign or loose material. A compatible prime or tack coat shall be applied, depending on the condition of the existing surface. All castings and edgestones shall be protected from the tack coat.

E. Where curbing is present, the new pavement shall be planned so that the curb reveal will be the same prior to and following the placement of permanent paving.

F. Survey existing curbing to document in the Contract Documents the condition before any work begins. Curbing to be reset shall be carefully removed and stored. Any curbing damaged by the

Contractor or lost due to his negligence shall be replaced at his expense.

G. The contractor shall maintain pavement placed by him under his contract for a period of one year and shall promptly fill all depressions and holes that may occur with similar materials to keep the pavement in a safe and satisfactory condition for traffic.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Asphalt pavement will be measured by the square yard. The dimensions for determining the surface areas are established by the depths and widths shown on the plans and the lengths measured at placement

4.02 PAYMENT

A. This price is full compensation for the removal and processing of the existing pavement; for preparing, hauling, and placing materials; for all freight involved; for all manipulations, including rolling and brooming; and for all labor, tools, equipment, and incidentals necessary to complete the work. This price also includes any surface treatment that is allowed on the plans but not required to complete the above work.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 32 13 13

CEMENT CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:

1. Driveways and roadways.

2. Parking lots.

3. Curbs and gutters.

4. Walkways.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete pavement mixture.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. ACI Publications: Comply with ACI 301, "Specifications for Concrete Construction," unless modified by requirements in the Contract Documents.

PART 2 - PRODUCTS

2.01 STEEL REINFORCEMENT

A. Refer to SECTION 03 20 00 – REINFORCING STEEL for Plain and Deformed Steel Welded Wire Reinforcement.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice."

2.02 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:

1. Portland Cement: ASTM C 150, Type I and III.

B. Normal-Weight Aggregates: ASTM C 33, Class 4S coarse aggregate, uniformly graded. Provide aggregates from a single source.

C. Water: ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: ASTM C 494/C 494M, of type suitable for application, certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

2.03 CURING MATERIALS

A. Reference SECTION 03 30 00 – CAST-IN-PLACE CONCRETE" for Absorptive Cover, Moisture-Retaining Cover, Water, Evaporation Retarder, and Clear Waterborne Membrane-Forming Curing Compound.

B. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

2.04 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

2.05 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, with the following properties:

1. Compressive Strength (28 Days): 3000 psi.

2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.60.

3. Slump Limit: 4 inches, plus or minus 1 inch.

4. Air Content: 4-1/2 percent plus or minus 1.5 percent.

2.06 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116. Furnish batch certificates for each batch discharged and used in the Work.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.

3.02 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.03 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.04 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness to match jointing of existing adjacent concrete pavement.

E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.05 CONCRETE PLACEMENT

A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.

B. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

C. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

D. Screed pavement surfaces with a straightedge and strike off.

E. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.06 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared, and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.

2. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

C. Slip-Resistive Aggregate Finish: Before final floating, spread slip-resistive aggregate finish on pavement surface according to manufacturer's written instructions.

1. Cure concrete with curing compound recommended by slip-resistive aggregate manufacturer. Apply curing compound immediately after final finishing.

2. After curing, lightly work surface with a steel wire brush or abrasive stone and water to expose nonslip aggregate.

3.07 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture-retaining-cover curing.

3.08 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch.

2. Thickness: Plus 3/8 inch, minus 1/4 inch.

3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.

4. Joint Spacing: 3 inches.

5. Contraction Joint Depth: Plus 1/4 inch, no minus.

6. Joint Width: Plus 1/8 inch, no minus.

3.09 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement.

C. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. This section will be measured as follows:

1. Concrete pavement will be measured by the square yard of surface area in place. The surface area includes the portion of the pavement slab extending beneath the curb.

2. Curb on concrete pavement will be measured by the foot in place.

4.02 PAYMENT

A. These prices are full compensation for materials, equipment, labor, tools, and incidentals.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 32 92 13

HYDROMULCHING

PART 1 - GENERAL

1.01 SUMMARY

A. This item shall consist of sowing of seeds, fertilizing, mulching with cellulose fiber and other management practices along and across such areas as are indicated or as directed by the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Seeds

1. All seed must meet the requirements of the Texas Seed Law including the labeling requirements for showing pure live seed (PLS), name and type of seed. Seed furnished shall be of the previous season's crop and the date of analysis shown on each bag shall be within nine months of the time of delivery to the project.

2. Each variety of seed shall be furnished and delivered in separate bags or containers. A sample of each variety of seed shall be furnished for analysis and testing when directed by the ENGINEER.

3. The amount of seed planted per acre shall be of the type specified below.

B. Water

1. Water shall be clean and free of industrial wastes and other substances harmful to the growth of grass, or the area irrigated.

C. Fertilizer

1. The fertilizer used shall have an analysis of 13-13-13.

D. Mulch

1. Cellulose Fiber Mulch shall be natural cellulose fiber much produced from grinding clean whole wood chips. The mulch shall be designed for use in conventional mechanical planting, hydraulic planting of seed or hydraulic mulching of grass seed, either alone or with fertilizers and other additives.

2. The mulch shall be such that, when applied, the material shall form a strong, moisture-retaining mat without need of an asphalt binder.

2.02 SEEDING

A. The seed bed shall be previously prepared as specified and hydraulic planting, which is capable of placing all material in a single operation, shall be used.

B. March 1 to September 15 C Hydraulic planting mixture and minimum rate of application per 1000 square feet:

Hulled Bermuda Seed (PLS=0.83)	Water Soluble Fertilizer	Natural Wood Fiber Mulch	Soil Tackifier
1 lb.	15 lb.	45.9 lb.	1.4 lb.

C. September 15 to March 1 C Add 7 pounds per 1000 square feet of winter rye with a PLS=0.83 to above mixture.

PART 3 - EXECUTION

(NOT USED)

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement will be by the square yard of surface area as shown on the plans.

4.02 PAYMENT

A. The work performed and materials furnished, as prescribed by this item, and measured as provided under Measurement, will be paid for at the unit price per square yard. This price is full compensation for furnishing materials, including water for hydromulching operations, mowing, labor, equipment, tools, supplies, and incidentals. Fertilizer will not be paid for directly but will be subsidiary to this Section.

END OF SECTION

SECTION 33 01 12

TESTING OF PIPELINES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, tools, equipment, and related items required to perform exfiltration testing and deflection testing of facility piping systems and to perform pressure and leakage testing of pressure pipelines.

B. All testing shall meet minimum TCEQ requirements. TCEQ requirements shall govern and supersede requirements herein.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. Hydrostatic pressure and leakage tests shall be made on all pressure pipelines carrying water or wastewater.

B. All labor and equipment, including test pump with regulated by-pass meters and gauges required for conducting pipeline tests, temporary pipe connections or fittings, plugs, etc. shall be furnished by the CONTRACTOR. The CONTRACTOR shall furnish equipment and necessary piping as required to transport water used in testing from source to test location.

C. Time and sequence of testing shall be scheduled by the CONTRACTOR, subject to observation and approval by the OWNER. The CONTRACTOR shall provide adequate labor, tools, and equipment to operate valves and to locate and repair any leaks discovered during the initial filling of the pipeline prior to actual testing or during the course of the tests.

D. Testing shall meet all TCEQ requirements.

3.02 CLEANING

A. At the conclusion of the work, thoroughly clean all pipelines by flushing with water or other means to remove all dirt, stones, pieces of wood, or other material that may have entered the pipes during the construction period. Debris cleaned from the lines shall be removed from the low end of the pipeline. If after this cleaning, obstructions remain, they shall be removed. After the pipelines are cleaned and if the groundwater level is above the pipe or following a heavy rain, the ENGINEER will examine the pipes for leaks. If any defective pipes or joints are discovered, they shall be repaired.

3.03 TEST PROCEDURES FOR GRAVITY PIPELINES

A. Gravity pipelines shall be installed and backfilled and then tested using either Exfiltration Water Testing or Low-Pressure Air Testing. In addition, flexible pipes shall be tested using an Allowable Deflection Test.

1. Exfiltration Water Testing

a. The section of pipe to be tested shall be filled with water and allowed to stand for such time as is required for the pipeline to adsorb such water as it will and for the escape of all air from the line. The sections undergoing test shall be carefully examined for leakage. All known leaks shall be repaired, regardless of these test requirements.

b. The line shall then be filled to a reference level in manhole or in a reservoir of sufficient capacity to allow for a reference level to be established. The reservoir must be of sufficient capacity as to not allow the water level to drop below the crown of the pipe during the 24-hour test period. If the water level drops below the crown of the pipe, the test shall be voided and run again or until such time the water level is maintained above the crown throughout the duration of the test.

c. At the end of a 24-hour period, water, if needed, shall be added to the line to bring the water level back to the referenced line. All water added shall be accurately measured by an approved water meter so that an exfiltration rate can be established.

d. Leakage during the above test shall not exceed a rate equal to 25 gallons per inch of internal diameter per mile per twenty-four hours.

e. All observed leaks shall be repaired regardless of the measured leakage rate.

2. Low Pressure Air Testing

a. This test shall conform to the procedure described in ASTM C828, ASTM C924 or other appropriate procedures. For safety reasons, air testing of sections of pipe shall be limited to lines less than 36 in. average inside diameter. Lines 36 in. average inside diameter and larger may be air tested at each joint. The minimum time allowable for the pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge during a joint test, regardless of pipe size, shall be 20 seconds. For sections of pipe less than 36 in. average inside diameter, the maximum time allowable for the pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge shall be computed by the following equation:

$$T = 0.085\ (D)\ (K) / (Q)$$

where T = time for pressure to drop 1.0 pounds per square inch gauge in seconds

K = 0.00049DL, but not less than 1.0

D = average inside diameter in inches

L = length of line of same pipe size being tested in feet

Q = rate of loss, assume 0.0015 ft^3/min/sq. ft. internal surface

b. All observed leaks shall be repaired regardless of the air test results.

3. Allowable Deflection Test

a. Pipe deflection testing shall be conducted on all gravity pipes constructed of flexible materials (PVC or other plastic materials).

b. Pipe deflection measured not less than ninety (90) days after the backfill has been completed as specified shall not exceed five (5.0) percent. Deflection shall be computed by multiplying the amount of deflection (nominal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.

c. Deflection shall be measured with a rigid mandrel device cylindrical in shape and constructed with a minimum of nine evenly spaced legs. The outer diameter of the legs shall be 95 percent of the pipe's actual internal diameter. Drawings of the mandrel with complete dimensions shall be submitted to the ENGINEER for each diameter of pipe to be tested. The mandrel shall be hand pulled by the CONTRACTOR through all sewer lines.

d. Any section of sewer not passing the mandrel shall be uncovered at the CONTRACTOR'S expense and the bedding and backfill replaced to prevent excessive deflection. Repaired pipe shall be retested.

3.04 MANHOLE TESTING

A. The contractor shall perform the testing for all sanitary sewer manholes in accordance with the following:

1. All manholes must pass a leakage test.

2. The contractor shall test each manhole for leakage, separate and independent of all other sanitary sewer piping, by means of vacuum test, as follows:

a. The lines entering the manhole shall be temporarily plugged with the plugs braced to prevent them from being drawn into the manhole.

b. The plugs shall be installed in the lines beyond drop connections, gas sealing connections, etc.

c. Prior to performing the test, the Contractor shall plug all lift holes and exterior joints with a non-shrink grout and plug all pipes entering the manhole.

d. Contractor shall use a minimum 60 inch-lb. torque wrench to tighten the external clamps that secure the test cover to the top of the manhole.

e. The test head shall be inflated in accordance with the manufacturer’s recommendations.

f. A vacuum of 10 inches of mercury shall be drawn, and the vacuum pump will be turned off.

g. With the valve closed, the level vacuum shall be read after the required test time.

h. If the drop in the level is less than 1 inch of mercury (final vacuum greater than 9 inches of mercury), the manhole will have passed the vacuum test.

i. The required test time is 2 minutes.

3. Acceptance: Any manhole which fails the initial test must be repaired with a non-shrink grout or other suitable material based on the material of which the manhole is constructed.

4. The manhole shall be retested as described above until a successful test is attained.

5. After a successful test, the temporary plugs will be removed.

3.05 TEST PROCEDURES FOR PRESSURE PIPELINES

A. General

1. After the pipe has been laid and backfilled and the backfill has been otherwise consolidated, all newly laid pipe, or any valved section thereof, shall be subjected to the hydrostatic pressure and leakage tests specified below for that particular type of pipe. The duration of each hydrostatic pressure test shall be at least one hour and each leakage test at least four hours, unless otherwise specified or noted on the Drawings. All meters, fixtures, devices or appliances which are connected to the pipeline system, and which might be damaged if subjected to the specified test pressure shall be disconnected and the ends of the branch lines plugged or capped during the testing procedures.

2. Each valved (capped or plugged) section of pipe shall be filled slowly with water and all air shall be expelled. If permanent air vents are not located at all high points, the CONTRACTOR shall install corporation or blow-off cocks at such points so that air can be expelled as filling takes place. After verification that all air has been expelled, the cocks shall be closed, and the pipe kept filled until tested. All exposed pipe, fittings, valves, hydrants, and joints shall be examined while under test pressure and all visible leaks shall be stopped. Any cracked or defective pipe, fittings, valves, or hydrants discovered during testing shall be removed and replaced by the CONTRACTOR. Replacement shall be with sound material and the test shall be repeated until satisfactory to the OWNER.

B. Special Requirements. Where any section of pipeline is provided with concrete thrust blocking, the hydrostatic pressure test shall not be made until at least five (5) days have elapsed after installation of the blocking. However, if high-early-strength cement is used in the concrete, two (2) days shall have elapsed prior to testing.

C. Hydrostatic Pressure Tests

1. After compliance with all applicable procedures described above, pressure of 150 percent of the pipe's normal operating pressure shall be applied, unless another test pressure is specified for the type of pipe being tested or as shown in the Table below. This pressure, based on the lowest point of the line or section under test, shall be corrected to the relative elevation of the test gauge and the pressure maintained for a period of not less than one (1) hour. CONTRACTOR shall coordinate all test pressures with ENGINEER.

2. Pipe Test Pressure Summary Schedule

Pipe ID	Test Pressure, PSI
All Flanged Ductile Iron Piping	150
All restrained mechanical joint ductile iron piping	150
All bell and spigot, gravity	25
All PVC solid wall piping	150

D. Leakage Tests

1. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain the specified leakage test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

2. Leakage shall be determined by recording the quantity of water pumped into the pipeline through a standard water meter of a size appropriate to secure an accuracy of ±2 percent at the average rate of flow pumped. Leakage rate shall be calculated by extrapolation of the total leakage during the testing period to a 24-hour period. Leakage test pressure shall be coordinated with ENGINEER and test pressure shall be maintained for a period of four (4) hours.

3. Allowable leakage for the types of pipe used shall be as follows:

   a. Cast Iron and Ductile Iron. Allowable as permitted by AWWA Standard C-600-82, "Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances", which is not to exceed that determined by the formula:

$$L = (SD\sqrt{P})/133{,}200$$

      1) Where L is the allowable leakage in gallons per hour, S is the length of pipeline tested in feet, D is the nominal diameter of the pipe in inches, and P is the average test pressure during the leakage tests in pounds per square inch gauge.

   b. PVC and HDPE – No leakage allowed.

   c. Stainless steel Air Piping – No leakage allowed.

4. In the event any section of the line tested fails to meet the above specified requirements for water tightness, the cause of the excessive leakage shall be determined and remedied at the expense of the CONTRACTOR, including retesting if required.

3.06 SUBMITTALS TO ENGINEER

A. Provide test report for each pipe segment tested. Each test report shall be submitted to the ENGINEER for approval and shall include the following minimum information: date of test, location of test, manholes related to test, pipe section ID number, manhole number, pipe diameter, pipe material, pipe length, and whether the test passed or failed. Additionally, any explanatory comments related to the testing shall be noted. A representative from the OWNER shall be onsite to witness testing procedures and provide a signature of acceptance for each test report.

3.07 FINAL ACCEPTANCE

A. No pipe installation will be accepted until all known leaks have been repaired whether or not leakage is within allowable limits. Locating and repairing of leaks shall be performed by the CONTRACTOR at no additional cost to the OWNER.

B. The OWNER will certify that all required pressure and leakage tests have been successfully completed before the pipeline is accepted.

3.08 WATER SOURCE

A. Water shall be available on this project as specified in other sections. The CONTRACTOR shall install temporary connections to the supply pipe, including supply/installation of RPZ backflow preventer and meter. Any additional water, if necessary, shall be provided at CONTRACTOR'S expense.

END OF SECTION

SECTION 33 05 05

TUNNELING, BORING, AND JACKING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This item shall govern furnishing and installing of pipe by the methods of jacking, boring, or tunneling as indicated on the Drawings and in conformity with this specification. This item shall also include, but not be limited to other constructions activities such as excavation, removal of all materials encountered in jacking, boring, or tunneling pipe or box operations, disposal of all material not required in the work, and backfilling.

1.02 SUBMITTALS

A. The submittal requirements for this specification item shall include:

1. Manufacturer's product data.

2. Instructions.

3. Recommendations.

4. Shop drawings identifying proposed jacking, boring, or tunneling method complete in assembled position.

5. Trench Safety Plan including pits, trenches and sheeting or bracing if necessary.

6. Certifications.

PART 2 - PRODUCTS

2.01 CARRIER PIPE

A. The carrier pipe shall be of the types and sizes shown in the plans and shall conform to the requirements of SECTION 33 05 31 – WATER MAIN CONSTRUCTION.

2.02 CASING PIPE

A. The casing pipe shall be straight, circular in section, uncoated, welded steel pipe.

2.03 GROUT

A. Supply grout as specified in SECTION 03 60 00 – GROUT.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS

A. Jacking.

1. Suitable pits or trenches shall be excavated for the purpose of jacking operations for placing end joints of the pipe. When trenches are cut in the side of embankment, such work shall be securely sheeted and braced. Jacking operations shall in no way interfere

with the operation of railroads, streets, highways or other facilities and shall not weaken or damage such facilities.

2. Barricades and lights shall be furnished as directed by the Engineer to safeguard traffic and pedestrians.

3. The pipe to be jacked shall be set on guides to support the section of pipe being jacked and to direct it in the proper line and grade. Embankment material shall be excavated just ahead of the pipe and material removed through the pipe, and the pipe forced through the opening thus provided.

4. The excavation for the underside of the pipe, for at least 1/3 of the circumference of the pipe, shall conform to the contour and grade of the pipe. A clearance of not more than 2 inches may be provided for the upper half of the pipe.

5. The distance that the excavation shall extend beyond the end of the pipe shall depend on the character of the material, but it shall not exceed two (2') feet in any case.

6. Generally, the pipe shall be jacked from the downstream end. Permissible lateral or vertical variation in the final position of the pipe from line and grade will be as shown on the plans or as determined by the Engineer.

7. Any pipe that cannot be repaired to its original condition or is damaged in jacking operations shall be removed and replaced at the CONTRACTOR'S expense. Jacking pits shall be backfilled immediately upon completion of jacking operations.

B. Excavation.

1. Excavation for "boring" pits and installation of shoring shall be as outlined under "Jacking".

2. Boring operations may include a pilot hole which shall be bored the entire length of crossing and shall be used as a guide for the larger hole to be bored. Water or drilling fluid may be used to lubricate cuttings. Variation in line and grade shall apply as specified under "Jacking".

C. Tunneling.

1. Tunneling may be used when the size of the proposed pipe or the use of a monolithic sewer would make the use of tunneling more satisfactory than "Jacking" or "Boring". The excavation for pits and the installation of shoring shall be as specified under "Jacking".

a. The lining of the tunnel shall be of the material shown in the contract documents.

b. Access holes for grouting annular space shall be spaced a maximum of 10 feet.

D. Joints.

1. Joints for pipe "Jacking", "Boring", or "Tunneling", shall be as shown on the plans, shop drawings, or as per additional pipe manufacturer's recommendations.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Jacking, boring, or tunneling shall be measured by the linear foot of bore or tunnel as measured from face to face of jacking pits. Jacking, boring, or tunneling shall include the casing or liners and the carrier pipe.

4.02 PAYMENT

A. The work performed and materials furnished as specified herein, measured as provided above, shall be paid for at the contract unit price bid per linear foot of jacking, boring or tunneling, which price shall be full compensation for furnishing all materials, carrier pipe, casing spacers, grout, labor, tools, equipment and incidentals necessary to complete the work, including excavation, grouting, backfilling, restoration to original ground conditions, end caps, and disposal of surplus materials.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 33 05 19

DUCTILE IRON PIPE AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The work to be performed under this section of the specifications shall comprise the furnishing of all labor, equipment, and materials, and in performing all operations necessary in connection with the installation of ductile iron pipe and fittings as shown in the plans, and as specified herein.

B. The CONTRACTOR shall submit for approval, complete and dimensional working drawings of all ductile iron pipeline layouts. Such drawings shall indicate the size, class, and laying dimensions of all pipe, valve fittings, expansion couplings, and specials and the location of all hangers and supports needed for the installation and not specifically indicated for on the plans. The number, size, and length of all bolts required for flanged pipe installations shall be given on the pipe schedule of the working drawings.

C. Ductile iron pipe, fittings, and valves used for the sewer force main shall have an internal coating consisting of Induron Protecto 401 Ceramic Epoxy.

PART 2 - PRODUCTS

2.01 DUCTILE IRON PIPE AND FITTINGS

A. Ductile Iron Pipe of size, class, and joint type shown on the plans will be furnished by the CONTRACTOR. All pipe furnished shall meet USA Standard A21.50, ANSI A 21.50, AWWA C150 (thickness design), or current revision. All Ductile Iron Pipe furnished shall also meet the requirements of federal specification ANSI A 21.51, AWWA C151, or current revision, unless otherwise noted on the plans. Flanged Ductile Iron Pipe shall be furnished with Ductile Iron Flanges and shall conform to ANSI A21.15 and AWWA C115. The ductile iron pipe shall meet thickness class 250.

B. Fittings shall be ductile iron of compact design and shall meet the requirements of ANSI A21.10, AWWA C153, or current revision. All fittings for above ground service shall be short body flanged fittings with Class 125 flanges. All flanges shall be faced and drilled.

C. All joints shall be made in strict accordance with the manufacturer's specifications.

2.02 LININGS AND COATINGS

A. Ductile Iron Pipe and Fittings shall be cement mortar lined. Exposed pipe and fittings to be painted shall be uncoated as delivered to the job site for prime/finish painting by the CONTRACTOR. Buried pipe and fittings shall be furnished with the manufacturer’s standard asphaltic varnish finish.

B. All grit piping and fittings shall be glass lined. Glass lining shall be a smooth, continuous glass coating with an average thickness of 10 mils and a minimum thickness of 8 mils. Surface hardness shall be greater than 5 on the MOHS scale and minimum density of lining shall be 2.5 grams/cc. The lining shall have a weight loss of not more than 3 mils per square inch when tested in a range of 500 degrees F in accordance with US Bureau of Standards, Standard T

Section Thermal Shock Tests and lining shall have a minimum compressive strength of 30,000 psi. Certified test reports shall be furnished to the Engineer. The finished lining shall be free of pin holes, crazing or fish scales. Lining shall be by Ferrock, Permutit or equal. Lining thickness shall be measured by a Mikrotest; Elcometer or equal magnetic thickness gauge. Continuity of lining shall be verified by means of an approved "holiday" detector of low-voltage, wet sponge, transistorized type.

2.03 EXPANSION COUPLINGS

A. Where the use of expansion couplings is indicated on the plans, they shall be Style 38 Dresser couplings, or approved equal, unless otherwise required.

B. As may be necessary to conform to the dimensions of the couplings, the outside diameter of the plain ends of the ductile iron pipe sections which are to be jointed by a coupling, shall be gauged to proper size for use with the couplings.

2.04 SUPPORTS AND HANGERS

A. The CONTRACTOR shall furnish and install all necessary supports and hangers, indicated on the plans or required for the proper installation of the ductile iron pipelines in a workmanlike manner.

2.05 FLANGED JOINTS

A. Flanged joints shall be made with bolts, or bolt-studs, with a nut on each end. Bolts, stud-bolts, and nuts shall conform to American Standard Heavy dimensions, semi-finished, with square or hexagonal heads and cold punched hexagonal nuts meeting the requirements of ASME B18.2. Bolt sizes shall be American Standard for the flanges specified. Bolt and nut threads shall conform to ASME B1.1, coarse thread series, Class 2 fit.

B. Gaskets for Class 125 flanges shall be full face with bolt holes punched. Gasket material shall be nylon-reinforced rubber, 1/8 in. minimum thickness.

2.06 GASKET MATERIALS

A. Gaskets furnished for Flanged, Mechanical Joint, of Bell and Spigot Piping for Water, Wastewater, and process Air Service shall be of the materials specified below:

Temperature Minimum				
Service	Joint Type	Rating	Thickness	Material
Water or Wastewater	Flanged	150°F	1/8 in.	Nylon Reinforced Rubber
Water or Wastewater	M.J. or B&S	150°F	-	Styrene- Butadiene

2.07 WALL CASTINGS

A. Mechanical Joint Wall Pipes will be utilized when possible. They shall be made of Ductile Iron, as specified. Fabricated Wall Castings shall have Ductile Iron wall collars and shall be welded on both sides. Screwed-on bells will not be acceptable.

PART 3 - EXECUTION

3.01 HANDLING

A. During loading, transportation, and unloading, care shall be taken to prevent injury to the pipe or fittings. Loading or unloading shall be so handled that the piece being moved is under perfect control at all times. Under no circumstances shall a pipe or large fitting be dropped.

3.02 LAYING AND INSTALLING

A. Proper and suitable tools and equipment for the installation of the pipelines and appurtenant valves and fittings in a safe and workmanlike manner shall be furnished and used on the work.

B. The pipe and fittings shall be thoroughly cleaned immediately before installation and shall be kept clean until final inspection of the project. Special care shall be exercised to prevent the leaving of wood, blocks, cans, tools, or other foreign objects in the pipeline during installation.

C. All costs incidental to the removal of any such foreign object, or objects, from the pipe lien shall be borne by the CONTRACTOR.

3.03 TESTING

A. Pipelines shall be subjected to water test pressure of 150 psi. All such tests shall be conducted to the satisfaction and under the observation of the ENGINEER.

B. All costs incidental to making such tests shall be borne by the CONTRACTOR. Where pipelines are laid in excavation, testing shall precede final backfill.

C. All pipelines shall be watertight under test, or under operating conditions, as a condition of final acceptance of the work.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. This section will be measure in the bid for supplying, installing, and testing per linear foot of ductile iron piping and the tonnage of fitting.

4.02 PAYMENT

A. The bid items include all components of the work, including testing of new ductile iron pipe and fitting, required for the completion of the job in every respect except as may be otherwise provided in these specifications. CONTRACTOR shall include the furnishing of all materials and labor, including any incidental labor, in its bid prices.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 33 05 31

WATER MAIN CONSTRUCTION

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. These specifications for construction of water mains are intended to be so written that only first-class workmanship and finish of the best grade and quality will result. The fact that the following specifications may fail to be so complete as to cover all details will not relieve the CONTRACTOR of full responsibility for providing a complete project of high-quality, first-class finish and appearance and satisfactory for operation.

B. The CONTRACTOR shall furnish all materials, labor, and equipment for constructing the work included in these specifications and as detailed on the plans.

1.02 SUBMITTALS

A. Shop Drawings shall be submitted as provided in Section 01 33 00 “Submittal Procedures”. Provide certified schematics and shop and erection drawings showing details, sizes, grades, materials of construction, and dimensions.

B. Provide warranty information in accordance with Section 00 61 00 “Warranties and Bonds”.

C. Provide complete bill of materials for all equipment components.

D. In the event that it is impossible to conform to certain details of the Specifications, describe completely all non-conforming aspects.

E. Number of Copies: Submit six (6) copies of each submittal, unless otherwise indicated. ENGINEER will return two (2) copies.

1.03 QUALITY ASSURANCE

A. All equipment in this section shall be furnished by the polymer mixing system manufacturer except as otherwise indicated. This does not require that all equipment be manufactured by the system manufacturer but does require that the system manufacturer shall be responsible for the satisfactory operation of the system and the associated equipment furnished hereunder.

B. Qualifications and Manufacturer

1. Minimum of ten (10) years’ experience in the design and manufacture of the specified systems, along with a minimum of ten (10) successful installations that can be referenced by the ENGINEER.

C. The specifications direct attention to certain required features of the equipment, but do not purport to cover all details entering into its design and construction. The CONTRACTOR shall furnish the equipment complete in all details and ready for operation for the intended purpose.

1.04 DESIGN PRESSURES

A. Fittings for water lines shall be designed to withstand minimum internal working pressures of 250 pounds per square inch unless otherwise noted on the plans or in the bid proposal. C900 DR 18 water lines shall be designed to withstand minimum internal working pressures of 235 pounds per square inch unless otherwise noted on the plans or in the bid proposal.

1.05 DELIVERY, STORAGE AND HANDLING

A. Storage of Materials

1. Materials delivered to the site of the work prior to their use shall be stored so as to cause the least inconvenience to the public, and in a manner satisfactory to the ENGINEER.

2. Materials that will deteriorate such as cement and mortar shall be stored in weather tight buildings.

B. Pipe Handling

1. Proper implements, tools, and facilities shall be provided and used by the CONTRACTOR for the safe and convenient prosecution of the work. All pipe, fittings, and valves shall be carefully lowered into the trench piece by piece by means of derrick ropes or other suitable tools or equipment in such a manner as to prevent damage to pipe or pipe coating. Under no circumstances shall pipe or accessories be dropped into the trench.

2. At all times when pipe laying is not in progress, the open ends of the pipe shall be closed by approved means. No trench water shall be permitted to enter the pipe. All foreign matter or dirt shall be removed from the pipe, and it shall be kept clean by approved means during and after laying. No pipe shall be laid in water or when trench conditions are unsuitable for such work.

3. Cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat workmanlike manner without damage to the pipe. Concrete pressure pipe shall not be cut on the job without the approval of the ENGINEER.

C. Service Connection Materials

1. The service pipe shall normally be 3/4” type "K" soft copper pipe, and shall conform to ASTM Class "A" Specifications and U.S. Government Specifications WW-T-799 as well as AWWA Specification 7S-CR. Within structures hard drawn Type L tubing (furnished in straight lengths) shall be used, rigidly and adequately supported.

2. Corporation cocks and angle stops shall be as shown on the plans.

3. Water meter boxes where required shall be of concrete construction with cast iron locking type lid. Brooks Products, Inc. plate No. 36 H.L.D. meter box for 3/4" water meter or equal.

D. No equipment shall be shipped until all submittals have been approved in writing by the ENGINEER.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. The CONTRACTOR shall furnish and place materials meeting the requirements of these specifications, of the dimensions and types at the locations and elevations shown on the plans or established by the ENGINEER. All materials shall be approved by the ENGINEER before being installed and any of these materials placed before they are so approved shall be removed and replaced with approved materials.

2.02 BACKFILL MATERIALS

A. Unless otherwise noted on the drawings, backfilling shall be done with good sound earth. Broken concrete, rock, bituminous pavement, or other lumpy material shall not be used in the backfill except as the lumps are small and their dispersal in the backfill is made in the upper section in a manner satisfactory to the ENGINEER.

B. Materials of a perishable, spongy, or otherwise improper nature shall not be used in backfilling. Where good sound earth is not available from the excavated material, pea gravel cushion and/or sand and granular backfill material will be used for the initial backfill operation to a point 12" above the top of the pipe.

C. Gravel cushion and/or granular backfill material will not be required when concrete encasement is specified or used around the pipe.

D. No backfill shall be made until it is authorized by the ENGINEER. All debris shall be removed.

E. Sheeting, shoring and bracing shall be pulled and removed during the progress of the backfilling in a manner satisfactory to the ENGINEER.

2.03 CONCRETE ENCASEMENT

A. Concrete encasement, when required, shall be composed of a free-flowing material consisting of small stone, pea gravel, limestone chat, or pit run sand and gravel and shall always consist of at least 60% sand.

B. The material shall all pass a three-quarter 3/4" screen and be free from sticks, lumps, stones, and organic matter.

C. The material shall be mixed with Portland Cement in the proportions of one (1) part cement to ten (10) parts of the above-described granular material, by volume measurement. Concrete encasement shall be poured either wet or dry as may be directed by the ENGINEER.

D. When the concrete encasement backfill material is specified or ordered by the ENGINEER to be poured DRY the CONTRACTOR shall place this material on each side of the pipe for the full width of the trench using shovels to cut the material back under the pipe and shall be tamped to a height of 6" above the pipe to receive final backfill.

E. Care must be exercised not to dislocate or disturb the grade and alignment of the pipe. If ordered by the ENGINEER to be poured WET, caution and care must be used not to float the pipe out of place.

F. In the event pipes are floated out of proper position they shall be removed and re-laid at the expense of the CONTRACTOR.

2.04 PIPES, FITTINGS, AND VALVES

A. FLANGED CAST IRON PIPE AND FITTINGS

1. All flanged end, flange and bell, and flange and spigot pipe and fittings shall meet ANSI/AWWA Specifications as outlined below and shall have American Standard Class 125 flanges. Bolts, bolt circles, heads and nuts shall be standard as to quantity of material. Gaskets shall be made from the best quality insertion rubber 1/16 inch thick. Flanged fittings shall be American Standard Class 125, except where noted on the plans.

B. FITTINGS

1. Fittings shall conform to ANSI/AWWA - C110/A21.10 or ANSI/AWWA – C153/A21.53 and ANSI/AWWA - C111/A21.11 standards.

2. All fittings shall be cement lined according to ANSI/AWWA - C104/A21.4. Fittings may be gray or ductile iron.

C. DUCTILE IRON PIPE

1. Ductile iron pipe for water line construction shall be as described in Section 33 05 19 – "Ductile Iron Pipe and Fittings" of these specifications.

D. PVC PIPE

1. This specification designates general requirements for polyvinyl chloride pipe with integral thickened wall bells used primarily for conveying potable water under pressure.

2. All pipe furnished shall meet the requirements of AWWA C-900 or latest revisions thereof. PVC pipe must have a dimension ratio (DR) as shown on the plans or noted in special provision with outside diameters equivalent to cast iron pipe.

3. All pipe furnished shall have a pressure class rating as shown on the plans or noted in special provisions at 73.4° F and shall bear the National Sanitation Foundation Seal of approval for potable water pipe.

4. Provisions shall be made for contraction and expansion at each joint with a rubber ring type gasket in a thickened bell as part of each joint, or a separate double bell coupling.

5. All joints shall be made using a non-toxic lubricant in accordance with manufacturer's recommendations.

E. ORIGIN OF PIPE

1. All pipe shall be new, and shall be manufactured within the Continental Limits of the United States of America, and shall be approved by Underwriters Laboratories, Inc. or Factory Mutual and acceptable to the Texas State Board of Insurance.

F. GATE VALVES

1. In general, all gate valves shall conform to the Standard Specifications for Gate Valves for Ordinary Water Works Service, AWWA C 515 or latest revision for valves up to 12", and AWWA C 500, or latest revision for sizes over 12", except for changes or additions specifically outlined as follows:

2. Valves shall have hub, flanged, or mechanical joint ends, or a combination of hub, flange, or mechanical joint ends as may be specified. Bell and spigot pipe sizes 2" to 24" will use valves with bells conforming to AWWA C 100. Mechanical joint pipe sizes 2" to 36" will use valves with bells conforming to AWWA C 111. Flanged pipe will use valves with flanged ends conforming to ASA B 16.1 Class 125.

3. All gate valves shall be iron body, bronze mounted, resilient seat or double disc, parallel seat, non-rising stem, internal wedging type. Valves must embody the best workmanship and finish, and open and close freely and easily. In closing, the gates must move without friction to their position opposite their ports, both discs being then closed squarely against the seat rings. When valves are in full opened position, the discs shall be raised clear of the water way and provide an opening equal to the full normal diameter of the valve.

4. Gate valves shall be tested at a hydrostatic pressure of 300 pounds per square inch and shall be guaranteed for 200 pounds water working pressure. Any leakage at the pressures through any castings or between the bronze ring and the cast iron body shall cause the said casting or assembled fitting to be rejected. No plugging or patching to stop any leakage will be permitted.

5. All gate valves shall open by turning to the left.

6. Gate valves 2" to 16", inclusive, shall be nut or handwheel operated, as shown on the plans.

7. All bronze metal used in the working parts of the valve, with the exception of the valve stem, shall have a tensile strength of 34,000 pounds per square inch.

8. Gate valves of the internal wedging type shall have solid wedges made of high-grade bronze, having a tensile strength of at least 50,000 pounds per square inch, with wide bearing surfaces of sufficient thickness to guarantee no bending or denting under abnormal strain, and such bearing surfaces shall be ground to flat surfaces on each face. The wedges in valves 12" and over may be trimmed with a heavy bronze mounting.

9. Gate valve stems or spindles shall be of high tensile strength manganese bronze, or other non-corrodible metals which produce a valve stem or spindle having tensile properties at least equal to those of Class "A", Leaded High Strength Yellow Brass (Manganese Bronze) Sand Castings, ASTM Designation B.132.

10. A thrust collar on the spindle shall be cast integral with the spindle. A spindle having a thrust collar fastened or upset by any mechanical means is not acceptable. (There shall be provided a stem collar bushing suitably machined, to permit repacking the valve when it is in fully open position. The stuffing boxes and glands shall be bronze bushed).

11. All gray iron castings shall be made from superior quality iron, of touch and even grain, having a tensile strength of not less than 30,000 pounds per square inch, without blow or sand holes or defects of any kind.

12. All gate valves installed in horizontal position whose discs do not revolve shall be equipped with bronze tracks, rollers and scrapers. Valves installed flat in vertical lines shall be equipped with bronze shoes and slides.

13. The manufacturer shall be required to furnish the OWNER with certified copies of the hydrostatic tests and physical test of all metals used in the manufacture of the valves.

14. Detail prints shall be furnished on all valves.

15. Gate valves (including tapping sleeves and valves) shall be one of the products below, or an approved equal.

MANUFACTURER	PRODUCT IDENTIFICATION/COMMENT
Clow Valve Co. 902 South 2nd Street Oskaloosa, IA 52577	Model # 2638 (4" and larger) Model # 2639 and 2640 (R/W 2"- 12")
Kennedy Valve Company 1021 Water Street Elmira, NY 14902	KS-FW = C509 (2"-12") ~FW means full wall iron (cast iron) KS-RW = C515 (2"- 24") ~RW mean reduced wall (ductile iron)
Mueller Co. 500 West Eldorado Street Decatur, IL 62525-1808	A-2360 (2") ~ Will Be Discontinued in 2016 by Muller. A-2361 (2" and larger)
EJ (Formerly East Jordan Iron Works) 301 Spring Street East Jordan, MI 49727	FlowMaster (2" and larger)

G. FLANGES

1. Flanges shall be cast solid and faced accurately at right angles to the axis of the casting. Dimensions and drilling of flanges shall be in accordance with the American Standards Association for a working pressure of 200 PSI for the gate and check valves and 125 PSI for all other valves. Special drilling shall be provided where necessary.

H. EXTENSION STEMS AND OPERATING WRENCHES

1. All valves to be furnished for buried installation shall be furnished with extension stems to reach a point not deeper than 2'-6" below finished grade elevation adjacent to the valve and valve box. Each set of valves shall be furnished with not less than two (2) operating wrenches of a size and length appropriate to operate the valves.

I. AIR VALVES

1. Air valves and vacuum valves, when shown on the plans or required, shall be the float and lever type, as is manufactured by Val-Matic, or equal. The inlet ends will be screwed for 2" and smaller and flanged for 3" and larger.

2.05 JOINTING PIPES MATERIALS

A. All component parts are to be furnished with and included in the price bid for pipe. The materials consist of a circular rubber gasket of modified bulb shape in cross section.

B. Where restrained joints are shown on the Drawings restraining glands shall be installed. Restraining glands for PVC pipe shall conform to AWWA C111 and be **Megalug 2,000 PV by EBAA Iron Sales Inc.** or equal. Restraints for PVC pipe joints shall be series 1,500 or 6,500 bell restraint by EBAA Iron Sales Inc. or equal. Nuts and bolts shall be Type 316 stainless steel conforming to AWWA C111/AZ1.11.

C. Joint restraint devices for ductile iron mechanical joint pipe and ductile iron mechanical joint fittings to ductile iron pipe shall be EBAA Iron Inc., Series 1100 Megalug (R), Uniflange, Romac Industries or approved equal. Bell joint restraint devices for ductile iron push joint pipe shall be EBAA Iron Inc., Series 1700 Megalug (R) for bell restraint or approved equal. Restrained push-on joints for push joint pipe shall be U.S. Pipe and Foundry, HDSS, McWane Inc., Super-Lock, American Cast Iron Pipe Company, Lok-Ring or Flex-Ring. Bolts and nuts shall be ASTM A307 Grade B or ASTM A242 Corten.

2.06 CONCRETE BACKING

A. Concrete shall be composed of normal Portland Cement, coarse aggregate, fine aggregate, and water proportioned and mixed properly in a concrete mixer.

B. Transit mix concrete will be allowed. Portland Cement shall be Type 1 and shall be fully protected until incorporated in this work.

C. Gravel to be used for coarse aggregate shall consist of clean hard, durable grains, and shall be free from an excess of salt or alkali and foreign materials.

D. Concrete shall have a compressive strength of not less than 2,000 pounds per square inch at 28-days and shall not have less than three (3) sacks of cement nor more than 6 and 6-3/4 gallons of water per cubic yard of concrete.

PART 3 - EXECUTION

3.01 PROTECTION

A. Work

1. When construction is stopped temporarily and at the end of the day's work, tight fitting stoppers or bulkheads shall be securely placed in or across the ends of all pipes.

2. The CONTRACTOR will be held responsible for the care of all work until final completion and acceptance, and he will be required to make good, at his own expense, any damage or injury it may sustain for any cause. The CONTRACTOR shall assume all risks from floods and casualties of every description and make no charge for damages from such cause.

B. Pipes

1. It shall be the responsibility of the CONTRACTOR to protect and support all water, sewer, gas, and other conduits crossed by the excavation or work to be performed by him or to arrange for their temporary removal and subsequent replacement. All expense incidental to this phase of the work shall be borne by the CONTRACTOR.

C. Trees, Plants, Shrubbery, etc.

1. Where trees, plants, shrubbery, etc., are adjacent to the line of the work and are not to be removed or removed and replaced, the CONTRACTOR shall protect such trees, plants, shrubbery, etc., by substantial wooden boxes and guards and shall not permit machinery or employees to scrape, tear the limbs from or damage or attach guy cables to them and if, in the opinion of the ENGINEER, such trees, plants, shrubbery, etc. would be damaged by machinery, etc., hand excavation may be required. The CONTRACTOR shall be responsible for all damages to adjacent trees, plants, shrubbery, etc.

D. Buildings

1. The CONTRACTOR shall, at his own expense, shore up and otherwise protect any building or other structure which may, in the opinion of the ENGINEER, be endangered during the work, and he shall restore all buildings, culverts, fences, walls, or other properties disturbed during his work to a condition similar or equal to that existing before his operations.

2. The CONTRACTOR shall be responsible for any injuries to persons and property, for all damages to any pipe, conduit, sewer, or other structures injuriously affected by the work. The OWNER shall not be liable therefore.

E. Unfinished Work

1. Before leaving work for the night, during a storm, or at other times, care must be taken to protect and securely close the unfinished end of the pipe. Any earth or other materials that may find entrance into the pipe through any such open or unplugged end of the pipe must be removed at the CONTRACTOR'S expense.

F. Lights and Guards

1. The CONTRACTOR must provide and maintain adequate detours around the work under construction. The CONTRACTOR shall provide lights, warning signs, and/or watchmen to provide adequately for the safety of the public.

G. At such street, railroad, and all other crossings as may be designated by the ENGINEER, the trenches are to be filled in such a manner as to prevent any serious interruption of traffic upon the roadway or sidewalks. The cost thereof shall be borne by the CONTRACTOR.

3.02 TRENCHES

A. When creating a trench, follow section 31 50 00 "Excavation Support and Protection" from these specifications (or follow the following procedure:).

1. Trenches shall be excavated by trenching machine, backhoe, or dragline, except in locations where hand trenching is required. The banks of trenches shall be vertical, to a point 1 foot above the top of the pipe.

2. Trenches will be excavated to the lines and grades laid out by the ENGINEER or as shown on the plans. No change in locations of the lines is contemplated, but should any changes be made in the lines not materially altering the amount of character of the trenching to be done, the CONTRACTOR shall proceed with the changed alignment at the unit bid price. In case any change involves greater construction difficulties than the original alignment, the OWNER and the ENGINEER will agree with the CONTRACTOR for extra compensation therefor, prior to the construction of the changed line or lines.

3. The width of the trench shall be 6" minimum and 8" maximum on each side of the pipe bell.

4. Trenches for water pipe shall be of such depth as to provide a minimum of 42" of cover unless otherwise shown on the plans.

5. The excavation shall not advance more than 300 feet ahead of the completed and backfilled pipeline. Pipe shall be laid in all trenches that has been opened at the end of each day's work, unless the CONTRACTOR secures written permission to do otherwise from the ENGINEER.

6. If the bottom of the trench becomes an unstable foundation for the pipe through the neglect of the CONTRACTOR to adequately shore or dewater, the CONTRACTOR will be required to remove the unstable material and backfill the trench to the proper grade with approved compacted gravel, and no extra compensation will be granted for this material or work.

7. Also, if the trench is inadvertently excavated deeper than necessary it shall be backfilled to the proper grade with approved compacted gravel at the CONTRACTOR'S expense.

8. However, if the undisturbed material encountered at the grade depth constitutes, in the opinion of the ENGINEER, an unstable foundation for the pipe, the CONTRACTOR will be required to remove such unstable material and backfill the trench to the proper grade with approved compacted material.

9. The CONTRACTOR shall excavate all trenches, including work necessary in working around existing pipelines or other obstructions. The CONTRACTOR shall give notice to the OWNERS of any such lines or obstructions in order that they may have time to take the necessary precautions for protecting their property. The CONTRACTOR shall be responsible for protecting the OWNER from any damage from his operations in such work.

10. In rock, excavation shall be carried 3" below the bottom of the pipe, and loose earth or gravel, thoroughly tamped, shall be used for backfilling to the grade of the bottom of the pipeline.

11. After inspection of pipelines has been finished on any completed portion of the work the trench may be backfilled. Backfilling shall be accomplished in compliance with the applicable portions of these specifications.

B. Sheeting, Shoring, and Bracing shall follow the information below:

1. The sides of all excavations shall be sheeted, shored, and braced as deemed necessary by the CONTRACTOR to try to prevent slides, cave ins, settlement, or movement of the banks and to maintain the excavation clear of obstructions that will in any way hinder or delay the progress of the work.

2. In wet, saturated, or flowing materials, when it is necessary to install tight sheeting or cofferdams, wood or steel sheet piling of a design and type approved by the ENGINEER shall be used.

3. All sheet piling, shoring, and bracing shall have sufficient strength and rigidity to withstand the pressure exerted and maintain the sides of the excavation properly in place and protect all persons or property from injury or damage.

4. When excavations are made adjacent to existing building or other structures or in paved streets, particular care should be taken to adequately sheet, shore, and brace the sides of the excavation to prevent undermining of, or settlement beneath, the structures or pavement.

5. Underpinning of adjacent structures or pavement shall be done by the CONTRACTOR at his own cost and expense in a manner satisfactory to the ENGINEER and when required by the ENGINEER.

6. The pavement shall be removed, the void satisfactorily refilled and compacted, and the pavement replaced by the CONTRACTOR; the entire expense of such removal and subsequent replacement thereof shall be borne by the CONTRACTOR.

7. Sheeting, shoring, and bracing shall not be left in place unless otherwise provided for in the contract or authorized by the ENGINEER.

8. The removal of sheeting, shoring, and bracing shall be done in such manner as not to endanger or damage either new or existing structures, private or public properties, and to avoid cave ins or sliding of the banks.

9. All holes or voids left by the removal of the sheeting, shoring, or bracing shall be immediately and filled and compacted with suitable materials.

10. Sheeting, shoring, and bracing ordered left in place by the ENGINEER will be paid for at the unit price bid for this item, when such pay item is provided.

    a. In the event no separate pay item is provided, then the cost of sheeting, shoring, and bracing is to be included in such items as are provided.

C. Pumping, Bailing, and Draining shall follow the information below:

1. The CONTRACTOR shall immediately remove all surface or seepage water from sewers, drains, ditches, and other sources which may accumulate during the excavation and construction work by providing the necessary underdrains or otherwise and by doing the necessary pumping, bailing, or draining.

2. The CONTRACTOR shall always have available sufficient equipment in proper working order for doing the work herein required.

3. All water removed from excavations shall be disposed of in an approved manner so as not to create unsanitary conditions nor to interfere unduly with the use of streets, private driveways, or entrances.

4. Pumping, bailing, draining, underdrains, ditches, etc., shall be considered as incidental work and will not be bid for as separate items but their cost shall be included in the contract prices bid in the Proposal for the various units of measure.

D. Disposal of Excavated Materials shall follow the information below:

1. Excavated materials, so far as needed and of a suitable character, shall be piled adjacent to the work to be used for backfilling as required.

2. Excavated materials unsuitable for the backfilling or more than that required for backfilling shall be disposed of in an approved manner at locations designated on the plans or approved by the ENGINEER.

3. Desirable topsoil, sod, etc. shall be carefully piled separately and replaced in its original position when required.

4. Excavated materials shall be always handled in such a manner as to cause a minimum of inconvenience to public travel and to permit safe and convenient access to private and public property adjacent to or along the line of the work.

5. In parkways and easements where it is necessary to deposit excavated materials on lawns during the work, burlap or canvas shall be placed on the lawn to prevent contact between excavated materials and the lawn.

E. Use of Explosives shall follow the information below:

1. Should the CONTRACTOR elect to use explosives in the prosecution of the work, they shall be used with utmost precaution, and no blasting shall be done within 50 feet of the completed work or exposed pipes, conduits, etc.

2. The CONTRACTOR shall assume all liability for any injury or damage to persons or property resulting from such usage.

3. All necessary precautions shall be taken by the CONTRACTOR, and provisions shall be made for the protection of the new work; all blasting shall be so conducted as not to endanger persons or property.

4. Only a sufficient quantity of explosives for the immediate day's work shall be kept at the site of the work by the CONTRACTOR. Caps, detonators, and explosives shall be stored separately.

5. The CONTRACTOR shall be responsible for, and shall make good, any damage caused by blasting or accidental explosions

3.03 JACKING, BORING, OR TUNNELING

A. When creating a tunnel, follow the specification Section 33 05 05 “Tunneling, Boring, and Jacking” and TxDOT Item 476 “Jacking, Boring, Or Tunneling of Pipe Or Box”.

B. Tunneling under highways, streets, or railroads, when required and shown on the plans, shall be accomplished by means of jacking, boring or tunneling equipment which has been approved by the ENGINEER prior to starting to tunnel operations.

C. Tunnels shall be backfilled as completely as practicable with selected materials and compacted by means of mechanical tampers.

D. The remainder of the tunnel backfill shall be of coarse sand, gravel or crushed rock hydraulically placed in such manner that no voids remain between the backfilled material and the roof of the tunnel.

3.04 BACKFILL

A. Excavation shall be backfilled only with approved materials. The placing of backfill material shall not begin until approval has been given by the ENGINEER and shall be done immediately when so ordered by the ENGINEER.

B. Backfilling shall be brought up to an elevation slightly above the original ground level to allow for subsequent settlement. The top surface or slopes of all backfill shall be neatly graded off in a workmanlike manner, and where select topsoil, sod, or other material is removed and piled separately, such material shall be carefully replaced in a manner satisfactory to the ENGINEER.

C. On water line construction when, in the opinion of the ENGINEER, the subgrade material encountered at grade is soft, spongy, and unsuitable, it shall be removed to such a depth that the replacement thereof with firmly tamped gravel or crushed stone will provide an unyielding, stable foundation.

1. The gravel used in cushion or backfill shall be pit run gravel or crushed stone and shall be free from silt, loam, or vegetable matter and shall be of a gradation suitable to the ENGINEER.

2. Gravel cushion or backfill, when required by the plans or the ENGINEER, will be paid for at the contract unit price and shall be the total compensation for furnishing all labor materials, tools, and equipment for performing this particular phase of work.

3. Subgrades that have been allowed to become unstable by neglect of the CONTRACTOR, by improper drainage or lack of drainage, and when in the opinion of the ENGINEER, the condition was caused by the neglect or fault of the CONTRTACTOR, the ENGINEER shall order the CONTRACTOR to remove the unstable subgrade and replace the same with gravel at the expense of the CONTRACTOR, and no extra compensation will be allowed.

D. Where backfill material shown or called for on the plans to be used in the pipe zone is cement stabilized sand, the material shall extend from a point 6" below the pipe to a point 6” above the top of the pipe.

1. The backfill material shall be deposited simultaneously on both sides of the pipe and worked carefully around and under the pipe with the point of a shovel.

2. Payment for this bedding material shall be included in the unit price bid per linear foot of cement stabilized backfill material.

3. Cement-stabilized backfill shall contain a minimum of one (1) sack mix (per yard of pit run sand).

E. After the pipe has been laid, the pipelines shall be backfilled as follows unless otherwise shown on the plans:

1. Good sound earth, free of clods or lumps exceeding 3” in any dimension, from the spoil bank shall be brought up by hand backfilling equally on each side of the pipe to a height of 12” over the top of the pipe. To ensure a good firm bedding the backfill shall be cut under and around the pipe with shovels up to the spring line of the pipe. This backfill shall be done so as not to displace the pipe from its original position.

2. In summation, initial backfill will be composed of one (1) or more of the following in the manner described above:

a. Good sound earth free of lumps or clods in dimension not exceeding 3" shall be brought up 12” over the top of the pipe.

b. Gravel cushion, when shown on the plans, shall be poured into place to the top of the pipelines. Gravel cushion is defined as a free-flowing material like sand or mixed sand and pea gravel, free from lumps, large stone, clay, and organic material. When wet, the material shall not form mud or muck.

c. 2,500-pound concrete poured and rodded into place 6" over top of the pipe and all around the pipe a minimum of 6" thickness as shown on the plans as concrete encasement or as required by the ENGINEER.

F. The final backfilling operation shall be one (1) of the following for any of the methods used in the initial backfill procedure, unless otherwise shown on the plans:

1. The remainder of the backfill material may be made from the spoil bank, free from clods or lumps exceeding 6" in any dimension, placed in uniformly compacted layers not exceeding 1 foot in loose depth and hand or mechanically tamped in a manner approved by the ENGINEER.

2. The backfill material may be placed loosely in the trench, rounded up over the trench slightly above the original ground elevation without tamping and the trench jetted with water until all settlement has ceased. In open rights of way, the trench may be left crowned above the original ground as directed by the ENGINEER. Except in cases where pipelines cross open field, surplus soil is in such excess that drainage and/or adjacent property may be affected, the surplus material shall be removed from the site as directed by the ENGINEER.

3. Where an existing street or driveway surface has been cut (all asphalt and concrete pavements shall be saw cut before excavation), the following procedure is to be used in backfilling and replacing the pavement (unless otherwise shown on the plans):

a. The top 24” of the trench shall be filled with gravel aggregate, consisting of hard durable uncoated pebbles or stone particles mixed with sand, free from clay lumps,

shales, salt or alkali, well graded from coarse, not to exceed 3", to fine with 55% retained on 1/4" screen or washed gravel will be poured and compacted into place taking care not to disturb the pipe to level with the finished surface.

b. In not less than 14 days after backfilling of the pavement cut is completed, unless otherwise approved by the ENGINEER, the CONTRACTOR shall remove the gravel backfill to 1-1/2" below the pavement surface and furnish and place fine graded surface course hot mix asphaltic concrete, which when compacted will be not less than 1-1/2" thick.

4. Where concrete pavement is cut, the pavement shall be cut by sawing 6" beyond trench width on each side of the ditch and breaking out the concrete. The reinforcing steel shall be cut and bent back to be replaced after pipe laying operation has been completed. The ditch shall be backfilled from around the pipe and over the pipe to the pavement surface with pit run gravel or washed gravel jetted into place as in paragraph C (1) above. In not less than five (5) days after the backfilling of pavement cut is completed, the CONTRACTOR shall remove gravel backfill to 6" below the surface of the pavement and shall pour a 6" thick 3,000 psi concrete slab the width of the paving cut.

G. Prior to completion and final acceptance of the entire job, the CONTRACTOR will be required to refill and recrown all trenches which have settled below ground level or where the crown is reduced to indicate that such subsidence will occur.

3.05 INSTALLATION OF VALVES

A. All valves shall be installed as shown on the plans. For each valve the CONTRACTOR shall furnish and install a valve box.

B. Valve boxes shall be two (2) piece screw type cast iron of the extension type with cover labeled "Water".

C. Valves shall be carefully handled and lowered into position in such a manner as to prevent damage to any parts of the valve.

D. Valves shall be placed in such positions as indicated on the plans with the stem in a vertical position and securely held until all connections have been made.

E. Gate valves and pipe fittings shall be set and jointed to new pipe in the manner herein specified for cleaning, laying, and jointing pipe. Hub ended valves shall be jointed to pipe only with lead joints. Flanged and mechanical joint valves will be preferred where suitable.

F. Cast iron valve boxes shall be firmly supported and maintained centered and plum over the wrench nut of the gate valve. The box cover shall be set flush with the surface of the ground or at such other level as may be directed.

3.06 SERVICE CONNECTIONS

A. Water service connections shall be made by tapping the mains at specific points as designated by the ENGINEER. Service taps shall be made after the mains have been laid. The work shall be done by experienced workmen with suitable tapping machine and tools.

B. The copper (as called for on the plans) service pipe shall be connected to the corporation cock at the main and laid in the trench from one side to the other every 10 feet to give ample space for expansion and contraction of the pipe.

C. The service pipe shall have a cover of 24", except where the service pipe shall pass under the curb. At this point the service pipe shall be a minimum of 18" under the top of the curb or a minimum of 6" under the bottom of the curb and gutter section.

D. Excessive bending of the pipe which will injure or reduce the cross-sectional area of the pipe will not be permitted.

E. The length of the service line shall extend from the mains to a point 2 feet back of the street curb where curb exists, or to the property line if no curb exists. If there is a curb, the curb shall be marked with the letter "W" in good quality green paint at the point where the service pipe passed under the curb.

3.07 CONNECTION TO EXISTING WATER MAINS

A. Where indicated on the plans and/or hereinafter specified, the CONTRACTOR shall connect the new main with existing mains or lines. The CONTRACTOR shall furnish all labor, materials, equipment or services required for the locating and uncovering of the existing line, the making of cuts in the existing line, the removal, relocation, and lowering of existing lines as required, dewatering of the trench, connecting of the existing line into the new main and any and all appurtenant work required for a complete connection. Relocated mains or lines shall be laid so that all valves so relocated or installed shall be set vertically.

B. Only such connections to existing mains as are necessary to load, test and sterilize mains under construction with water from city mains will be permitted prior to the sterilization of new mains. All other connections to existing mains from a new main being constructed shall be made only after the new main has been adequately and satisfactorily sterilized and the ENGINEER or his inspector has authorized the connections to be made. CONTRACTORS will be required to plug and block lines, crosses, tees or other fittings installed in the new main to permit testing and sterilization prior to the making of connections. Such plugs and blocking shall be adequate to withstand a test pressure of 150 pounds per square inch.

C. Where cut-ins are made immediately adjacent to valves which are under pressure, the CONTRACTORS shall take all necessary precautions to brace such valves with temporary blocking and bracing which shall be of ample size and properly placed to prevent movement or blowing off of any pipe, valves or fittings due to water pressure on the main.

D. Connections to existing water mains shall be made at the locations shown, as specified, and/or as directed by the ENGINEER. All such connections shall be made in a most expeditious and workmanlike manner to cause the least inconvenience to water customers and to traffic and shall be made at night unless otherwise approved by the ENGINEER. The detailed schedule of operations for making each connection shall be approved by the ENGINEER or his inspector before any work thereupon is commenced.

3.08 CONCRETE BACKING

A. Concrete having compressive strength of not less than 2,000 pounds per square inch shall be used as a cradle or backing where shown on the plans or where directed by the ENGINEER. All materials including aggregates, cement, and water, as well as the mixing and placing of the

concrete, shall be approved by the ENGINEER. Bends of 22 1/2 degrees and greater, plugs, and all tees, crosses, etc. shall be placed between solid ground and the fitting to be anchored; the area of bearing on pipe and on ground in each instance shall be that required by the ENGINEER. The backing shall, unless otherwise directed, be placed so that the pipe and fitting joints will be accessible for repair.

3.09 STERILIZATION OF WATER MAINS

A. During the construction operations workmen shall be required to use utmost care to see those parts of the structures, inside of pipes, fittings, jointing materials, valves, etc., the surface of which come in contact with City water are maintained in a sanitary condition.

B. Every effort must be made to keep the inside of the pipe, fittings, and valves free of all foreign matter, sticks, dirt, rocks, etc. As each joint of pipe is being laid it must be effectively swabbed so that all foreign matter is removed. All fittings and exposed open ends of pipe must be blocked or capped until the line is completed.

C. When the entire pipeline or certain selected sections thereof have been completed, tested, and made ready for turning over to the OWNER ready for use, the line or section of line shall be thoroughly sterilized according to AWWA C-651 and the following procedure:

1. The line shall be flushed out, completely replacing its entire volume with water from the OWNER's mains.

2. Chlorine will be injected into the section of line being sterilized so that its entire capacity will be filled with water containing chlorine in the amount of 50 PPM. or in such other quantity as determined by the ENGINEER. The sterilizing agent shall be introduced at one end of the section and the water released from the opposite end until the sterilizing agent is present at the discharge end in such quantity as to indicate a residual chlorine of 50 PPM or as otherwise determined by the ENGINEER. All valves shall be opened and closed several times and the sterilizing solution permitted to remain in the pipeline section for not less than 24 hours.

3. At the end of the sterilizing period the sterilizing solution shall be discharged from the pipe and replaced with water direct from a main of the OWNER.

4. A sample of water from the sterilized main shall be taken (not through a fire hydrant) from a suitable tap under the supervision of the ENGINEER or his Inspector and submitted to an approved testing laboratory or the State Health Department for analysis. If the test shows a satisfactory quality of water, the line so sterilized shall then be placed in service by the CONTRACTOR who shall notify and assist the Water Superintendent in location and operation of all valves installed by the CONTRACTOR. If the sample shows unsatisfactory quality of water, the process of sterilization shall be repeated until a satisfactory water is obtained.

D. Sterilization of the line or any section thereof shall not be commenced until the ENGINEER'S approval of the method, apparatus, sterilizing agent, and the section of the line has been obtained.

3.10 SANITARY SEWER AND WATER MAIN SEPARATION DISTANCES

A. The following separation distances shall be maintained between potable water and wastewater treatment plants, and waterlines and sanitary sewers, and shall be in accordance with TAC Chapter 217 and Chapter 290 requirements.

1. Water line/new sewer line separation. When new sanitary sewers are installed, they shall be installed no closer to waterlines than 9 feet in all directions. All separation distances shall be measured from the outside surface of each of the respective pieces. Sewers that parallel waterlines must be installed in separate trenches. Any appurtenance shall be designed and constructed so as to prevent any possibility of sewage entering the drinking water system. Where the 9 feet separation distance cannot be achieved, the following guidelines will apply:

    a. Where a sanitary sewer parallels a waterline, the sewer shall be constructed of cast iron, ductile iron or PVC meeting ASTM specifications with a pressure rating for both the pipe and joints of 150 PSI. The waterline shall be located at least a minimum of 2 feet above the wastewater main or lateral, measured vertically, and at least a minimum of 4 feet away, measured horizontally, from the wastewater main or lateral. The sewer shall be located below the waterline.

    b. Where a sanitary sewer crosses a waterline, and the sewer is constructed of cast iron, ductile iron or PVC with a minimum pressure rating of 150 PSI, the potable waterline shall be at least a minimum of 6" above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral.

    c. Where a sewer crosses under a waterline and the sewer is constructed of ABS truss pipe, similar semi-rigid plastic composite pipe, clay pipe or concrete pipe with gasketed joints, the potable waterline shall be at least a minimum two (2) feet above the wastewater main or lateral. The initial backfill shall be from one quarter diameter below the centerline of the pipe to one (1) pipe diameter (but not less than 12") above the top of the pipe.

    d. Where a sewer crosses over a waterline all portions of the sewer within nine (9) feet of the waterline shall be constructed of cast iron, ductile iron, or PVC pipe with a pressure rating of at least 150 PSI using appropriate adapters. In lieu of this procedure, the new conveyance pipe may be encased in a joint of 150-PSI pressure class pipe at least 18 feet (or longer) and two (2) nominal sizes larger than the new conveyance pipe. The space around the carrier pipe shall be supported at 5 feet intervals with spacers or be filled to the springline with washed sand. The encasement pipe should be centered on the crossing and both ends sealed with cement grout or manufactured seal.

B. Waterline/manhole separation. Unless sanitary sewer manholes and the connecting sewer can be made watertight and tested for no leakage, they must be installed so as to provide a minimum of 9 feet of horizontal clearance from an existing or proposed waterline. Where the nine (9') foot separation distance cannot be achieved, a carrier pipe as described in subsection A (1) of this section may be used where appropriate.

3.11 CLEARANCE FROM OTHER PIPES

A. Water lines and sanitary sewers shall be installed no closer to each other than 9 feet. Where this cannot be achieved, the sanitary sewer shall be constructed of pressure type cast iron pipe or the equivalent of 150 psi pressure pipe with watertight joints used in water main construction for the 9 feet clearance. No physical connection shall be made between a drinking water supply, public or private, and the sewer or any appurtenances.

B. Any facilities for permitting discharge of drinking water into the sewer or any appurtenance thereof shall be constructed so as to prevent any possibility of sewage entering the drinking water system.

3.12 INSPECTION

A. During the process of unloading, all pipe and accessories shall be inspected by the CONTRACTOR for loss or damage in transit. No shipment shall be accepted by the CONTRACTOR until notation of any lost or damaged material shall have been placed on the bill of lading by the agent of the carrier.

B. All pipe and accessories shall be laid, jointed, tested for defects and for leakage with pressure, and chlorinated in the manner herein specified in the presence of the ENGINEER or his authorized Inspector and subject to their approval.

C. All material found during the progress of the work to have cracks, flaws, or other defects will be rejected by the ENGINEER, and the CONTRACTOR shall promptly remove from the site of the work such defective material.

D. The CONTRACTOR shall be responsible for all material furnished to him or by him and shall replace at his own expense all such material that is found to be defective in manufacturing or that has become damaged in handling after delivery by the manufacturer. The CONTRACTOR shall be responsible for the safe storage of material furnished by or to him until it has been incorporated in the completed project.

E. Pipe fittings, valves and other accessories shall be unloaded at the point of delivery, hauled to, and distributed at the site of the project by the CONTRACTOR. They shall, at all times, be handled with care to avoid damage. In loading and unloading they shall be lifted by hoists, slid, or rolled on skidways in such a manner as to avoid shock. Under no circumstances shall they be dropped. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground.

F. In distributing the material at the site of the work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench. Pipe shall be handled in such a manner that a minimum amount of damage to the coating will result. Damaged coating shall be replaced in a manner satisfactory to the ENGINEER.

G. Pipe shall be placed on the site of the work parallel with the trench alignment and with bell ends facing the direction on which the work will proceed unless otherwise directed. The interior of all pipes, fittings, and other accessories shall be kept free from dirt and foreign matter at all times.

3.13 JOINTING PIPES

A. Remove any foreign matter in the gasket seat of the socket, wipe gasket clean, flex gasket and place in socket with the large round end or bulb end entering first. Seat gasket evenly around inside of the socket with the groove fitted over the bead. Remove any bulges.

B. Apply a thin film of lubricant furnished by the pipe manufacturer to the inside surface of gasket.

C. No lubricant other than that furnished with the pipe by the pipe manufacturer will be allowed to be used.

D. Wipe plain end of pipe to be entered, clean and place in approximate alignment with the bell of the pipe to which it is to be joined.

E. Apply a thin film of the lubricant to the outside of the plain end for about 1" back from the end. Align the pipe and carefully enter the plain end into the socket until it just makes contact with the gasket.

F. Complete joint assembly by forcing the plain end of the entering pipe past the gasket until it makes contact with the bottom of the socket.

1. For pipe in sizes 10” and larger, a jack-type tool will be used to make up the joint and complete the assembly of the joint in forcing the plain end of the pipe past the gasket.

3.14 DEFLECTION OF JOINTS

A. The maximum deflection at each joint will not exceed 5 degrees for sizes through 12", 4 degrees for 14" and 16", and 3 degrees for 18", 20" and 24" pipe sizes, or the manufacturer’s recommendations, whichever is less.

B. If a profile is shown on the plans, the CONTRACTOR will be required to lay the line to conform to the grades shown.

C. If it is necessary that water line shall have over 42” of cover in order not to exceed the manufacturer’s recommendations for deflection of the pipe, the CONTRACTOR shall excavate the ditch with no extra compensation.

D. Regardless of the depth of ditch necessary, the CONTRACTOR shall, under no condition, exceed the manufacturer's recommendations for deflection of the pipe at joints. The CONTRACTOR will receive no extra compensation for extra depth necessary to cross existing utility lines.

E. Attention is called to the fact that concrete cylinder pipe must be laid on grade to insure proper jointing of the pipe. The grades will be determined in such a manner so as to avoid excessive use of fittings and specials and to provide a uniform grade between low points and high points.

F. No additional compensation will be paid for extra trench depth required, to meet these conditions. Any differences of opinions concerning the grades as set by the ENGINEER must be resolved by the CONTRACTOR prior to pipe laying.

3.15 ABANDONMENT/REMOVAL OF EXISTING MAINS

A. The CONTRACTOR shall accomplish all cutting, capping, plugging, and blocking necessary to isolate existing mains retained in service from abandoned mains.

B. The open ends of abandoned mains and all other openings or holes in such mains occasioned by cutting or removal of outlets shall be blocked off by pressure forcing cement grout or concrete into and around the openings in sufficient quantity to provide a permanent substantially watertight seal.

C. Capping or plugging of main is preferred over grouting. For mains 12'' and larger, under major thoroughfare or highways, grouting will be required.

D. When specified or shown otherwise in the contract documents, CONTRACTOR shall remove the main and all related appurtenances that are to be replaced, or will no longer be in service, and all effort to accomplish this requirement will be considered subsidiary to the work required, and no direct payment will be made.

E. Valves abandoned in the execution of the work shall have the valve box and extension removed in its entirety and filled with flowable fill to within 12" inches of the surface.

1. The remaining 12" inches shall be filled with required asphaltic pavement or topsoil and sod and finished flush with the adjacent pavement or ground surface as required (N.S.P.I.).

3.16 CLEAN UP

A. During construction the CONTRACTOR shall maintain the premises in an orderly, neat, and presentable manner. Scraps and debris shall not be left scattered but shall be assembled and such as are unusable shall be moved from the premises or disposed of to the satisfaction of the ENGINEER. When construction of the contract has been otherwise completed, the CONTRACTOR shall remove all left-over construction materials, equipment, scraps, debris, and rubbish. Earthwork shall be smoothed and graded to the lines shown on the plans. Backfill over all trenches shall be left in a uniform and neat condition.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Pipe: Pipe will be measured from center of fitting to center of fitting or end of pipe without any deduction for the length of intermediate fittings or valves. Payment will be made at the price bid per foot for furnishing and installing pipe, which bid price will include all costs for the complete pipe installation, including trenching and backfill, and shall include all work not otherwise provided for in these specifications.

B. Fittings: Payment for fittings will be at the unit price per ton bid for such work. This shall include the furnishing and installation of the fitting. This unit price shall also include the cost of concrete backing or blocking. Weight shall be determined from the manufacturer's catalogs. No separate payment will be made for galvanized pipe fittings. If mechanical joint fittings are used, payment will be based on weights of mechanical joint fittings and joint accessories.

C. Gate valves and tapping sleeves and valves will be paid for at the unit price bid for each, which price shall include the cost of the valve or tapping sleeve and valve, as well as the valve box and labor complete in place.

D. Fire Hydrants: Payment for the furnishing and installing of fire hydrants will be made at the unit price bid for each, complete in place.

E. Connections to Existing Mains: Payment for valves, fittings, pipe, etc., will be made at the unit price bid for the various items. No additional payment will be made for "WET" connections, but a lump sum will be paid for each "DRY" connection made as specified in these specifications.

F. Concrete Backing: No separate payment will be made for concrete backing or blocking of fittings, valves, etc. The CONTRACTOR shall include such costs in the price bid for setting fittings, valves, etc.

G. Hydrostatic Test: No separate payment will be made for the hydrostatic test. The cost of the test shall be included in the bid price for pipe in place.

H. Sterilizing: No separate payment will be made for sterilizing the main. The cost of such work shall be included in the price bid for pipe in place.

I. Water Services: Water services will be paid for as a lump sum bid for each water service connection. The lump sum will include tapping the main, furnishing and installing the corporation stop, and the copper service line necessary to connect to the existing water service.

J. Abandonment: Grouting of abandoned water lines shall be measured by linear foot. Removal of valves & valve boxes for abandonment shall be measured on the basis of each one complete in place. Said price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work including trenching and backfill and shall include all work not otherwise provided for in these specifications.

K. Trenches: This item consists of excavating all necessary trenches for the water main and system construction and backfilling after the pipe has been properly laid, inspected, and tested.

L. Backfill: This work shall include the furnishing of all labor, materials, tools, equipment, and machinery necessary for clearing and removing from the site of the work, wherever located, all obstructions, trees, stumps, brush, vegetation and debris, and all earth, rock, and other materials to be excavated; the removal of existing structures except where specifically paid for as separate contract pay items; the stripping or removal of top soil or sod to be piled separately from other excavated materials and later to be restored to its original place after backfilling is completed; the furnishing, placing, and maintaining of all sheeting, shoring and bracing necessary to protect the work and adjacent properties, all pumping, bailing, and draining necessary to keep the excavation free from seepage water, water from sewers, drains, ditches, creeks, and other sources; provision for the uninterrupted flow of sewers and surface waters during progress of the construction; the removal, after completion of the work, of all sheeting, shoring, and bracing not necessary to support the sides of the excavation; the satisfactory disposal of excess and unsuitable materials not required or which cannot be used for backfilling, tamping, compacting, and refilling after settlement of all excavated areas; the restoring of all streets, alleys, fences, rights of way, and other lands or structures, private or public, damaged or occupied by the CONTRACTOR in the performance of the contract, to as good a condition as they were prior to the beginning of the work.

M. Excavation: In trenches for water line construction will be unclassified and will not be paid for separately but shall be included in the price bid per linear foot for the various sizes of pipe unless specific provision for separate payment is called for in the Special Instruction and on the Bid Form.

4.02 PAYMENT

A. The bid items include all components of the work, including testing of new water main, required for the completion of the job in every respect except as may be otherwise provided in these specifications. CONTRACTOR shall include the furnishing of all materials and labor, including any incidental labor, in its bid prices.

END OF SECTION

SECTION 40 05 81

FIRE HYDRANTS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section covers the installation of new hydrants and the resetting of existing hydrants.

B. Prior to putting any existing hydrant out of service for any reason, the CONTRACTOR shall notify the Fire Department in writing in accordance with the **City of Lytle Fire Department** requirements.

C. Hydrants which will be out of service for more than twenty-four (24) hours shall be replaced by temporary hydrants.

1.02 SUBMITTALS

A. Submit in accordance with SECTION 01 33 00 – SUBMITTAL PROCEDURES.

PART 2 - PRODUCTS

2.01 HYDRANTS

A. Provide fire hydrants in conformance with AWWA C 502, Standard for Dry Barrel Fire Hydrants (Latest Edition). Hydrants are approved by the **OWNER** for issuance of a Certificate of Responsibility.

B. The ENGINEER may, at any time prior to or during installation of hydrants, randomly select furnished hydrant for disassembly and laboratory inspection, at OWNER'S expense, to verify compliance with Specifications. When hydrant is found to be non-compliant, replace, at CONTRACTOR'S expense, hydrants, with hydrants that comply with Specifications.

C. Provide lower hydrant barrel fabricated from Ductile Iron Pipe as single piece, connected to upper hydrant barrel by means of joint coupling that will provide three hundred sixty-degree (360) rotation of upper barrel.

2.02 LEADS

A. See SECTION 33 05 31 – WATER MAIN CONSTRUCTION for pipe and fittings for Leads (Branches).

2.03 HYDRANT PAINTING

A. New hydrants and refurbished hydrants shall be shop coated as specified herein.

B. Exterior Above Traffic Flange (Including Bolts & Nuts). Bolts and nuts (both above and below ground) shall conform to AWWA C-502 Section 4.11 and shall be stainless steel, cadmium plated, or zinc coated.

1. Surface preparation to be in accordance with SSPC-SP 10 (NACE 2) near white blast cleaned surface.

2. Coat with a liquid or powder epoxy primer and two part polyurethane or TGIC polyester top coat system with total dry film thickness (DFT) of not to exceed 20 mils as follows:

   a. Prime Coat - Liquid or powder epoxy primer with a total dry film thickness (DFT) of 4-6 mils, OR cathodic epoxy electro-coat (e-coat) with a (DFT) of 0.5-1.0 mils.

   b. Intermediate Coat – Intermediate coat not required.

   c. Finish Coat - Two-part polyurethane enamel to be in general conformance with SSPC Paint Specification No. 36 or TGIC polyester system, with a total dry film thickness (DFT) 1.5-3.0 mils. Install color coded finish coating of bonnet in field.

   d. Bonnet Paint - Field apply finish coat of Silicone Alkyd Resin Enamel to be in general conformance with SSPC Paint Specification No. 21. Dry film thickness of 2 - 3 mils. Bonnet colors are to be as specified in Paragraph 3.01 to designate the appropriate size of water supply line.

3. Colors - Primer: Manufacturer's standard color. Finish coat of hydrant body: Federal Standard Color #15187 (Blue) or equivalent. Bonnet and Connection caps: Finished coated white. Paint white band of finish coat two (2) inches in width on hydrant body approximately six inches (6") above and parallel to traffic flange.

C. Field Maintenance Painting (Exterior Above Traffic Flange)

1. Surface Preparation to be in accordance with SSPC - SP2, Hand Tool Cleaning, or SSPC - SP3, Power Tool Cleaning, depending on condition of existing paint and extent of corrosion. It is not necessary to remove tightly adhered mill scale, rust, and paint. Mill scale, rust and paint are considered tightly adherent when they cannot be removed with dull putty knife. In some severe cases where it is necessary to remove majority of existing paint, surface should be cleaned in accordance with SSPC -SP11, Power Tool Cleaning to Bare Metal.

2. When surface is cleaned to bare metal (SSPC - SP11), coat hydrant with three coat Alkyd/Silicone Alkyd system in accordance with Paragraph 2.03.B.2 as for new hydrants. When surface is cleaned to SSPC - SP2 or SSPC - SP3, coat hydrant with Silicone Alkyd Resin Enamel in general conformance with SSPC Paint Specification No. 21. Total dry film thickness of 3-6 mils.

3. Field coating should be conducted in accordance with the individual coatings manufacturer's recommendations.

D. Exterior Below Traffic Flange (including lower barrel extensions).

1. Surface preparation in accordance with SSPC- SP10 (NACE 2) Near White Blast Cleaned Surface.

2. Primer: One or two coats of modified or equal polyamide epoxy primer, to be in general conformance with SSPC Paint Specification No. 42 or approved equal with a total dry film thickness (DFT) of 20 mils. Exterior below traffic flange should be the same color as the above traffic flange, i.e., blue. (Federal Standard Color #15187 (Blue) or equivalent.)

E. Interior Surfaces Above and Below Water Line Valve (including lower barrel extensions)

1. Material used for internal coating of hydrant interior ferrous surfaces must be NSF certified as suitable for contact with potable water as required by Chapter 290, Rules and Regulations for Public Water Systems, Texas Commission on Environmental Quality.

2. Coating shall be liquid or powder epoxy system in accordance with AWWA Standard C - 550 (latest revision). Coating may be applied in two or three coats, according to manufacturer's recommendations, for total dry film thickness not to exceed 20 mils.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS

A. Where hydrants are specified to be reset the CONTRACTOR will test each hydrant to ensure that the hydrant functions and drains. The test will be done prior to deactivating the water main and in the presence of the Inspector or the Engineer. The CONTRACTOR shall immediately notify the Engineer if the hydrant is found to be defective.

B. Hydrants shall be set plumb with the steamer nozzle facing the roadway.

C. Hydrants shall be set with the center of the operating nut 18 inches back from the face of the curb.

D. Hydrants shall be set so that manufacturers "bury" mark or ground line is at finish grade. If there is no bury mark on the hydrant, the bottom of the breakaway feature shall be a minimum of 2 inches and a maximum of 4 inches above finished grade.

E. The depth off bury shall be either 5-1/2 or 6 feet, or as shown in the construction plans.

F. Hydrants shall be set on either a flat stone or concrete base at least 14 inches square and 4 inches thick.

G. Hydrants shall be restrained by using mechanical joint follower glands, rods and clamps, thrust blocks or any combination thereof as required by the Engineer.

H. A drainage pit shall be excavated below and around each hydrant and backfilled to a height of at least six (6) inches above all drain ports with at least 12 cubic feet of 1 inch to 2 inch crushed stone. This shall be covered with 4-mil thick plastic sheeting.

I. All hydrants to be reset, as noted on the contract drawings or directed by the Engineer, shall be removed in their entirety prior to resetting. Hydrants not reset in accordance with these specifications will not be eligible for payment.

J. All work to reset existing hydrants shall be done in complete compliance with all the specifications contained herein for setting new hydrants.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. This section will be measured for supplying, installing, and testing by each fire hydrant being added, each valve that will be installed, and linear foot of fire hydrant leads from the service pipe.

4.02 PAYMENT

A. The bid items include all components of the work, including testing of new hydrants, required for the completion of the job in every respect except as may be otherwise provided in these specifications. CONTRACTOR shall include the furnishing of all materials and labor, including any incidental labor, in its bid prices.

END OF SECTION

Item 300
Asphalts, Oils, and Emulsions

1. DESCRIPTION

Provide asphalt cements, cutback and emulsified asphalts, performance-graded asphalt binders, and other miscellaneous asphalt materials as specified on the plans.

2. MATERIALS

Provide asphalt materials that meet the stated requirements when tested in accordance with the referenced Department, AASHTO, and ASTM test methods. Use asphalt containing recycled materials only if the recycled components meet the requirements of Article 6.9, "Recycled Materials." Provide asphalt materials that have been preapproved for use by the Construction Division in accordance with Tex-545-C.

Acronyms used in this Item are defined in Table 1.

Table 1
Acronyms

Acronym	Definition
Test Procedure Designations	
Tex	Department
T or R	AASHTO
D	ASTM
Polymer Modifier Designations	
P	polymer-modified
SBR or L	styrene-butadiene rubber (latex)
SBS	styrene-butadiene-styrene block co-polymer
TR	tire rubber (from ambient temperature grinding of truck and passenger tires)
AC	asphalt cement
AE	asphalt emulsion
AE-P	asphalt emulsion prime
A-R	asphalt-rubber
C	cationic
EAP&T	emulsified asphalt prime and tack
H-suffix	harder residue (lower penetration)
HF	high float
MC	medium-curing
MS	medium-setting
PCE	prime, cure, and erosion control
PG	performance grade
RC	rapid-curing
RS	rapid-setting
S-suffix	stockpile usage
SCM	special cutback material
SS	slow-setting

2.1. **Asphalt Cement**. Provide asphalt cement that is homogeneous, water-free, and nonfoaming when heated to 347°F, and meets the requirements in Table 2.

Table 2
Asphalt Cement

Property	Test Procedure	Viscosity Grade									
		AC-0.6		AC-1.5		AC-3		AC-5		AC-10	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity	T 202										
140°F, poise		40	80	100	200	250	350	400	600	800	1,200
275°F, poise		0.4	–	0.7	–	1.1	–	1.4	–	1.9	–
Penetration, 77°F, 100g, 5 sec.	T 49	350	–	250	–	210	–	135	–	85	–
Flash point, C.O.C., °F	T 48	425	–	425	–	425	–	425	–	450	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–	99.0	–	99.0	–
Spot test	Tex-509-C	Neg.		Neg.		Neg.		Neg.		Neg.	
Tests on residue from Thin-Film Oven Test:	T 179										
Viscosity, 140°F, poise	T 202	–	180	–	450	–	900	–	1,500	–	3,000
Ductility,[1] 77°F 5 cm/min., cm	T 51	100	–	100	–	100	–	100	–	100	–

1. If AC-0.6 or AC-1.5 ductility at 77°F is less than 100 cm, material is acceptable if ductility at 60°F is more than 100 cm.

2.2. **Polymer-Modified Asphalt Cement**. Provide polymer-modified asphalt cement that is smooth, homogeneous, and meets the requirements of Table 3. Supply samples of the base asphalt cement and polymer additives if requested.

Table 3
Polymer-Modified Asphalt Cement

Property	Test Procedure	Polymer-Modified Viscosity Grade											
		AC-5 w/2% SBR		AC-10 w/2% SBR		AC-15P		AC-20XP		AC-10-2TR		AC-20-5TR	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Polymer		SBR		SBR		SBS		SBS		TR		TR	
Polymer content, % (solids basis)	Tex-533-C	2.0	–	2.0	–	3.0	–	–	–	2.0	–	5.0	–
Dynamic shear, G*/sin δ, 64°C, 10 rad/s, kPa	T 315	–	–	–	–	–	–	1.0	–	–	–	1.0	–
Dynamic shear, G*/sin δ, 58°C, 10 rad/s, kPa	T 315	–	–	–	–	–	–	–	–	1.0	–	–	–
Viscosity													
140°F, poise	T 202	700	–	1,300	–	1,500	–	2,000	–	1,000	–	2,000	–
275°F, poise	T 202	–	7.0	–	8.0	–	8.0	–	–	–	8.0	–	10.0
Penetration, 77°F, 100 g, 5 sec.	T 49	120	–	80	–	100	150	75	115	95	130	75	115
Ductility, 5cm/min., 39.2°F, cm	T 51	70	–	60	–	–	–	–	–	–	–	–	–
Elastic recovery, 50°F, %	Tex-539-C	–	–	–	–	55	–	55	–	30	–	55	–
Softening point, °F	T 53	–	–	–	–	–	–	120	–	110	–	120	–
Polymer separation, 48 hr.	Tex-540-C	None		None		None		None		None		None	
Flash point, C.O.C., °F	T 48	425	–	425	–	425	–	425	–	425	–	425	–
Tests on residue from RTFOT aging and pressure aging:	Tex-541-C and R 28 T 313												
Creep stiffness													
S, -18°C, MPa		–	–	–	–	–	300	–	300	–	300	–	300
m-value, -18°C		–	–	–	–	0.300	–	0.300	–	0.300	–	0.300	–

2.3. **Cutback Asphalt**. Provide cutback asphalt that meets the requirements of Tables 4, 5, and 6 for the specified type and grade. Supply samples of the base asphalt cement and polymer additives if requested.

Table 4
Rapid-Curing Cutback Asphalt

Property	Test Procedure	Type–Grade					
		RC-250		RC-800		RC-3000	
		Min	Max	Min	Max	Min	Max
Kinematic viscosity, 140°F, cSt	T 201	250	400	800	1,600	3,000	6,000
Water, %	D95	–	0.2	–	0.2	–	0.2
Flash point, T.O.C., °F	T 79	80	–	80	–	80	–
Distillation test:	T 78						
Distillate, percentage by volume of total distillate to 680°F							
to 437°F		40	75	35	70	20	55
to 500°F		65	90	55	85	45	75
to 600°F		85	–	80	–	70	–
Residue from distillation, volume %		70	–	75	–	82	–
Tests on distillation residue:							
Viscosity, 140°F, poise	T 202	600	2400	600	2400	600	2400
Ductility, 5 cm/min., 77°F, cm	T 51	100	–	100	–	100	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–
Spot test	Tex-509-C	Neg.		Neg.		Neg.	

Table 5
Medium-Curing Cutback Asphalt

Property	Test Procedure	Type–Grade							
		MC-30		MC-250		MC-800		MC-3000	
		Min	Max	Min	Max	Min	Max	Min	Max
Kinematic viscosity, 140°F, cSt	T 201	30	60	250	500	800	1,600	3,000	6,000
Water, %	D95	–	0.2	–	0.2	–	0.2	–	0.2
Flash point, T.O.C., °F	T 79	95	–	122	–	140	–	149	–
Distillation test:	T 78								
Distillate, percentage by volume of total distillate to 680°F									
to 437°F		–	35	–	20	–	–	–	–
to 500°F		30	75	5	55	–	40	–	15
to 600°F		75	95	60	90	45	85	15	75
Residue from distillation, volume %		50	–	67	–	75	–	80	–
Tests on distillation residue:									
Viscosity, 140°F, poise	T 202	300	1200	300	1200	300	1200	300	1200
Ductility, 5 cm/min., 77°F, cm	T 51	100	–	100	–	100	–	100	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–	99.0	–
Spot test	Tex-509-C	Neg.		Neg.		Neg.		Neg.	

Table 6
Special-Use Cutback Asphalt

Property	Test Procedure	Type–Grade					
		MC-2400L		SCM I		SCM II	
		Min	Max	Min	Max	Min	Max
Kinematic viscosity, 140°F, cSt	T 201	2,400	4,800	500	1,000	1,000	2,000
Water, %	D95	–	0.2	–	0.2	–	0.2
Flash point, T.O.C., °F	T 79	150	–	175	–	175	–
Distillation test:	T 78						
Distillate, percentage by volume of total distillate to 680°F							
to 437°F		–	–	–	–	–	–
to 500°F		–	35	–	0.5	–	0.5
to 600°F		35	80	20	60	15	50
Residue from distillation, volume %		78	–	76	–	82	–
Tests on distillation residue:							
Polymer		SBR		–		–	
Polymer content, % (solids basis)	Tex-533-C	2.0	–	–	–	–	–
Penetration, 100 g, 5 sec., 77°F	T 49	150	300	180	–	180	–
Ductility, 5 cm/min., 39.2°F, cm	T 51	50	–	–	–	–	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–

2.4. **Emulsified Asphalt**. Provide emulsified asphalt that is homogeneous, does not separate after thorough mixing, and meets the requirements for the specified type and grade in Tables 7, 8, 9, and 10.

Table 7
Emulsified Asphalt

Property	Test Procedure	Type–Grade									
		Rapid-Setting		Medium-Setting				Slow-Setting			
		HFRS-2		MS-2		AES-300		SS-1		SS-1H	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72										
77°F, sec.		–	–	–	–	75	400	20	100	20	100
122°F, sec.		150	400	100	300	–	–	–	–	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1
Miscibility	T 59	–		–		–		Pass		Pass	
Cement mixing, %	T 59	–	–	–	–	–	–	–	2.0	–	2.0
Coating ability and water resistance:	T 59										
Dry aggregate/after spray		–		–		Good/Fair		–		–	
Wet aggregate/after spray		–		–		Fair/Fair		–		–	
Demulsibility, 35 mL of 0.02 N $CaCl_2$, %	T 59	50	–	–	30	–	–	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	1	–	1	–	1
Freezing test, 3 cycles[1]	T 59	–		Pass		–		Pass		Pass	
Distillation test:	T 59										
Residue by distillation, % by wt.		65	–	65	–	65	–	60	–	60	–
Oil distillate, % by volume of emulsion		–	0.5	–	0.5	–	5	–	0.5	–	0.5
Tests on residue from distillation:											
Penetration, 77°F, 100 g, 5 sec.	T 49	100	140	120	160	300	–	120	160	70	100
Solubility in trichloroethylene, %	T 44	97.5	–	97.5		97.5	–	97.5	–	97.5	–
Ductility, 77°F, 5 cm/min., cm	T 51	100	–	100		–	–	100	–	80	–
Float test, 140°F, sec.	T 50	1,200	–	–		1,200	–	–	–	–	–

1. Applies only when the Engineer designates material for winter use.

Table 8
Cationic Emulsified Asphalt

Property	Test Procedure	Type–Grade											
		Rapid-Setting				Medium-Setting				Slow-Setting			
		CRS-2		CRS-2H		CMS-2		CMS-2S		CSS-1		CSS-1H	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol													
77°F, sec.	T 72	–	–	–	–	–	–	–	–	20	100	20	100
122°F, sec.		150	400	150	400	100	300	100	300	–	–	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1
Cement mixing, %	T 59	–	–	–	–	–	–	–	–	–	2.0	–	2.0
Coating ability and water resistance:													
Dry aggregate/after spray	T 59	–		–		Good/Fair		Good/Fair		–		–	
Wet aggregate/after spray		–		–		Fair/Fair		Fair/Fair		–		–	
Demulsibility, 35 mL of 0.8% Sodium dioctyl sulfosuccinate, %	T 59	70	–	70	–	–	–	–	–	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	1	–	1	–	1	–	1
Particle charge	T 59	Positive		Positive		Positive		Positive		Positive		Positive	
Distillation test:													
Residue by distillation, % by wt.	T 59	65	–	65	–	65	–	65	–	60	–	60	–
Oil distillate, % by volume of emulsion		–	0.5	–	0.5	–	7	–	5	–	0.5	–	0.5
Tests on residue from distillation:													
Penetration, 77°F, 100 g, 5 sec.	T 49	120	160	70	110	120	200	300	–	120	160	70	110
Solubility in trichloroethylene, %	T 44	97.5	–	97.5	–	97.5	–	97.5	–	97.5	–	97.5	–
Ductility, 77°F, 5 cm/min., cm	T 51	100	–	80	–	100	–	–	–	100	–	80	–

Table 9
Polymer-Modified Emulsified Asphalt

Property	Test Procedure	Type–Grade											
		Rapid-Setting				Medium-Setting				Slow-Setting			
		RS-1P		HFRS-2P		AES-150P		AES-300P		AES-300S		SS-1P	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72												
77°F, sec.		–	–	–	–	75	400	75	400	75	400	30	100
122°F, sec.		50	200	150	400	–	–	–	–	–	–	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1
Miscibility	T 59	–		–		–		–		–		Pass	
Coating ability and water resistance:	T 59												
Dry aggregate/after spray		–		–		Good/Fair		Good/Fair		Good/Fair		–	
Wet aggregate/after spray		–		–		Fair/Fair		Fair/Fair		Fair/Fair		–	
Demulsibility, 35 mL of 0.02 N $CaCl_2$, %	T 59	60	–	50	–	–	–	–	–	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	1	–	1	–	1	–	1
Breaking index, g	Tex-542-C	–	80	–	–	–	–	–	–	–	–	–	–
Distillation test:[1]	T 59												
Residue by distillation, % by wt.		65	–	65	–	65	–	65	–	65	–	60	–
Oil distillate, % by volume of emulsion		–	3	–	0.5	–	3	–	5	–	7	–	0.5
Tests on residue from distillation:													
Polymer content, wt. % (solids basis)	Tex-533-C	–	–	3.0	–	–	–	–	–	–	–	3.0	–
Penetration, 77°F, 100 g, 5 sec.	T 49	225	300	90	140	150	300	300	–	300	–	100	140
Solubility in trichloroethylene, %	T 44	97.0	–	97.0	–	97.0	–	97.0	–	97.0	–	97.0	–
Viscosity, 140°F, poise	T 202	–	–	1,500	–	–	–	–	–	–	–	1,300	–
Float test, 140°F, sec.	T 50	–	–	1,200	–	1,200	–	1,200	–	1,200	–	–	–
Ductility,[2] 39.2°F, 5 cm/min., cm	T 51	–	–	50	–	–	–	–	–	–	–	50	–
Elastic recovery,[2] 50°F, %	Tex-539-C	55	–	55	–	–	–	–	–	–	–	–	–
Tests on RTFO curing of distillation residue	Tex-541-C												
Elastic recovery, 50°F, %	Tex-539-C	–	–	–	–	50	–	50	–	30	–	–	–

Property	Test	Type–Grade

1. Exception to T 59: Bring the temperature on the lower thermometer slowly to 350°F ±10°F. Maintain at this temperature for 20 min. Complete total distillation in 60 min. (±5 min.) from the first application of heat.
2. HFRS-2P must meet one of either the ductility or elastic recovery requirements.

Table 10
Polymer-Modified Cationic Emulsified Asphalt

Property	Test Procedure	Type-Grade											
		Rapid-Setting						Medium-Setting				Slow-Setting	
		CRS-1P		CRS-2P		CHFRS-2P		CMS-1P[3]		CMS-2P[3]		CSS-1P	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72												
77°F, sec.		–	–	–	–	–	–	20	100	–	–	20	100
122°F, sec.		50	150	150	400	100	400	–	–	50	400	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1
Demulsibility, 35 mL of 0.8% Sodium dioctyl sulfosuccinate, %	T 59	60	–	70	–	60	–	–	–	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	1	–	–	–	–	–	1
Breaking index, g	Tex-542-C	–	80	–	–	–	–	–	–	–	–	–	–
Particle charge	T 59	Positive		Positive		Positive		Positive		Positive		Positive	
Distillation test:[1]	T 59												
Residue by distillation, % by weight		65	–	65	–	65	–	65	–	65	–	62	–
Oil distillate, % by volume of emulsion		–	3	–	0.5	–	0.5	–	0.5	–	0.5	–	0.5
Tests on residue from distillation:													
Polymer content, wt. % (solids basis)	Tex-533-C	–	–	3.0	–	3.0	–	–	–	–	–	3.0	–
Penetration, 77°F, 100 g, 5 sec.	T 49	225	300	90	150	80	130	40	–	40	–	55	90
Viscosity, 140°F, poise	T 202	–	–	1,300	–	1,300	–	–	5,000	–	5,000	–	–
Solubility in trichloroethylene, %	T 44	97.0	–	97.0	–	95.0	–	–	–	–	–	97.0	–
Softening point, °F	T 53	–	–	–	–	130	–	–	–	–	–	135	–
Ductility, 77°F, 5 cm/min., cm	T 51	–	–	–	–	–	–	–	–	–	–	70	–
Float test, 140°F, sec.	T 50	–	–	–	–	1,800	–	–	–	–	–		
Ductility,[2] 39.2°F, 5 cm/min., cm	T 51	–	–	50	–	–	–	–	–	–	–	–	–
Elastic recovery,[2] 50°F, %	Tex-539-C	45	–	55	–	55	–	45	–	45	–	–	–
Tests on rejuvenating agent:													
Viscosity, 140°F, cSt	T 201	–	–	–	–	–	–	50	175	50	175	–	–
Flash point, C.O.C., °F	T 48	–	–	–	–	–	–	380	–	380	–	–	–
Saturates, % by weight	D2007	–	–	–	–	–	–	–	30	–	30	–	–
Solubility in n-pentane, % by weight	D2007	–	–	–	–	–	–	99	–	99	–	–	–
Tests on rejuvenating agent after TFO or RTFO:	T 240 or T 179												
Weight Change, %		–	–	–	–	–	–	–	6.5	–	6.5	–	–
Viscosity Ratio		–	–	–	–	–	–	–	3.0	–	3.0	–	–
Tests on latex:[4]													
Tensile strength, die C dumbbell, psi	D412[5]	–	–	–	–	–	–	500	–	500	–	–	–
Change in mass after immersion in rejuvenating agent, %	D471	–	–	–	–	–	–	–	40[6]	–	40[6]	–	–

1. Exception to T 59: Bring the temperature on the lower thermometer slowly to 350°F (±0°F). Maintain at this temperature for 20 min. Complete total distillation in 60 min. (±5 min.) from the first application of heat.
2. CRS-2P must meet one of either the ductility or elastic recovery requirements.
3. With all precertification samples of CMS-1P or CMS-2P, submit certified test reports showing that the rejuvenating agent and latex meet the stated requirements. Submit samples of these raw materials if requested by the Engineer.
4. Preparation of latex films: Use any substrate which produces a film of uniform cross-section. Apply latex using a drawdown tool that will deliver enough material to achieve desired residual thickness. Cure films for 14 days at 75°F and 50% relative humidity.
5. Cut samples for tensile strength determination using a crosshead speed of 20 in./min.
6. Specimen must remain intact after exposure and removal of excess rejuvenating agent.

2.5. **Specialty Emulsions**. Provide specialty emulsion that is either asphalt-based or resin-based and meets the requirements of Table 11.

Table 11
Specialty Emulsions

Property	Test Procedure	Type–Grade					
		Medium-Setting				Slow-Setting	
		AE–P		EAP&T		PCE[1]	
		Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72						
77°F, sec.		–	–	–	–	10	100
122°F, sec.		15	150	–	–	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1
Miscibility[2]	T 59	–		Pass		Pass	
Demulsibility, 35 mL of 0.10 N $CaCl_2$, %	T 59	–	70	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	–
Particle size,[5] % by volume < 2.5 μm	Tex-238-F[3]	–	–	90	–	90	–
Asphalt emulsion distillation to 500°F followed by Cutback asphalt distillation of residue to 680°F:	T 59 & T 78						
Residue after both distillations, % by wt.		40	–	–	–	–	–
Total oil distillate from both distillations, % by volume of emulsion		25	40	–	–	–	–
Residue by distillation, % by wt.	T 59	–	–	60	–	–	–
Residue by evaporation,[4] % by wt.	T 59	–	–	–	–	60	–
Tests on residue after all distillation(s):							
Viscosity, 140°F, poise	T 202	–	–	800	–	–	–
Kinematic viscosity,[5] 140°F, cSt	T 201	–	–	–	–	100	350
Flash point C.O.C., °F	T 48	–	–	–	–	400	–
Solubility in trichloroethylene, %	T 44	97.5	–	–	–	–	–
Float test, 122°F, sec.	T 50	50	200	–	–	–	–

Supply with each shipment of PCE:

- a copy of a lab report from an approved analytical lab, signed by a lab official, indicating the PCE formulation does not meet any characteristics of a Resource Conservation Recovery Act (RCRA) hazardous waste;
- a certification from the producer that the formulation supplied does not differ from the one tested and that no listed RCRA hazardous wastes or Polychlorinated Biphenyls (PCBs) have been mixed with the product; and
- a Safety Data Sheet.

Exception to T 59: In dilution, use 350 mL of distilled or deionized water and a 1,000-mL beaker.
Use Tex-238-F, beginning at "Particle Size Analysis by Laser Diffraction," with distilled or deionized water as a medium and no dispersant, or use another approved method.
Exception to T 59: Leave sample in the oven until foaming ceases, then cool and weigh.
PCE must meet either the kinematic viscosity requirement or the particle size requirement.

2.6. **Recycling Agent**. Recycling agent and emulsified recycling agent must meet the requirements in Table 12. Additionally, recycling agent and residue from emulsified recycling agent, when added in the specified proportions to the recycled asphalt, must meet the properties specified on the plans.

Table 12
Recycling Agent and Emulsified Recycling Agent

Property	Test Procedure	Recycling Agent		Emulsified Recycling Agent	
		Min	Max	Min	Max
Viscosity, Saybolt Furol, 77°F, sec.	T 72	–	–	15	100
Sieve test, %	T 59	–	–	–	0.1
Miscibility[1]	T 59	–		No coagulation	
Residue by evaporation,[2] % by wt.	T 59	–	–	60	–
Tests on recycling agent or residue from evaporation:					
Flash point, C.O.C., °F	T 48	400	–	400	–
Kinematic viscosity,	T 201				
140°F, cSt		75	200	75	200
275°F, cSt		–	10.0	–	10.0

2. Exception to T 59: Use 0.02 N CaCl2 solution in place of water.
3. Exception to T 59: Maintain sample at 300°F until foaming ceases, then cool and weigh.

2.7. **Crumb Rubber Modifier**. Crumb rubber modifier (CRM) consists of automobile and truck tires processed by ambient temperature grinding.

CRM must be:

- free from contaminants including fabric, metal, and mineral and other nonrubber substances;
- free-flowing; and
- nonfoaming when added to hot asphalt binder.

Ensure rubber gradation meets the requirements of the grades in Table 13 when tested in accordance with Tex-200-F, Part I, using a 50-g sample.

Table 13
CRM Gradations

Sieve Size (% Passing)	Grade A		Grade B		Grade C		Grade D	Grade E
	Min	Max	Min	Max	Min	Max		
#8	100	–	–	–	–	–	As shown on the plans	As approved
#10	95	100	100	–	–	–		
#16	–	–	70	100	100	–		
#30	–	–	25	60	90	100		
#40	–	–	–	–	45	100		
#50	0	10	–	–	–	–		
#200	–	–	0	5	–	–		

2.8. **Crack Sealer**. Provide polymer-modified asphalt-emulsion crack sealer meeting the requirements of Table 14. Provide rubber-asphalt crack sealer meeting the requirements of Table 15.

Table 14
Polymer-Modified Asphalt-Emulsion Crack Sealer

Property	Test Procedure	Min	Max
Rotational viscosity, 77°F, cP	D 2196, Method A	10,000	25,000
Sieve test, %	T 59	–	0.1
Storage stability, 1 day, %	T 59	–	1
Evaporation	Tex-543-C		
Residue by evaporation, % by wt.		65	–
Tests on residue from evaporation:			
Penetration, 77°F, 100 g, 5 sec.	T 49	35	75
Softening point, °F	T 53	140	–
Ductility, 39.2°F, 5 cm/min., cm	T 51	100	–

Table 15
Rubber-Asphalt Crack Sealer

Property	Test Procedure	Class A		Class B	
		Min	Max	Min	Max
CRM content, Grade A or B, % by wt.	Tex-544-C	22	26	–	–
CRM content, Grade B, % by wt.	Tex-544-C	–	–	13	17
Virgin rubber content,[1] % by wt.		–	–	2	–
Flash point,[2] C.O.C., °F	T 48	400	–	400	–
Penetration,[3] 77°F, 150 g, 5 sec.	T 49	30	50	30	50
Penetration,[3] 32°F, 200 g, 60 sec.	T 49	12	–	12	–
Softening point, °F	T 53	–	–	170	–
Bond Test, non-immersed, 0.5 in specimen, 50% extension, 20°F[4]	D5329	–		Pass	

1. Provide certification that the Min % virgin rubber was added.
2. Agitate the sealing compound with a 3/8- to 1/2-in. (9.5- to 12.7-mm) wide, square-end metal spatula to bring the material on the bottom of the cup to the surface (i.e., turn the material over) before passing the test flame over the cup. Start at one side of the thermometer, move around to the other, and then return to the starting point using 8 to 10 rapid circular strokes. Accomplish agitation in 3 to 4 sec. Pass the test flame over the cup immediately after stirring is completed.
3. Exception to T 49: Substitute the cone specified in D 217 for the penetration needle.
4. Allow no crack in the crack sealing materials or break in the bond between the sealer and the mortar blocks over 1/4 in. deep for any specimen after completion of the test.

2.9. **Asphalt-Rubber Binders**. Provide asphalt-rubber (A-R) binders that are mixtures of asphalt binder and CRM, which have been reacted at elevated temperatures. Provide A-R binders meeting D6114 and containing a minimum of 15% CRM by weight. Provide Types I or II, containing CRM Grade C, for use in hot-mixed aggregate mixtures. Provide Types II or III, containing CRM Grade B, for use in surface treatment binder. Ensure binder properties meet the requirements of Table 16.

Table 16
A-R Binders

Property	Test Procedure	Binder Type					
		Type I		Type II		Type III	
		Min	Max	Min	Max	Min	Max
Apparent viscosity, 347°F, cP	D2196, Method A	1,500	5,000	1,500	5,000	1,500	5,000
Penetration, 77°F, 100 g, 5 sec.	T 49	25	75	25	75	50	100
Penetration, 39.2°F, 200 g, 60 sec.	T 49	10	–	15	–	25	–
Softening point, °F	T 53	135	–	130	–	125	–
Resilience, 77°F, %	D5329	25	–	20	–	10	–
Flash point, C.O.C., °F	T 48	450	–	450	–	450	–
Tests on residue from Thin-Film Oven Test:	T 179						
Retained penetration ratio, 39.2°F, 200 g, 60 sec., % of original	T 49	75	–	75	–	75	–

2.10. **Performance-Graded Binders**. Provide PG binders that are smooth and homogeneous, show no separation when tested in accordance with Tex-540-C, and meet the requirements of Table 17.

Separation testing is not required if:

- a modifier is introduced separately at the mix plant either by injection in the asphalt line or mixer,
- the binder is blended on site in continuously agitated tanks, or
- binder acceptance is based on field samples taken from an in-line sampling port at the hot-mix plant after the addition of modifiers.

Table 17
Performance-Graded Binders

Property and Test Method	Performance Grade																		
	PG 58			PG 64				PG 70				PG 76				PG 82		
	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28
Average 7-day max pavement design temperature, °C[1]	< 58			< 64				< 70				< 76				< 82		
Min pavement design temperature, °C[1]	>-22	>-28	>-34	>-16	>-22	>-28	>-34	>-16	>-22	>-28	>-34	>-16	>-22	>-28	>-34	>-16	>-22	>-28
Original Binder																		
Flash point, T 48, Min, °C	230																	
Viscosity, T 316:[2,3] Max, 3.0 Pa·s, test temperature, °C	135																	
Dynamic shear, T 315:[4] G*/sin(δ), Min, 1.00 kPa, Max, 2.00 kPa,[7] Test temperature @ 10 rad/sec., °C	58			64				70				76				82		
Elastic recovery, D 6084, 50°F, % Min	–	–	30	–	–	30	50	–	30	50	60	30	50	60	70	50	60	70
Rolling Thin-Film Oven (Tex-541-C)																		
Mass loss, Tex-541-C, Max, %	1.0																	
Dynamic shear, T 315: G*/sin(δ), Min, 2.20 kPa, Max, 5.00 kPa,[7] Test temperature @ 10 rad/sec., °C	58			64				70				76				82		
Pressure Aging Vessel (PAV) Residue (R 28)																		
PAV aging temperature, °C	100																	
Dynamic shear, T 315: G*sin(δ), Max, 5,000 kPa Test temperature @ 10 rad/sec., °C	25	22	19	28	25	22	19	28	25	22	19	28	25	22	19	28	25	22
Creep stiffness, T 313:[5,6] *S*, max, 300 MPa, *m*-value, Min, 0.300 Test temperature @ 60 sec., °C	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18
Direct tension, T 314:[6] Failure strain, Min, 1.0% Test temperature @ 1.0 mm/min., °C	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18

1. Pavement temperatures are estimated from air temperatures using an algorithm contained in a Department-supplied computer program, may be provided by the Department, or by following the procedures outlined in AASHTO MP 2 and PP 28.
2. This requirement may be waived at the Department's discretion if the supplier warrants that the asphalt binder can be adequately pumped, mixed, and compacted at temperatures that meet all applicable safety, environmental, and constructability requirements. At test temperatures where the binder is a Newtonian fluid, any suitable standard means of viscosity measurement may be used, including capillary (T 201 or T 202) or rotational viscometry (T 316).
3. Viscosity at 135°C is an indicator of mixing and compaction temperatures that can be expected in the lab and field. High values may indicate high mixing and compaction temperatures. Additionally, significant variation can occur from batch to batch. Contractors should be aware that variation could significantly impact their mixing and compaction operations. Contractors are therefore responsible for addressing any constructability issues that may arise.
4. For quality control of unmodified asphalt binder production, measurement of the viscosity of the original asphalt binder may be substituted for dynamic shear measurements of G*/sin(δ) at test temperatures where the asphalt is a Newtonian fluid. Any suitable standard means of viscosity measurement may be used, including capillary (T 201 or T 202) or rotational viscometry (T 316).
5. Silicone beam molds, as described in AASHTO TP 1-93, are acceptable for use.
6. If creep stiffness is below 300 MPa, direct tension test is not required. If creep stiffness is between 300 and 600 MPa, the direct tension failure strain requirement can be used instead of the creep stiffness requirement. The m-value requirement must be satisfied in both cases.
7. Maximum values for unaged and RTFO aged dynamic shear apply only to materials used as substitute binders, as described in specification Items 340, "Dense-Graded Hot-Mix Asphalt (Small Quantity)," 341, "Dense-Graded Hot-Mix Asphalt," and 344, "Superpave Mixtures."

3. EQUIPMENT

Provide all equipment necessary to transport, store, sample, heat, apply, and incorporate asphalts, oils, and emulsions.

4. CONSTRUCTION

Typical Material Use. Use materials shown in Table 18, unless otherwise determined by the Engineer.

Table 18
Typical Material Use

Material Application	Typically Used Materials
Hot-mixed, hot-laid asphalt mixtures	PG binders, A-R binders Types I and II
Surface treatment	AC-5, AC-10, AC-5 w/2% SBR, AC-10 w/2% SBR, AC-15P, AC-20XP, AC-10-2TR, AC-20-5TR, HFRS-2, MS-2, CRS-2, CRS-2H, HFRS-2P,CRS-2P, CHFRS-2P, A-R binders Types II and III
Surface treatment (cool weather)	RS-1P, CRS-1P, RC-250, RC-800, RC-3000, MC-250, MC-800, MC-3000, MC-2400L
Precoating	AC-5, AC-10, PG 64-22, SS-1, SS-1H, CSS-1, CSS-1H
Tack coat	PG Binders, SS-1H, CSS-1H, EAP&T
Fog seal	SS-1, SS-1H, CSS-1, CSS-1H
Hot-mixed, cold-laid asphalt mixtures	AC-0.6, AC-1.5, AC-3, AES-300, AES-300P, CMS-2, CMS-2S
Patching mix	MC-800, SCM I, SCM II, AES-300S
Recycling	AC-0.6, AC-1.5, AC-3, AES-150P, AES-300P, recycling agent, emulsified recycling agent
Crack sealing	SS-1P, polymer mod AE crack sealant, rubber asphalt crack sealers (Class A, Class B)
Microsurfacing	CSS-1P
Prime	MC-30, AE-P, EAP&T, PCE
Curing membrane	SS-1, SS-1H, CSS-1, CSS-1H, PCE
Erosion control	SS-1, SS-1H, CSS-1, CSS-1H, PCE

4.1. **Storage and Application Temperatures**. Use storage and application temperatures in accordance with Table 19. Store and apply materials at the lowest temperature yielding satisfactory results. Follow the manufacturer's instructions for any agitation requirements in storage. Manufacturer's instructions regarding recommended application and storage temperatures supersede those of Table 19.

Table 19
Storage and Application Temperatures

Type–Grade	Application		Storage
	Recommended Range (°F)	Maximum Allowable (°F)	Maximum (°F)
AC-0.6, AC-1.5, AC-3	200–300	350	350
AC-5, AC-10	275–350	350	350
AC-5 w/2% SBR, AC-10 w/2% SBR, AC-15P, AC-20-5TR	300–375	375	360
RC-250	125–180	200	200
RC-800	170–230	260	260
RC-3000	215–275	285	285
MC-30, AE-P	70–150	175	175
MC-250	125–210	240	240
MC-800, SCM I, SCM II	175–260	275	275
MC-3000, MC-2400L	225–275	290	290
HFRS-2, MS-2, CRS-2, CRS-2H, HFRS-2P, CRS-2P, CMS-2, CMS-2S, AES-300, AES-300S, AES-150P, AES-300P	120–160	180	180
SS-1, SS-1H, CSS-1, CSS-1H, PCE, EAP&T, SS-1P, RS-1P, CRS-1P, CSS-1P, recycling agent, emulsified recycling agent, polymer mod AE crack sealant	50–130	140	140
PG binders	275–350	350	350
Rubber asphalt crack sealers (Class A, Class B)	350–375	400	–
A-R binders Types I, II, and III	325–425	425	425

5. MEASUREMENT AND PAYMENT

The work performed, materials furnished, equipment, labor, tools, and incidentals will not be measured or paid for directly but is subsidiary or is included in payment for other pertinent Items.

Item 340
Dense-Graded Hot-Mix Asphalt (Small Quantity)

1. DESCRIPTION

Construct a hot-mix asphalt (HMA) pavement layer composed of a compacted, dense-graded mixture of aggregate and asphalt binder mixed hot in a mixing plant. This specification is intended for small quantity (SQ) HMA projects, typically under 5,000 tons total production.

2. MATERIALS

Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications.

Notify the Engineer of all material sources and before changing any material source or formulation. The Engineer 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 Engineer may sample and test project materials at any time during the project to verify specification compliance in accordance with Item 6, "Control of Materials."

2.1. **Aggregate**. Furnish aggregates from sources that conform to the requirements shown in Table 1 and as specified in this Section. Aggregate requirements in this Section, including those shown in Table 1, may be modified or eliminated when shown on the plans. Additional aggregate requirements may be specified when shown on the plans. Provide aggregate stockpiles that meet the definitions in this Section for coarse, intermediate, or fine aggregate. Aggregate from reclaimed asphalt pavement (RAP) is not required to meet Table 1 requirements unless otherwise shown on the plans. Supply aggregates that meet the definitions in Tex-100-E for crushed gravel or crushed stone. The Engineer will designate the plant or the quarry as the sampling location. Provide samples from materials produced for the project. The Engineer will establish the Surface Aggregate Classification (SAC) and perform Los Angeles abrasion, magnesium sulfate soundness, and Micro-Deval tests. Perform all other aggregate quality tests listed in Table 1. Document all test results on the mixture design report. The Engineer may perform tests on independent or split samples to verify Contractor test results. Stockpile aggregates for each source and type separately. Determine aggregate gradations for mixture design and production testing based on the washed sieve analysis given in Tex-200-F, Part II.

2.1.1. **Coarse Aggregate**. Coarse aggregate stockpiles must have no more than 20% material passing the No. 8 sieve. Aggregates from sources listed in the Department'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.

For sources not listed on the Department's BRSQC:

- build an individual stockpile for each material;
- request the Department test the stockpile for specification compliance; and
- once approved, do not add material to the stockpile unless otherwise approved.

Provide aggregate from non-listed sources only when tested by the Engineer and approved before use. Allow 30 calendar days for the Engineer to sample, test, and report results for non-listed sources.

Provide coarse aggregate with at least the minimum SAC shown on the plans. SAC requirements only apply to aggregates used on the surface of travel lanes. SAC requirements apply to aggregates used on surfaces other than travel lanes when shown on the plans. The SAC for sources on the Department's *Aggregate Quality Monitoring Program* (AQMP) (Tex-499-A) is listed in the BRSQC.

2.1.1.1. **Blending Class A and Class B Aggregates**. Class B aggregate meeting all other requirements in Table 1 may be blended with a Class A aggregate to meet requirements for Class A materials. Ensure that at least 50% by weight, or volume if required, of the material retained on the No. 4 sieve comes from the Class A aggregate source when blending Class A and B aggregates to meet a Class A requirement. Blend by volume if the bulk specific gravities of the Class A and B aggregates differ by more than 0.300. Coarse aggregate from RAP and Recycled Asphalt Shingles (RAS) will be considered as Class B aggregate for blending purposes.

The Engineer may perform tests at any time during production, when the Contractor blends Class A and B aggregates to meet a Class A requirement, to ensure that at least 50% by weight, or volume if required, of the material retained on the No. 4 sieve comes from the Class A aggregate source. The Engineer will use the Department's mix design template, when electing to verify conformance, to calculate the percent of Class A aggregate retained on the No. 4 sieve by inputting the bin percentages shown from readouts in the control room at the time of production and stockpile gradations measured at the time of production. The Engineer may determine the gradations based on either washed or dry sieve analysis from samples obtained from individual aggregate cold feed bins or aggregate stockpiles. The Engineer may perform spot checks using the gradations supplied by the Contractor on the mixture design report as an input for the template; however, a failing spot check will require confirmation with a stockpile gradation determined by the Engineer.

2.1.2. **Intermediate Aggregate**. 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 Engineer 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 Table 1 unless otherwise approved.

Test the stockpile if 10% or more of the stockpile is retained on the No. 4 sieve, and verify that it meets the requirements in Table 1 for crushed face count (Tex-460-A) and flat and elongated particles (Tex-280-F).

2.1.3. **Fine Aggregate**. Fine aggregates consist of manufactured sands, screenings, and field sands. Fine aggregate stockpiles must meet the gradation requirements in Table 2. Supply fine aggregates that are free from organic impurities. The Engineer 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 uncrushed fine aggregate. Use fine aggregate, with the exception of field sand, from coarse aggregate sources that meet the requirements shown in Table 1 unless otherwise approved.

Test the stockpile if 10% or more of the stockpile is retained on the No. 4 sieve, and verify that it meets the requirements in Table 1 for crushed face count (Tex-460-A) and flat and elongated particles (Tex-280-F).

Table 1
Aggregate Quality Requirements

Property	Test Method	Requirement
Coarse Aggregate		
SAC	Tex-499-A (AQMP)	As shown on the plans
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,[2] %, Min	Tex-460-A, Part I	85
Flat and elongated particles @ 5:1, %, Max	Tex-280-F	10
Fine Aggregate		
Linear shrinkage, %, Max	Tex-107-E	3
Combined Aggregate[3]		
Sand equivalent, %, Min	Tex-203-F	45

1. Not used for acceptance purposes. Optional test used by the Engineer as an indicator of the need for further investigation.
2. Only applies to crushed gravel.
3. Aggregates, without mineral filler, RAP, RAS, or additives, combined as used in the job-mix formula (JMF).

Table 2
Gradation Requirements for Fine Aggregate

Sieve Size	% Passing by Weight or Volume
3/8"	100
#8	70–100
#200	0–30

2.2. **Mineral Filler**. 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 unless otherwise shown on the plans. Use no more than 1% hydrated lime if a substitute binder is used unless otherwise shown on the plans or allowed. 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:

- is sufficiently dry, free-flowing, and free from clumps and foreign matter as determined by the Engineer;
- does not exceed 3% linear shrinkage when tested in accordance with Tex-107-E; and
- meets the gradation requirements in Table 3.

Table 3
Gradation Requirements for Mineral Filler

Sieve Size	% Passing by Weight or Volume
#8	100
#200	55–100

2.3. **Baghouse Fines**. Fines collected by the baghouse or other dust-collecting equipment may be reintroduced into the mixing drum.

2.4. **Asphalt Binder**. Furnish the type and grade of performance-graded (PG) asphalt specified on the plans.

2.5. **Tack Coat**. 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 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.

The Engineer will obtain at least one sample of the tack coat binder per project in accordance with Tex-500-C, Part III, and test it to verify compliance with Item 300, “Asphalts, Oils, and Emulsions.” The Engineer will obtain the sample from the asphalt distributor immediately before use.

2.6. **Additives**. 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. Provide the Engineer with documentation, such as the bill of lading, showing the quantity of additives used in the project unless otherwise directed.

2.6.1. **Lime and Liquid Antistripping Agent**. When lime or a liquid antistripping agent is used, add in accordance with 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.

2.6.2. **Warm Mix Asphalt (WMA)**. Warm Mix Asphalt (WMA) is defined as HMA that is produced within a target temperature discharge range of 215°F and 275°F using approved WMA additives or processes from the Department's MPL.

WMA is allowed for use on all projects and is required when shown on the plans. When WMA is required, the maximum placement or target discharge temperature for WMA will be set at a value below 275°F.

Department-approved WMA additives or processes may be used to facilitate mixing and compaction of HMA produced at target discharge temperatures above 275°F; however, such mixtures will not be defined as WMA.

2.7. **Recycled Materials**. 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 Table 4. The allowable percentages shown in Table 4 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 Engineer 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 Table 5 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.

Surface, intermediate, and base mixes referenced in Tables 4 and 5 are defined as follows:

- **Surface**. The final HMA lift placed at or near the top of the pavement structure;
- **Intermediate**. Mixtures placed below an HMA surface mix and less than or equal to 8.0 in. from the riding surface; and
- **Base**. Mixtures placed greater than 8.0 in. from the riding surface.

2.7.1. **RAP**. RAP is salvaged, milled, pulverized, broken, or crushed asphalt pavement. Crush or break RAP so that 100% of the particles pass the 2 in. sieve. Fractionated RAP is defined as 2 or more RAP stockpiles, divided into coarse and fine fractions.

Use of Contractor-owned RAP, including HMA plant waste, is permitted unless otherwise shown on the plans. Department-owned RAP stockpiles are available for the Contractor's use when the stockpile locations are shown on the plans. If Department-owned RAP is available for the Contractor's use, the Contractor may use Contractor-owned fractionated RAP and replace it with an equal quantity of Department-owned RAP. This allowance does not apply to a Contractor using unfractionated RAP. Department-owned RAP generated through required work on the Contract is available for the Contractor's use when shown on the plans. Perform any necessary tests to ensure Contractor- or Department-owned RAP is appropriate for use. The Department will not perform any tests or assume any liability for the quality of the Department-owned RAP unless otherwise shown on the plans. The Contractor will retain ownership of RAP generated on the project when shown on the plans.

The coarse RAP stockpile will contain only material retained by processing over a 3/8-in. or 1/2-in. screen unless otherwise approved. The fine RAP stockpile will contain only material passing the 3/8-in. or 1/2-in. screen unless otherwise approved. The Engineer may allow the Contractor to use an alternate to the 3/8-in.

or 1/2-in. screen to fractionate the RAP. The maximum percentages of fractionated RAP may be comprised of coarse or fine fractionated RAP or the combination of both coarse and fine fractionated RAP.

Do not use Department- or Contractor-owned RAP contaminated with dirt or other objectionable materials. Do not use Department- or Contractor-owned RAP if the decantation value exceeds 5% and the plasticity index is greater than 8. Test the stockpiled RAP for decantation in accordance with Tex-406-A, Part I. Determine the plasticity index in accordance with Tex-106-E if the decantation value exceeds 5%. The decantation and plasticity index requirements do not apply to RAP samples with asphalt removed by extraction or ignition.

Do not intermingle Contractor-owned RAP stockpiles with Department-owned RAP stockpiles. Remove unused Contractor-owned RAP material from the project site upon completion of the project. Return unused Department-owned RAP to the designated stockpile location.

Table 4
Maximum Allowable Amounts of RAP[1]

Maximum Allowable Fractionated RAP[2] (%)			Maximum Allowable Unfractionated RAP[3] (%)		
Surface	**Intermediate**	**Base**	**Surface**	**Intermediate**	**Base**
20.0	30.0	40.0	10.0	10.0	10.0

1. Must also meet the recycled binder to total binder ratio shown in Table 5.
2. Up to 5% RAS may be used separately or as a replacement for fractionated RAP.
3. Unfractionated RAP may not be combined with fractionated RAP or RAS.

2.7.2. **RAS**. Use of post-manufactured RAS or post-consumer RAS (tear-offs) is permitted unless otherwise shown on the plans. Up to 5% RAS may be used separately or as a replacement for fractionated RAP in accordance with Table 4 and Table 5. RAS is defined as processed asphalt shingle material from manufacturing of asphalt roofing shingles or from re-roofing residential structures. Post-manufactured RAS is processed manufacturer's shingle scrap by-product. Post-consumer RAS is processed shingle scrap removed from residential structures. Comply with all regulatory requirements stipulated for RAS by the TCEQ. RAS may be used separately or in conjunction with RAP.

Process the RAS by ambient grinding or granulating such that 100% of the particles pass the 3/8 in. sieve when tested in accordance with Tex-200-F, Part I. Perform a sieve analysis on processed RAS material before extraction (or ignition) of the asphalt binder.

Add sand meeting the requirements of Table 1 and Table 2 or fine RAP to RAS stockpiles if needed to keep the processed material workable. Any stockpile that contains RAS will be considered a RAS stockpile and be limited to no more than 5.0% of the HMA mixture in accordance with Table 4.

Certify compliance of the RAS with DMS-11000, "Evaluating and Using Nonhazardous Recyclable Materials Guidelines." Treat RAS as an established nonhazardous recyclable material if it has not come into contact with any hazardous materials. Use RAS from shingle sources on the Department's MPL. Remove substantially all materials before use that are not part of the shingle, such as wood, paper, metal, plastic, and felt paper. Determine the deleterious content of RAS material for mixture design purposes in accordance with Tex-217-F, Part III. Do not use RAS if deleterious materials are more than 0.5% of the stockpiled RAS unless otherwise approved. Submit a sample for approval before submitting the mixture design. The Department will perform the testing for deleterious material of RAS to determine specification compliance.

2.8. **Substitute Binders**. Unless otherwise shown on the plans, the Contractor may use a substitute PG binder listed in Table 5 instead of the PG binder originally specified, if the substitute PG binder and mixture made with the substitute PG binder meet the following:

- the substitute binder meets the specification requirements for the substitute binder grade in accordance with Section 300.2.10., "Performance-Graded Binders;" and
- the mixture has less than 10.0 mm of rutting on the Hamburg Wheel test (Tex-242-F) after the number of passes required for the originally specified binder. Use of substitute PG binders may only be allowed at the discretion of the Engineer if the Hamburg Wheel test results are between 10.0 mm and 12.5 mm.

Table 5
Allowable Substitute PG Binders and Maximum Recycled Binder Ratios

Originally Specified PG Binder	Allowable Substitute PG Binder	Maximum Ratio of Recycled Binder[1] to Total Binder (%)		
		Surface	Intermediate	Base
HMA				
76-22[2]	70-22 or 64-22	20.0	20.0	20.0
	70-28 or 64-28	30.0	35.0	40.0
70-22[2]	64-22	20.0	20.0	20.0
	64-28 or 58-28	30.0	35.0	40.0
64-22[2]	58-28	30.0	35.0	40.0
76-28[2]	70-28 or 64-28	20.0	20.0	20.0
	64-34	30.0	35.0	40.0
70-28[2]	64-28 or 58-28	20.0	20.0	20.0
	64-34 or 58-34	30.0	35.0	40.0
64-28[2]	58-28	20.0	20.0	20.0
	58-34	30.0	35.0	40.0
WMA[3]				
76-22[2]	70-22 or 64-22	30.0	35.0	40.0
70-22[2]	64-22 or 58-28	30.0	35.0	40.0
64-22[4]	58-28	30.0	35.0	40.0
76-28[2]	70-28 or 64-28	30.0	35.0	40.0
70-28[2]	64-28 or 58-28	30.0	35.0	40.0
64-28[4]	58-28	30.0	35.0	40.0

1. Combined recycled binder from RAP and RAS.
2. Use no more than 20.0% recycled binder when using this originally specified PG binder.
3. WMA as defined in Section 340.2.6.2., "Warm Mix Asphalt (WMA)."
4. When used with WMA, this originally specified PG binder is allowed for use at the maximum recycled binder ratios shown in this table.

3. EQUIPMENT

Provide required or necessary equipment in accordance with Item 320, "Equipment for Asphalt Concrete Pavement."

4. CONSTRUCTION

Produce, haul, place, and compact the specified paving mixture. In addition to tests required by the specification, Contractors may perform other QC tests as deemed necessary. At any time during the project, the Engineer may perform production and placement tests as deemed necessary in accordance with Item 5, "Control of the Work." Schedule and participate in a pre-paving meeting with the Engineer on or before the first day of paving unless otherwise directed.

4.1. **Certification**. Personnel certified by the Department-approved hot-mix asphalt certification program must conduct all mixture designs, sampling, and testing in accordance with Table 6. Supply the Engineer with a list of certified personnel and copies of their current certificates before beginning production and when personnel changes are made. Provide a mixture design developed and signed by a Level 2 certified specialist.

Table 6
Test Methods, Test Responsibility, and Minimum Certification Levels

Test Description	Test Method	Contractor	Engineer	Level[1]
1. Aggregate and Recycled Material Testing				
Sampling	Tex-221-F	✓	✓	1A
Dry sieve	Tex-200-F, Part I	✓	✓	1A
Washed sieve	Tex-200-F, Part II	✓	✓	1A
Deleterious material	Tex-217-F, Parts I & III	✓	✓	1A
Decantation	Tex-217-F, Part II	✓	✓	1A
Los Angeles abrasion	Tex-410-A		✓	TxDOT
Magnesium sulfate soundness	Tex-411-A		✓	TxDOT
Micro-Deval abrasion	Tex-461-A		✓	2
Crushed face count	Tex-460-A	✓	✓	2
Flat and elongated particles	Tex-280-F	✓	✓	2
Linear shrinkage	Tex-107-E	✓	✓	2
Sand equivalent	Tex-203-F	✓	✓	2
Organic impurities	Tex-408-A	✓	✓	2
2. Asphalt Binder & Tack Coat Sampling				
Asphalt binder sampling	Tex-500-C, Part II	✓	✓	1A/1B
Tack coat sampling	Tex-500-C, Part III	✓	✓	1A/1B
3. Mix Design & Verification				
Design and JMF changes	Tex-204-F	✓	✓	2
Mixing	Tex-205-F	✓	✓	2
Molding (TGC)	Tex-206-F	✓	✓	1A
Molding (SGC)	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F	✓	✓	1A
VMA[2] (calculation only)	Tex-204-F	✓	✓	2
Rice gravity	Tex-227-F	✓	✓	1A
Ignition oven correction factors[3]	Tex-236-F	✓	✓	2
Indirect tensile strength	Tex-226-F	✓	✓	2
Hamburg Wheel test	Tex-242-F	✓	✓	2
Boil test	Tex-530-C	✓	✓	1A
4. Production Testing				
Mixture sampling	Tex-222-F	✓	✓	1A
Molding (TGC)	Tex-206-F		✓	1A
Molding (SGC)	Tex-241-F		✓	1A
Laboratory-molded density	Tex-207-F		✓	1A
VMA[2] (calculation only)	Tex-204-F		✓	1A
Rice gravity	Tex-227-F		✓	1A
Gradation & asphalt binder content[3]	Tex-236-F		✓	1A
Moisture content	Tex-212-F		✓	1A
Hamburg Wheel test	Tex-242-F		✓	2
Boil test	Tex-530-C		✓	1A
5. Placement Testing				
Trimming roadway cores	Tex-207-F	✓	✓	1A/1B
In-place air voids	Tex-207-F		✓	1A/1B
Establish rolling pattern	Tex-207-F	✓		1B
Ride quality measurement	Tex-1001-S	✓	✓	Note 4

1. Level 1A, 1B, and 2 are certification levels provided by the Hot Mix Asphalt Center certification program.
2. Voids in mineral aggregates.
3. Refer to Section 340.4.8.3., "Production Testing," for exceptions to using an ignition oven.
4. Profiler and operator are required to be certified at the Texas A&M Transportation Institute facility when Surface Test Type B is specified.

4.2. **Reporting, Testing, and Responsibilities**. Use Department-provided templates to record and calculate all test data pertaining to the mixture design. The Engineer will use Department templates for any production and placement testing. Obtain the current version of the templates at http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/site-manager.html or from the Engineer.

The maximum allowable time for the Engineer to exchange test data with the Contractor is as given in Table 7 unless otherwise approved. The Engineer will immediately report to the Contractor any test result that requires suspension of production or placement or that fails to meet the specification requirements.

Subsequent mix placed after test results are available to the Contractor, which require suspension of operations, may be considered unauthorized work. Unauthorized work will be accepted or rejected at the discretion of the Engineer in accordance with Article 5.3., "Conformity with Plans, Specifications, and Special Provisions."

Table 7
Reporting Schedule

Description	Reported By	Reported To	To Be Reported Within
Production Testing			
Gradation	Engineer	Contractor	1 working day of completion of the test
Asphalt binder content			
Laboratory-molded density			
VMA (calculation)			
Hamburg Wheel test			
Moisture content			
Boil test			
Binder tests			
Placement Testing			
In-place air voids	Engineer	Contractor	1 working day of completion of the test[1]

1. 2 days are allowed if cores cannot be dried to constant weight within 1 day.

4.3. **Mixture Design**.

4.3.1. **Design Requirements**. The Contractor may design the mixture using a Texas Gyratory Compactor (TGC) or a Superpave Gyratory Compactor (SGC) unless otherwise shown on the plans. Use the dense-graded design procedure provided in Tex-204-F. Design the mixture to meet the requirements listed in Tables 1, 2, 3, 4, 5, 8, 9, and 10.

4.3.1.1. **Target Laboratory-Molded Density When The TGC Is Used**. Design the mixture at a 96.5% target laboratory-molded density. Increase the target laboratory-molded density to 97.0% or 97.5% at the Contractor's discretion or when shown on the plans or specification.

4.3.1.2. **Design Number of Gyrations (Ndesign) When The SGC Is Used**. Design the mixture at 50 gyrations (Ndesign). Use a target laboratory-molded density of 96.0% to design the mixture; however, adjustments can be made to the Ndesign value as noted in Table 9. The Ndesign level may be reduced to no less than 35 gyrations at the Contractor's discretion.

Use an approved laboratory from the Department's MPL to perform the Hamburg Wheel test in accordance with Tex-242-F, and provide results with the mixture design, or provide the laboratory mixture and request that the Department perform the Hamburg Wheel test. The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel test results on the laboratory mixture design.

The Engineer will provide the mixture design when shown on the plans. The Contractor may submit a new mixture design at any time during the project. The Engineer will verify and approve all mixture designs (JMF1) before the Contractor can begin production.

Provide the Engineer with a mixture design report using the Department-provided template. Include the following items in the report:

- the combined aggregate gradation, source, specific gravity, and percent of each material used;
- asphalt binder content and aggregate gradation of RAP and RAS stockpiles;
- the target laboratory-molded density (or Ndesign level when using the SGC);
- results of all applicable tests;

- the mixing and molding temperatures;
- the signature of the Level 2 person or persons that performed the design;
- the date the mixture design was performed; and
- a unique identification number for the mixture design.

Table 8
Master Gradation Limits (% Passing by Weight or Volume) and VMA Requirements

Sieve Size	A Coarse Base	B Fine Base	C Coarse Surface	D Fine Surface	F Fine Mixture
2"	100.0[1]	–	–	–	–
1-1/2"	98.0–100.0	100.0[1]	–	–	–
1"	78.0–94.0	98.0–100.0	100.0[1]	–	–
3/4"	64.0–85.0	84.0–98.0	95.0–100.0	100.0[1]	–
1/2"	50.0–70.0	–	–	98.0–100.0	100.0[1]
3/8"	–	60.0–80.0	70.0–85.0	85.0–100.0	98.0–100.0
#4	30.0–50.0	40.0–60.0	43.0–63.0	50.0–70.0	70.0–90.0
#8	22.0–36.0	29.0–43.0	32.0–44.0	35.0–46.0	38.0–48.0
#30	8.0–23.0	13.0–28.0	14.0–28.0	15.0–29.0	12.0–27.0
#50	3.0–19.0	6.0–20.0	7.0–21.0	7.0–20.0	6.0–19.0
#200	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0
Design VMA, % Minimum					
–	12.0	13.0	14.0	15.0	16.0
Production (Plant-Produced) VMA, % Minimum					
–	11.5	12.5	13.5	14.5	15.5

1. Defined as maximum sieve size. No tolerance allowed.

Table 9
Laboratory Mixture Design Properties

Mixture Property	Test Method	Requirement
Target laboratory-molded density, % (TGC)	Tex-207-F	96.5[1]
Design gyrations (Ndesign for SGC)	Tex-241-F	50[2]
Indirect tensile strength (dry), psi	Tex-226-F	85–200[3]
Boil test[4]	Tex-530-C	–

1. Increase to 97.0% or 97.5% at the Contractor's discretion or when shown on the plans or specification.
2. Adjust within a range of 35–100 gyrations when shown on the plans or specification or when mutually agreed between the Engineer and Contractor.
3. The Engineer may allow the IDT strength to exceed 200 psi if the corresponding Hamburg Wheel rut depth is greater than 3.0 mm and less than 12.5 mm.
4. Used to establish baseline for comparison to production results. May be waived when approved.

Table 10
Hamburg Wheel Test Requirements

High-Temperature Binder Grade	Test Method	Minimum # of Passes @ 12.5 mm[1] Rut Depth, Tested @ 50°C
PG 64 or lower	Tex-242-F	10,000[2]
PG 70		15,000[3]
PG 76 or higher		20,000

1. When the rut depth at the required minimum number of passes is less than 3 mm, the Engineer may require the Contractor to increase the target laboratory-molded density (TGC) by 0.5% to no more than 97.5% or lower the Ndesign level (SGC) to no less than 35 gyrations.
2. May be decreased to no less than 5,000 passes when shown on the plans.
3. May be decreased to no less than 10,000 passes when shown on the plans.

4.3.2. **Job-Mix Formula Approval**. The job-mix formula (JMF) is the combined aggregate gradation, target laboratory-molded density (or Ndesign level), and target asphalt percentage used to establish target values for hot-mix production. JMF1 is the original laboratory mixture design used to produce the trial batch. When

WMA is used, JMF1 may be designed and submitted to the Engineer without including the WMA additive. When WMA is used, document the additive or process used and recommended rate on the JMF1 submittal. Furnish a mix design report (JMF1) with representative samples of all component materials and request approval to produce the trial batch. Provide approximately 10,000 g of the design mixture and request that the Department perform the Hamburg Wheel test if opting to have the Department perform the test. The Engineer will verify JMF1 based on plant-produced mixture from the trial batch unless otherwise determined. The Engineer may accept an existing mixture design previously used on a Department project and may waive the trial batch to verify JMF1. Provide split samples of the mixtures and blank samples used to determine the ignition oven correction factors. The Engineer will determine the aggregate and asphalt correction factors from the ignition oven used for production testing in accordance with Tex-236-F.

The Engineer will use a TGC calibrated in accordance with Tex-914-K in molding production samples. Provide an SGC at the Engineer's field laboratory for use in molding production samples if the SGC is used to design the mix.

The Engineer may perform Tex-530-C and retain the tested sample for comparison purposes during production. The Engineer may waive the requirement for the boil test.

4.3.3. **JMF Adjustments**. If JMF adjustments are necessary to achieve the specified requirements, the adjusted JMF must:

- be provided to the Engineer in writing before the start of a new lot;
- be numbered in sequence to the previous JMF;
- meet the mixture requirements in Table 4 and Table 5;
- meet the master gradation limits shown in Table 8; and
- be within the operational tolerances of the current JMF listed in Table 11.

The Engineer may adjust the asphalt binder content to maintain desirable laboratory density near the optimum value while achieving other mix requirements.

Table 11
Operational Tolerances

Description	Test Method	Allowable Difference Between Trial Batch and JMF1 Target	Allowable Difference from Current JMF Target
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	Must be within master grading limits in Table 8	±5.0[1,2]
Individual % retained for sieves smaller than #8 and larger than #200			±3.0[1,2]
% passing the #200 sieve			±2.0[1,2]
Asphalt binder content, %	Tex-236-F	±0.5	±0.3[2]
Laboratory-molded density, %	Tex-207-F	±1.0	±1.0
VMA, %, min	Tex-204-F	Note 3	Note 3

1. When within these tolerances, mixture production gradations may fall outside the master grading limits; however, the % passing the #200 will be considered out of tolerance when outside the master grading limits.
2. Only applies to mixture produced for Lot 1 and higher.
3. Mixture is required to meet Table 8 requirements.

4.4. **Production Operations**. Perform a new trial batch when the plant or plant location is changed. Take corrective action and receive approval to proceed after any production suspension for noncompliance to the specification. Submit a new mix design and perform a new trial batch when the asphalt binder content of:

- any RAP stockpile used in the mix is more than 0.5% higher than the value shown on the mixture design report; or
- RAS stockpile used in the mix is more than 2.0% higher than the value shown on the mixture design report.

4.4.1. **Storage and Heating of Materials**. Do not heat the asphalt binder above the temperatures specified in Item 300, "Asphalts, Oils, and Emulsions," or outside the manufacturer's recommended values. Provide the Engineer with daily records of asphalt binder and hot-mix asphalt discharge temperatures (in legible and discernible increments) in accordance with Item 320, "Equipment for Asphalt Concrete Pavement," unless

otherwise directed. Do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr. unless otherwise approved.

4.4.2. **Mixing and Discharge of Materials**. Notify the Engineer 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 (or 275°F for WMA) and is not lower than 215°F. The Department will not pay for or allow placement of any mixture produced above 350°F.

Produce WMA within the target discharge temperature range of 215°F and 275°F when WMA is required. Take corrective action any time the discharge temperature of the WMA exceeds the target discharge range. The Engineer may suspend production operations if the Contractor's corrective action is not successful at controlling the production temperature within the target discharge range. Note that when WMA is produced, it may be necessary to adjust burners to ensure complete combustion such that no burner fuel residue remains in the mixture.

Control the mixing time and temperature so that substantially all moisture is removed from the mixture before discharging from the plant. The Engineer may determine the moisture content 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. The Engineer will obtain the sample immediately after discharging the mixture into the truck, and will perform the test promptly.

4.5. **Hauling Operations**. Clean all truck beds before use to ensure that mixture is not contaminated. Use a release agent shown on the Department's MPL to coat the inside bed of the truck when necessary.

Use equipment for hauling as defined in Section 340.4.6.3.2., "Hauling Equipment." Use other hauling equipment only when allowed.

4.6. **Placement Operations**. Collect haul tickets from each load of mixture delivered to the project and provide the Department's copy to the Engineer approximately every hour, or as directed. Use a hand-held thermal camera or infrared thermometer 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 unless otherwise directed. Calculate the daily yield and cumulative yield for the specified lift and provide to the Engineer at the end of paving operations for each day unless otherwise directed. The Engineer 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.

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 in. 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 Engineer will use the guidelines in Table 12 to determine the compacted lift thickness of each layer when multiple lifts are required. The thickness determined is based on the rate of 110 lb./sq. yd. for each inch of pavement unless otherwise shown on the plans.

Table 12
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.)	
A	3.00	6.00	2.00
B	2.50	5.00	1.75
C	2.00	4.00	1.50
D	1.50	3.00	1.25
F	1.25	2.50	1.25

4.6.1. **Weather Conditions**. Place mixture when the roadway surface temperature is at or above 60°F unless otherwise approved. Measure the roadway surface temperature with a hand-held thermal camera or infrared thermometer. The Engineer may allow mixture placement to begin before the roadway surface reaches the required temperature if conditions are such that the roadway surface will reach the required temperature within 2 hr. of beginning placement operations. Place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable as determined by the Engineer. The Engineer may restrict the Contractor from paving if the ambient temperature is likely to drop below 32°F within 12 hr. of paving.

4.6.2. **Tack Coat**. Clean the surface before placing the tack coat. The Engineer will set the rate between 0.04 and 0.10 gal. of residual asphalt per square yard of surface area. Apply a uniform tack coat at the specified rate unless otherwise directed. Apply the tack coat in a uniform manner to avoid streaks and other irregular patterns. Apply a thin, uniform tack coat to all contact surfaces of curbs, structures, and all joints. Allow adequate time for emulsion to break completely before placing any material. Prevent splattering of tack coat when placed adjacent to curb, gutter, and structures. Roll the tack coat with a pneumatic-tire roller to remove streaks and other irregular patterns when directed.

4.6.3. **Lay-Down Operations**.

4.6.3.1. **Windrow Operations**. Operate windrow pickup equipment so that when hot-mix is placed in windrows substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.

4.6.3.2. **Hauling Equipment**. Use belly dumps, live bottom, or end dump trucks to haul and transfer mixture; however, with exception of paving miscellaneous areas, end dump trucks are only allowed when used in conjunction with an MTD with remixing capability unless otherwise allowed.

4.6.3.3. **Screed Heaters**. Turn off screed heaters, to prevent overheating of the mat, if the paver stops for more than 5 min.

4.7. **Compaction**. Compact the pavement uniformly to contain between 3.8% and 8.5% in-place air voids.

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.

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.

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 Engineer may require rolling with a trench roller on widened areas, in trenches, and in other limited areas.

Complete all compaction operations before the pavement temperature drops below 160°F unless otherwise allowed. The Engineer may allow compaction with a light finish roller operated in static mode for pavement temperatures below 160°F.

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.

4.8. **Production Acceptance**.

4.8.1. **Production Lot**. Each day of production is defined as a production lot. Lots will be sequentially numbered and correspond to each new day of production. Note that lots are not subdivided into sublots for this specification.

4.8.2. **Production Sampling**.

4.8.2.1. **Mixture Sampling**. The Engineer may obtain mixture samples in accordance with Tex-222-F at any time during production.

4.8.2.2. **Asphalt Binder Sampling**. The Engineer may obtain or require the Contractor to obtain 1 qt. samples of the asphalt binder at any time during production from a port located immediately upstream from the mixing drum or pug mill in accordance with Tex-500-C, Part II. The Engineer may test any of the asphalt binder samples to verify compliance with Item 300, "Asphalts, Oils, and Emulsions."

4.8.3. **Production Testing**. The Engineer will test at the frequency listed in the Department's *Guide Schedule of Sampling and Testing* and this specification. The Engineer may suspend production if production tests do not meet specifications or are not within operational tolerances listed in Table 11. Take immediate corrective action if the Engineer's laboratory-molded density on any sample is less than 95.0% or greater than 98.0%, to bring the mixture within these tolerances. The Engineer may suspend operations if the Contractor's corrective actions do not produce acceptable results. The Engineer will allow production to resume when the proposed corrective action is likely to yield acceptable results.

The Engineer may use alternate methods for determining the asphalt binder content and aggregate gradation if the aggregate mineralogy is such that Tex-236-F does not yield reliable results. Use the applicable test procedure if an alternate test method is selected.

Table 13
Production and Placement Testing

Description	Test Method
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F
Individual % retained for sieves smaller than #8 and larger than #200	
% passing the #200 sieve	
Laboratory-molded density	Tex-207-F
Laboratory-molded bulk specific gravity	
In-Place air voids	
VMA	Tex-204-F
Moisture content	Tex-212-F, Part II
Theoretical maximum specific (Rice) gravity	Tex-227-F
Asphalt binder content	Tex-236-F
Hamburg Wheel test	Tex-242-F
Recycled Asphalt Shingles (RAS)[1]	Tex-217-F, Part III
Asphalt binder sampling and testing	Tex-500-C
Tack coat sampling and testing	Tex-500-C, Part III
Boil test	Tex-530-C

1. Testing performed by the Construction Division or designated laboratory.

4.8.3.1. **Voids in Mineral Aggregates (VMA)**. The Engineer may determine the VMA for any production lot. Take immediate corrective action if the VMA value for any lot is less than the minimum VMA requirement for production listed in Table 8. Suspend production and shipment of the mixture if the Engineer's VMA result is more than 0.5% below the minimum VMA requirement for production listed in Table 8. In addition to suspending production, the Engineer may require removal and replacement or may allow the lot to be left in place without payment.

4.8.3.2. **Hamburg Wheel Test**. The Engineer may perform a Hamburg Wheel test at any time during production, including when the boil test indicates a change in quality from the materials submitted for JMF1. In addition to testing production samples, the Engineer may obtain cores and perform Hamburg Wheel tests on any areas of the roadway where rutting is observed. Suspend production until further Hamburg Wheel tests meet the specified values when the production or core samples fail the Hamburg Wheel test criteria in Table 10. Core samples, if taken, will be obtained from the center of the finished mat or other areas excluding the vehicle wheel paths. The Engineer may require up to the entire lot of any mixture failing the Hamburg Wheel test to be removed and replaced at the Contractor's expense.

If the Department's or Department-approved laboratory's Hamburg Wheel test results in a "remove and replace" condition, the Contractor may request that the Department confirm the results by re-testing the failing material. The Construction Division will perform the Hamburg Wheel tests and determine the final disposition of the material in question based on the Department's test results.

4.8.4. **Individual Loads of Hot-Mix**. The Engineer can reject individual truckloads of hot-mix. When a load of hot-mix is rejected for reasons other than temperature, contamination, or excessive uncoated particles, the Contractor may request that the rejected load be tested. Make this request within 4 hr. of rejection. The Engineer will sample and test the mixture. If test results are within the operational tolerances shown in Table 11, payment will be made for the load. If test results are not within operational tolerances, no payment will be made for the load.

4.9. **Placement Acceptance**.

4.9.1. **Placement Lot**. A placement lot is defined as the area placed during a production lot (one day's production). Placement lot numbers will correspond with production lot numbers.

4.9.2. **Miscellaneous Areas**. Miscellaneous areas include areas that typically involve significant handwork or discontinuous paving operations, such as temporary detours, driveways, mailbox turnouts, crossovers, gores, spot level-up areas, and other similar areas. Miscellaneous areas also include level-ups and thin overlays when the layer thickness specified on the plans is less than the minimum untrimmed core height eligible for testing shown in Table 12. The specified layer thickness is based on the rate of 110 lb./sq. yd. for each inch of pavement unless another rate is shown on the plans. Compact miscellaneous areas in accordance with Section 340.4.7., "Compaction." Miscellaneous areas are not subject to in-place air void determination except for temporary detours when shown on the plans.

4.9.3. **Placement Sampling**. Provide the equipment and means to obtain and trim roadway cores on site. On site is defined as in close proximity to where the cores are taken. Obtain the cores within one working day of the time the placement lot is completed unless otherwise approved. Obtain two 6-in. diameter cores side-by-side at each location selected by the Engineer for in-place air void determination unless otherwise shown on the plans. For Type D and Type F mixtures, 4-in. diameter cores are allowed. Mark the cores for identification, measure and record the untrimmed core height, and provide the information to the Engineer. The Engineer will witness the coring operation and measurement of the core thickness.

Visually inspect each core and verify that the current paving layer is bonded to the underlying layer. Take corrective action if an adequate bond does not exist between the current and underlying layer to ensure that an adequate bond will be achieved during subsequent placement operations.

Trim the cores immediately after obtaining the cores from the roadway in accordance with Tex-207-F if the core heights meet the minimum untrimmed value listed in Table 12. Trim the cores on site in the presence of the Engineer. Use a permanent marker or paint pen to record the date and lot number on each core as well as the designation as Core A or B. The Engineer may require additional information to be marked on the core and may choose to sign or initial the core. The Engineer will take custody of the cores immediately after they are trimmed and will retain custody of the cores until the Department's testing is completed. Before turning the trimmed cores over to the Engineer, the Contractor may wrap the trimmed cores or secure them in a manner that will reduce the risk of possible damage occurring during transport by the Engineer. After testing, the Engineer will return the cores to the Contractor.

The Engineer may have the cores transported back to the Department's laboratory at the HMA plant via the Contractor's haul truck or other designated vehicle. In such cases where the cores will be out of the Engineer's possession during transport, the Engineer will use Department-provided security bags and the Roadway Core Custody protocol located at http://www.txdot.gov/business/specifications.htm to provide a secure means and process that protects the integrity of the cores during transport.

Instead of the Contractor trimming the cores on site immediately after coring, the Engineer and the Contractor may mutually agree to have the trimming operations performed at an alternate location such as a field laboratory or other similar location. In such cases, the Engineer will take possession of the cores immediately after they are obtained from the roadway and will retain custody of the cores until testing is completed. Either the Department or Contractor representative may perform trimming of the cores. The Engineer will witness all trimming operations in cases where the Contractor representative performs the trimming operation.

Dry the core holes and tack the sides and bottom immediately after obtaining the cores. Fill the hole with the same type of mixture and properly compact the mixture. Repair core holes with other methods when approved.

4.9.4. **Placement Testing**. The Engineer may measure in-place air voids at any time during the project to verify specification compliance.

4.9.4.1. **In-Place Air Voids**. The Engineer will measure in-place air voids in accordance with Tex-207-F and Tex-227-F. Cores not meeting the height requirements in Table 12 will not be tested. Before drying to a constant weight, cores may be pre-dried using a Corelok or similar vacuum device to remove excess moisture. The Engineer will use the corresponding theoretical maximum specific gravity to determine the air void content of each core. The Engineer will use the average air void content of the 2 cores to determine the in-place air voids at the selected location.

The Engineer will use the vacuum method to seal the core if required by Tex-207-F. The Engineer will use the test results from the unsealed core if the sealed core yields a higher specific gravity than the unsealed core. After determining the in-place air void content, the Engineer will return the cores and provide test results to the Contractor.

Take immediate corrective action when the in-place air voids exceed the range of 3.8% and 8.5% to bring the operation within these tolerances. The Engineer may suspend operations or require removal and replacement if the in-place air voids are less than 2.7% or greater than 9.9%. The Engineer will allow paving to resume when the proposed corrective action is likely to yield between 3.8% and 8.5% in-place air voids. Areas defined in Section 340.9.2., "Miscellaneous Areas," are not subject to in-place air void determination.

4.9.5. **Irregularities**. Identify and correct irregularities including segregation, rutting, raveling, flushing, fat spots, mat slippage, irregular color, irregular texture, roller marks, tears, gouges, streaks, uncoated aggregate particles, or broken aggregate particles. The Engineer may also identify irregularities, and in such cases, the Engineer will promptly notify the Contractor. If the Engineer determines that the irregularity will adversely affect pavement performance, the Engineer may require the Contractor to remove and replace (at the Contractor's expense) areas of the pavement that contain irregularities and areas where the mixture does not bond to the existing pavement. If irregularities are detected, the Engineer may require the Contractor to immediately suspend operations or may allow the Contractor to continue operations for no more than one day while the Contractor is taking appropriate corrective action.

4.9.6. **Ride Quality**. Use Surface Test Type A to evaluate ride quality in accordance with Item 585, "Ride Quality for Pavement Surfaces," unless otherwise shown on the plans.

5. MEASUREMENT

Hot mix will be measured by the ton of composite hot-mix, which includes asphalt, aggregate, and additives. Measure the weight on scales in accordance with Item 520, "Weighing and Measuring Equipment."

6. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under Article 340.5., "Measurement," will be paid for at the unit bid price for "Dense Graded Hot-Mix Asphalt (SQ)" of the mixture type, SAC, and binder specified. These prices are full compensation for surface preparation, materials including tack coat, placement, equipment, labor, tools, and incidentals.

Trial batches will not be paid for unless they are included in pavement work approved by the Department.

Payment adjustment for ride quality, if applicable, will be determined in accordance with Item 585, "Ride Quality for Pavement Surfaces."

Item 402
Trench Excavation Protection

1. DESCRIPTION

Furnish and place excavation protection for trenches 5 ft. or greater in depth.

2. CONSTRUCTION

Provide vertical or sloped cuts, benches, shields, support systems, or other systems providing the necessary protection in accordance with OSHA Standards and Interpretations, 29 CFR Part 1926, Subpart P, “Excavations.”

3. MEASUREMENT

This Item will be measured by the foot along the long axis of the trench where the depth of trench exceeds 5 ft. This measurement includes all required trench protection, including trench ends.

4. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Trench Excavation Protection.” This price is full compensation for excavation and backfill required for excavation protection; furnishing, placing, and removing shoring, sheeting, or bracing; de-watering or diversion of water; jacking and jack removal; and equipment, labor, materials, tools, and incidentals.

THIS PAGE LEFT BLANK INTENTIONALLY

Item 440
Reinforcement for Concrete

1. DESCRIPTION

Furnish and place reinforcement of the type, size, and details shown on the plans.

2. MATERIALS

Use deformed steel bar reinforcement unless otherwise specified or allowed.

2.1. **Approved Mills**. Before furnishing steel, producing mills of reinforcing steel for the Department must be pre-approved in accordance with DMS-7320, "Qualification Procedure for Reinforcing Steel Producing Mills," by the Construction Division. The Department's MPL has a list of approved producing mills. Reinforcing steel obtained from unapproved sources will not be accepted.

Contact the Construction Division with the name and location of the producing mill for stainless reinforcing steel, low carbon/chromium reinforcing steel, or dual-coated reinforcing steel at least 4 weeks before ordering any material.

2.2. **Deformed Steel Bar Reinforcement**. Provide deformed reinforcing steel conforming to one of the following:

- ASTM A615, Grades 60, 75, or 80;
- ASTM A996, Type A, Grade 60;
- ASTM A996, Type R, Grade 60, permitted in concrete pavement only (Furnish ASTM A996, Type R bars as straight bars only and do not bend them. Bend tests are not required.); or
- ASTM A706, Grades 60 or 80.

Provide the grade of reinforcing steel shown on the plans. Provide Grade 60 if no grade is shown.

The nominal size, area, and weight of reinforcing steel bars this Item covers are shown in Table 1.

Table 1
Size, Area, and Weight of Reinforcing Steel Bars

Bar Size Number (in.)	Diameter (in.)	Area (sq. in.)	Weight per Foot (lbs.)
3	0.375	0.11	0.376
4	0.500	0.20	0.668
5	0.625	0.31	1.043
6	0.750	0.44	1.502
7	0.875	0.60	2.044
8	1.000	0.79	2.670
9	1.128	1.00	3.400
10	1.270	1.27	4.303
11	1.410	1.56	5.313
14	1.693	2.25	7.650
18	2.257	4.00	13.60

2.3. **Smooth Steel Bar Reinforcement**. Provide smooth bars for concrete pavement with a yield strength of at least 60 ksi and meeting ASTM A615. Provide steel conforming to ASTM A615 or meet the physical requirements of ASTM A36 for smooth bars that are larger than No. 3. Designate smooth bars by size number up to No. 4 and by diameter in inches above No. 4.

2.4. **Spiral Reinforcement**. Provide bars or wire for spiral reinforcement of the grade and minimum size or gauge shown on the plans.

Provide smooth or deformed wire conforming to ASTM A1064. Provide bars conforming to ASTM A615; ASTM A996, Type A; or ASTM A675, Grade 80, meeting dimensional requirements of ASTM A615.

2.5. **Weldable Reinforcing Steel**. Provide reinforcing steel conforming to ASTM A706 or with a maximum carbon equivalent (C.E.) of 0.55% if welding of reinforcing steel is required or desired. Provide a report showing the percentages of elements necessary to establish C.E. for reinforcing steel that does not meet ASTM A706, in order to be structurally welded. These requirements do not pertain to miscellaneous welds on reinforcing steel as defined in Section 448.4.2.1.1., "Miscellaneous Welding Applications."

Calculate C.E. using the following formula:

$$C.E. = \%C + \frac{\%Mn}{6} + \frac{\%Cu}{40} + \frac{\%Ni}{20} + \frac{\%Cr}{10} - \frac{\%Mo}{50} - \frac{\%V}{10}$$

Do not weld stainless reinforcing steel without permission from the Engineer. Provide stainless reinforcing steel suitable for welding, if required, and submit welding procedures and electrodes to the Engineer for approval.

2.6. **Welded Wire Reinforcement**. Provide welded wire reinforcement (WWR) conforming to ASTM A1064. Observe the relations shown in Table 2 among size number, diameter in inches, and area when ordering wire by size numbers, unless otherwise specified. Precede the size number for deformed wire with "D" and for smooth wire with "W."

Designate WWR as shown in the following example: 6 × 12 – W16 × W8 (indicating 6-in. longitudinal wire spacing and 12-in. transverse wire spacing with smooth No. 16 wire longitudinally and smooth No. 8 wire transversely).

Table 2
Wire Size Number, Diameter, and Area

Size Number (in.)	Diameter (in.)	Area (sq. in.)
31	0.628	0.310
30	0.618	0.300
28	0.597	0.280
26	0.575	0.260
24	0.553	0.240
22	0.529	0.220
20	0.505	0.200
18	0.479	0.180
16	0.451	0.160
14	0.422	0.140
12	0.391	0.120
10	0.357	0.100
8	0.319	0.080
7	0.299	0.070
6	0.276	0.060
5.5	0.265	0.055
5	0.252	0.050
4.5	0.239	0.045
4	0.226	0.040
3.5	0.211	0.035
2.9	0.192	0.035
2.5	0.178	0.025
2	0.160	0.020
1.4	0.134	0.014
1.2	0.124	0.012
0.5	0.080	0.005

Note—Size numbers (in.) are the nominal cross-sectional area of the wire in hundredths of a square inch. Fractional sizes between the sizes listed above are also available and acceptable for use.

2.7. **Epoxy Coating**. Provide epoxy coated reinforcing steel as shown on the plans. Before furnishing epoxy coated reinforcing steel, an epoxy applicator must be pre-approved in accordance with DMS-7330, "Qualification Procedure for Reinforcing Steel Epoxy Coating Applicators." The Department's MPL has a list of approved applicators.

Furnish coated reinforcing steel meeting the requirements in Table 3.

Table 3
Epoxy Coating Requirements for Reinforcing Steel

Material	Specification
Bar	ASTM A775 or A934
Wire or WWR	ASTM A884 Class A or B
Mechanical couplers	As shown on the plans
Hardware	As shown on the plans

Use epoxy coating material and coating repair material that complies with DMS-8130, "Epoxy Powder Coating for Reinforcing Steel." Patch no more than 1/4-in. total length in any foot at the applicator's plant.

Maintain identification of all reinforcing steel throughout the coating and fabrication process and until delivery to the project site.

Furnish 1 copy of a written certification verifying the coated reinforcing steel meets the requirements of this Item and 1 copy of the manufacturer's control tests.

2.8. **Mechanical Couplers**. Use couplers of the type specified in DMS-4510, "Mechanical Couplers for Reinforcing Steel," Article 4510.5.A, "General Requirements," when mechanical splices in reinforcing steel bars are shown on the plans.

Furnish only couplers pre-qualified in accordance with DMS-4510, "Mechanical Couplers for Reinforcing Steel." Ensure sleeve-wedge type couplers are not used on coated reinforcing. Sample and test couplers for use on individual projects in accordance with DMS-4510, "Mechanical Couplers for Reinforcing Steel." Furnish couplers only at locations shown on the plans.

Furnish couplers for stainless reinforcing steel with the same alloy designation as the reinforcing steel.

2.9. **Fibers**. Supply fibers conforming to DMS-4550 "Fibers for Concrete" at the minimum dosage listed in the Department's MPL, when allowed by the plans. Use non-metallic fibers when shown on the plans.

2.10. **Stainless Reinforcing Steel**. Provide deformed steel bars of the types listed in Table 4 and conforming to ASTM A955, Grade 60 or higher when stainless reinforcing steel is required on the plans.

Table 4
Acceptable Types of Deformed Stainless Steel Bar

UNS Designation	S31653	S31803	S24100	S32304
AISI Type	316LN	2205	XM-28	2304

2.11. **Low Carbon/Chromium Reinforcing Steel**. Provide deformed steel bars conforming to ASTM A1035, Grade 100 when low carbon/chromium reinforcing steel is required on the plans.

2.12. **Dual-Coated Reinforcing Steel**. Provide deformed bars conforming to ASTM A1055, Grade 60 or higher when dual-coated reinforcing steel is required on the plans.

2.13. **Glass Fiber Reinforced Polymer Bars (GFRP)**. Provide bars conforming to the AASHTO LRFD *Bridge Design Guide Specifications for GFRP-Reinforced Concrete Bridge Decks and Traffic Railings*, Section 4, "Material Specifications" when GFRP bars are required on the plans. Provide sample certification demonstrating the GFRP bar supplier has produced bar that meets the Material Specifications 2 mo. before fabrication. Furnish certification upon shipment that the GFRP bar supplied meets the Material Specifications.

3. CONSTRUCTION

3.1. **Bending**. Fabricate reinforcing steel bars as prescribed in the CRSI *Manual of Standard Practice* to the shapes and dimensions shown on the plans. Fabricate in the shop if possible. Field-fabricate, if permitted, using a method approved by the Engineer. Replace improperly fabricated, damaged, or broken bars at no additional expense to the Department. Repair damaged or broken bars embedded in a previous concrete placement using a method approved by the Engineer.

Unless otherwise shown on the plans, the inside diameter of bar bends, in terms of the nominal bar diameter (d), must be as shown in Table 5.

Table 5
Minimum Inside Diameter of Bar Bends

Bend	Bar Size Number (in.)	Pin Diameter
Bends of 90° and greater in stirrups, ties, and other secondary bars that enclose another bar in the bend	3, 4, 5	4d
	6, 7, 8	6d
Bends in main bars and in secondary bars not covered above	3 through 8	6d
	9, 10, 11	8d
	14, 18	10d

Bend-test representative specimens as described for smaller bars in the applicable ASTM specification where bending No. 14 or No. 18 Grade 60 bars is required. Make the required 90° bend around a pin with a diameter of 10 times the nominal diameter of the bar.

Bend stainless reinforcing steel in accordance with ASTM A955.

3.2. **Tolerances**. Fabrication tolerances for bars are shown in Figure 1.

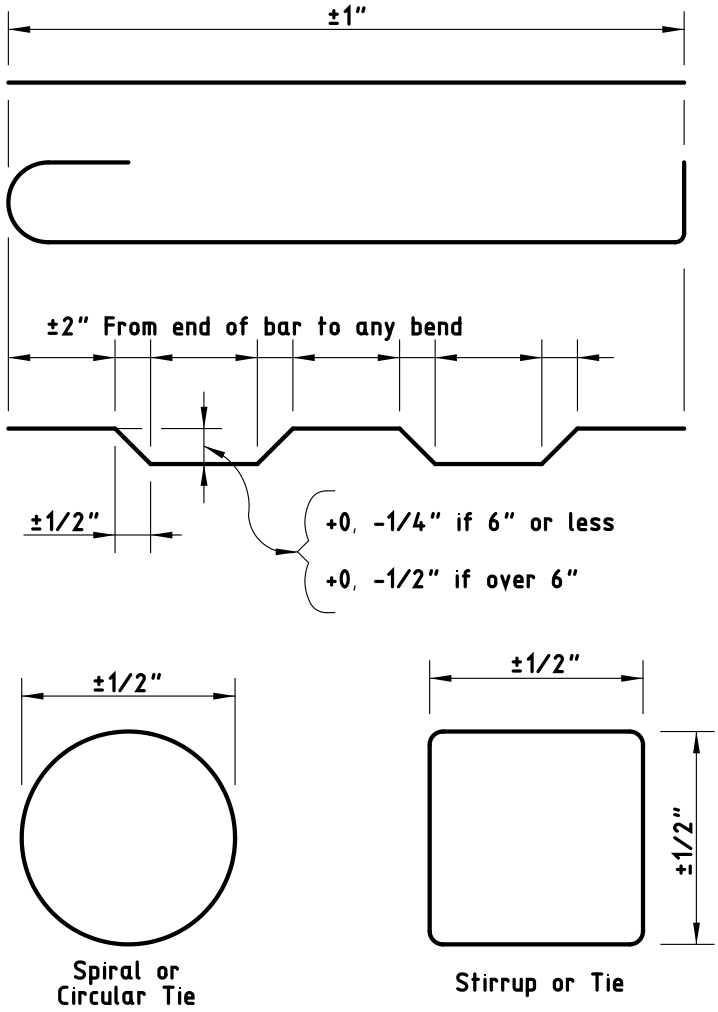


Figure 1
Fabrication Tolerances for Bars

3.3. **Storage**. Store reinforcement above the ground on platforms, skids, or other supports, and protect it from damage and deterioration. Ensure reinforcement is free from dirt, paint, grease, oil, and other foreign materials when it is placed in the work. Use reinforcement free from defects such as cracks and delaminations. Rust, surface seams, surface irregularities, or mill scale will not be cause for rejection if the minimum cross-sectional area of a hand wire-brushed specimen meets the requirements for the size of steel specified.

Do not allow stainless reinforcing steel to be in direct contact with uncoated reinforcing steel, nor with galvanized reinforcing steel. This does not apply to stainless steel wires and ties. Store stainless reinforcing steel separately, off the ground on wooden supports.

3.4. **Splices**. Lap-splice, weld-splice, or mechanically splice bars as shown on the plans. Additional splices not shown on the plans will require approval. Splices not shown on the plans will be permitted in slabs no more than 15 in. in thickness, columns, walls, and parapets.

- Do not splice bars less than 30 ft. in plan length unless otherwise approved. For bars exceeding 30 ft. in plan length, the distance center-to-center of splices must be at least 30 ft. minus 1 splice length, with no more than 1 individual bar length less than 10 ft. Make lap splices not shown on the plans, but otherwise

permitted, in accordance with Table 6. Maintain the specified concrete cover and spacing at splices, and place the lap-spliced bars in contact, securely tied together.

Table 6
Minimum Lap Requirements for Steel Bar Sizes through No. 11

Bar Size Number (in.)	Uncoated Lap Length	Coated Lap Length
3	1 ft. 4 in.	2 ft. 0 in.
4	1 ft. 9 in.	2 ft. 8 in.
5	2 ft. 2 in.	3 ft. 3 in.
6	2 ft. 7 in.	3 ft. 11 in.
7	3 ft. 5 in.	5 ft. 2 in.
8	4 ft. 6 in.	6 ft. 9 in.
9	5 ft. 8 in.	8 ft. 6 in.
10	7 ft. 3 in.	10 ft. 11 in.
11	8 ft. 11 in.	13 ft. 5 in.

- Do not lap No. 14 or No. 18 bars.
- Lap spiral steel at least 1 turn.
- Splice WWR using a lap length that includes the overlap of at least 2 cross wires plus 2 in. on each sheet or roll. Splices using bars that develop equivalent strength and are lapped in accordance with Table 6 are permitted.
- Lap the existing longitudinal bars with the new bars as shown in Table 6 for box culvert extensions with less than 1 ft. of fill. Lap at least 1 ft. 0 in. for extensions with more than 1 ft. of fill.
- Ensure welded splices conform to the requirements of the plans and of Item 448, "Structural Field Welding." Field-prepare ends of reinforcing bars if they will be butt-welded. Delivered bars must be long enough to permit weld preparation.
- Install mechanical coupling devices in accordance with the manufacturer's recommendations at locations shown on the plans. Protect threaded male or female connections, and ensure the threaded connections are clean when making the connection. Do not repair damaged threads.
- Mechanical coupler alternate equivalent strength arrangements, to be accomplished by substituting larger bar sizes or more bars, will be considered if approved in writing before fabrication of the systems.

3.5. **Placing**. Place reinforcement as near as possible to the position shown on the plans. Do not vary bars from plan placement by more than 1/12 of the spacing between bars in the plane of the bar parallel to the nearest surface of concrete. Do not vary bars from plan placement by more than 1/4 in in the plane of the bar perpendicular to the nearest surface of concrete. Provide a minimum 1-in. clear cover of concrete to the nearest surface of bar unless otherwise shown on the plans.

For bridge slabs, the clear cover tolerance for the top mat of reinforcement is −0, +1/2 in.

Locate the reinforcement accurately in the forms, and hold it firmly in place before and during concrete placement by means of bar supports that are adequate in strength and number to prevent displacement and keep the reinforcement at the proper distance from the forms. Provide bar supports in accordance with the CRSI *Manual of Standard Practice*. Use Class 1 supports, approved plastic bar supports, precast mortar, or concrete blocks when supports are in contact with removable or stay-in-place forms. Use Class 3 supports in slab overlays on concrete panels or on existing concrete slabs. Bar supports in contact with soil or subgrade must be approved.

Use Class 1A supports with epoxy coated reinforcing steel. Provide epoxy or plastic coated tie wires and clips for use with epoxy coated reinforcing steel.

Use mortar or concrete with a minimum compressive strength of 5,000 psi for precast bar supports. Provide a suitable tie wire in each block for anchoring to the bar.

Place individual bar supports in rows at 4-ft. maximum spacing in each direction. Place continuous type bar supports at 4-ft. maximum spacing. Use continuous bar supports with permanent metal deck forms.

The exposure of the ends of longitudinals, stirrups, and spacers used to position the reinforcement in concrete pipe and storm drains is not cause for rejection.

Tie reinforcement for bridge slabs and top slabs of direct traffic culverts at all intersections, except tie only alternate intersections where spacing is less than 1 ft. in each direction. Tie the bars at enough intersections to provide a rigid cage of reinforcement for reinforcement cages for other structural members. Fasten mats of WWR securely at the ends and edges.

Clean mortar, mud, dirt, debris, oil, and other foreign material from the reinforcement before concrete placement. Do not place concrete until authorized.

Stop placement until corrective measures are taken if reinforcement is not adequately supported or tied to resist settlement, reinforcement is floating upward, truss bars are overturning, or movement is detected in any direction during concrete placement.

3.6. **Handling, Placing, and Repairing Epoxy Coated Reinforcing Steel**.

3.6.1. **Handling**. Provide systems for handling coated reinforcing steel with padded contact areas. Pad bundling bands or use suitable banding to prevent damage to the coating. Lift bundles of coated reinforcement with a strongback, spreader bar, multiple supports, or a platform bridge. Transport the bundled reinforcement carefully, and store it on protective cribbing. Do not drop or drag the coated reinforcement.

3.6.2. **Placing**. Do not flame-cut coated reinforcement. Saw or shear-cut only when approved. Coat cut ends as specified in Section 440.3.6.3., “Repairing Coating.”

Do not weld or mechanically couple coated reinforcing steel except where specifically shown on the plans. Remove the epoxy coating at least 6 in. beyond the weld limits before welding and 2 in. beyond the limits of the coupler before assembly. Clean the steel of oil, grease, moisture, dirt, welding contamination (slag or acid residue), and rust to a near-white finish after welding or coupling. Check the existing epoxy for damage. Remove any damaged or loose epoxy back to sound epoxy coating.

Coat the splice area after cleaning with epoxy repair material to a thickness of 7 to 17 mils after curing. Apply a second application of repair material to the bar and coupler interface to ensure complete sealing of the joint.

3.6.3. **Repairing Coating**. Use material that complies with the requirements of this Item and ASTM D3963 for repairing of the coating. Make repairs in accordance with procedures recommended by the manufacturer of the epoxy coating powder. Apply at least the same coating thickness as required for the original coating for areas to be patched. Repair all visible damage to the coating.

Repair sawed and sheared ends, cuts, breaks, and other damage promptly before additional oxidation occurs. Clean areas to be repaired to ensure they are free from surface contaminants. Make repairs in the shop or field as required.

3.7. **Handling and Placing Stainless Reinforcing Steel**. Handle, cut, and place stainless reinforcing steel bar using tools that are not used on carbon steel. Do not use carbon steel tools, chains, slings, etc. when handling stainless steel. Use only nylon or polypropylene slings. Cut stainless steel reinforcing using shears, saws, abrasive cutoff wheels, or torches. Remove any thermal oxidation using pickling paste. Do not field bend stainless steel reinforcing without approval.

Use 16 gauge fully annealed stainless steel tie wire conforming to the material properties listed in Section 440.2.10., “Stainless Reinforcing Steel.” Support all stainless reinforcing steel on solid plastic, stainless steel, or epoxy coated steel chairs. Do not use uncoated carbon steel chairs in contact with stainless reinforcing steel.

3.8. **Bending, Handling, Repairing, and Placing GFRP Bars**. Fabricate, handle, repair, and place GFRP bars in accordance with the AASHTO LRFD Bridge Design Guide Specifications for GFRP-Reinforced Concrete Bridge Decks and Traffic Railings, Section 5, Construction Specifications.

4. MEASUREMENT AND PAYMENT

The work performed, materials furnished, equipment, labor, tools, and incidentals will not be measured or paid for directly but will be considered subsidiary to pertinent Items.

Item 476
Jacking, Boring, or Tunneling Pipe or Box

1. DESCRIPTION

Furnish and install pipe or box by jacking, boring, or tunneling.

2. MATERIALS

Use the following types of pipe or box:

- corrugated metal pipe meeting Item 460, “Corrugated Metal Pipe,” of the size, type, design, and dimension shown on the plans;
- reinforced concrete pipe meeting the special requirements for jacking, boring, or tunneling of Item 464, “Reinforced Concrete Pipe,” of the size, strength, and dimension shown on the plans;
- reinforced concrete box meeting Item 462, “Concrete Box Culverts and Drains,” of the size and type shown on the plans; or
- other types specified by the plans.

3. CONSTRUCTION

Excavate suitable shafts or trenches for conducting the jacking, boring, or tunneling operations and for placing end joints of the pipe or box if the grade at the jacking, boring, or tunneling end is below the ground surface. Maintain a 3:1 slope from edge of pavement on the shaft side of the road unless otherwise shown or directed. Provide a positive barrier when the shaft location is within the clear zone of the roadway. Protect excavations deeper than 5 ft. as specified in Item 402, “Trench Excavation Protection,” or Item 403, “Temporary Special Shoring.”

Install pipe or box so there is no interference with the operation of street, highway, railroad, or other facility and no embankment or structure is weakened or damaged.

Repair any pipe or box damaged in jacking, boring, or tunneling. Remove and replace any pipe or box damaged beyond repair at the Contractor’s expense.

Backfill shafts or trenches excavated to facilitate jacking, boring, or tunneling immediately after installation of pipe or box.

3.1. **Jacking**. Provide jacks suitable for forcing the pipe or box through the embankment. Use even pressure to all jacks during operation. Provide a suitable jacking head and suitable bracing between the jacks and the jacking head to apply uniform pressure around the ring of the pipe or circumference of the box. Use joint cushioning of plywood or other approved material. For plywood cushioning material, use 1/2-in. minimum thickness for pipe diameter 30 in. or less, and use 3/4-in. minimum thickness for pipe diameter greater than 30 in. Use 3/4-in. minimum thickness for all boxes. Use cushioning rings of single or multiple pieces. Provide a suitable jacking frame or backstop. Set the pipe or box to be jacked on guides that support the section of the pipe or box, and direct it on the proper line and grade. Place the entire jacking assembly in line with the direction and grade of the pipe or box. In general, excavate the embankment material just ahead of the pipe or box, remove the material through the pipe or box, and force the pipe or box through the embankment with jacks into the space bored or tunneled.

Furnish a plan showing the proposed method of jacking for approval. Include the design for the jacking head, jacking support or backstop (thrust block), arrangement and position of jacks, and guides in the plan.

Ensure excavation for the underside of the pipe for at least 1/3 of the circumference of the pipe conforms to the contour and grade of the pipe. Ensure the excavation for the bottom slab of the box conforms to the grade of the box. Over-excavate, if desired, to provide no more than 2 in. of clearance for the upper portion and sides of the pipe or box. Taper this clearance to zero at the point where the excavation conforms to the contour of the pipe or box. Carry out jacking without interruption to prevent the pipe from becoming firmly set in the embankment. Monitor volume of soil excavated to avoid any appreciable over excavation. Pressure-grout any over excavation of more than 1 in. Pressure-grout between the carrier pipe and casing when shown on the plans.

The distance the excavation extends beyond the end of the pipe or box must not exceed 2 ft. Decrease this distance as necessary to maintain stability of the material being excavated.

Jack the pipe or box from the low or downstream end. The final position of the pipe or box must not vary from the line and grade shown on the plans by more than 1 in. in 10 ft. Variation must be regular and in one direction, and the final flow line must be in the direction shown on the plans.

Use a shield or cutting edge of steel plate around the head end of the pipe or box extending a short distance beyond the end if desired. The minimum distance for parallel pipe or box jacking or tunneling is 3 ft. or 2 times the diameter of the pipe or width of box, whichever is greater, unless otherwise shown on the plans.

3.2. **Boring or Tunneling**. Bore from a shaft in an approved location provided for the boring equipment and workmen.

Dispose of excavated material using an approved method. Use water or other appropriate drilling fluids in connection with the boring operation only as necessary to lubricate cuttings and pipe or box; do not use jetting.

Use a gel-forming colloidal drilling fluid consisting of high-grade, carefully processed bentonite to consolidate cuttings of the bit in unconsolidated soil formations. Seal the walls of the bore hole and furnish lubrication for subsequent removal of cuttings and immediate installation of the pipe.

Allowable variations from line and grade are specified in Section 476.3.1., “Jacking.” Pressure-grout any over excavation of more than 1 in.

3.2.1. **Larger Diameter Boring Methods**. Use the pilot hole or auger method for drainage and large utility borings. Pressure-grout any over excavation of more than 1 in. Pressure-grout between the carrier pipe and casing when shown on the plans.

3.2.1.1. **Pilot Hole Method**. Bore a 2-in. pilot hole the entire length of the crossing, and check it for line and grade during the boring or tunneling operation on the opposite end of the bore from the work shaft. This pilot hole will serve as centerline for the larger diameter hole to be bored.

3.2.1.2. **Auger Method**. Use a steel encasement pipe of the appropriate diameter equipped with a cutter head to mechanically perform the excavation. Use augers of large enough diameter to convey the excavated material to the work shaft.

3.2.2. **Electrical and Communication Conduit Boring**. Limit over excavation to the dimensions shown in Table 1 for electrical and communication conduit borings. Increased boring diameters will be allowed for outer diameters of casing and couplings. Pressure-grouting will not be required for electrical and communication conduit borings.

Table 1
Allowable Bore Diameter for Electrical or Communication Conduit or Casing

Single Conduit Bores		Multiple Conduit Bores	
Conduit Size (in.)	Maximum Allowable Bore (in.)	Conduit Size (in.)[1]	Maximum Allowable Bore (in.)
2	4	4	6
3	6	5	8
4	6	6	10
6	10	7	12
		8	12

1. The diameter of multiple conduits is the sum of the outside diameter of the 2 largest conduits for placement of up to 4 conduits in one bore. Submit boring diameters for the Engineer's approval when more than 4 conduits are to be placed in a bore.

3.3. **Tunneling**. Use an approved tunneling method where the characteristics of the soil, the size of the proposed pipe, or the use of monolithic pipe would make the use of tunneling more satisfactory than jacking or boring, or when shown on the plans.

Ensure the lining of the tunnel is strong enough to support the overburden when tunneling is permitted. Submit the proposed liner method for approval. Approval does not relieve the Contractor of the responsibility for the adequacy of the liner method.

Pressure-grout the space between the liner plate and the limits of excavation.

Pressure-grout between the carrier pipe and liner plate when shown on the plans.

3.4. **Joints**. Make joints by field bolting or connecting bands, whichever is feasible if corrugated metal pipe is used. Make the joints in accordance with Item 464, "Reinforced Concrete Pipe," if reinforced concrete pipe is used. Make the joints in accordance with Item 462, "Concrete Box Culverts and Drains," if reinforced concrete box is used.

4. MEASUREMENT

This Item will be measured by the foot between the ends of the pipe or box along the flow line.

This is a plans quantity measurement Item. The quantity to be paid is the quantity shown in the proposal, unless modified by Article 9.2., "Plans Quantity Measurement." Additional measurements or calculations will be made if adjustments of quantities are required.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Jacking, Boring, or Tunneling Pipe" of the type, size, and class specified; or "Jacking, Boring, or Tunneling Pipe" of the type, size, and design specified; or "Jacking or Tunneling Box Culvert" of the size specified.

This price is full compensation for excavation, grouting, backfilling, and disposal of surplus material; furnishing pipe, box, and pipe liner materials required for tunnel operations; preparation, hauling, and installing of pipe, box, and pipe liner materials; and materials, tools, equipment, labor, and incidentals.

Protection methods for open excavations deeper than 5 ft. will be measured and paid for as required under Item 402, "Trench Excavation Protection," or Item 403, "Temporary Special Shoring."

THIS PAGE LEFT BLANK INTENTIONALLY

Item 502
Barricades, Signs, and Traffic Handling

1. DESCRIPTION

Provide, install, move, replace, maintain, clean, and remove all traffic control devices shown on the plans and as directed.

2. CONSTRUCTION

Comply with the requirements of Article 7.2., "Safety."

Implement the traffic control plan (TCP) shown on the plans.

Install traffic control devices straight and plumb. Make changes to the TCP only as approved. Minor adjustments to meet field conditions are allowed.

Submit Contractor-proposed TCP changes, signed and sealed by a licensed professional engineer, for approval. The Engineer may develop, sign, and seal Contractor-proposed changes. Changes must conform to guidelines established in the TMUTCD using approved products from the Department's Compliant Work Zone Traffic Control Device List.

Maintain traffic control devices by taking corrective action when notified. Corrective actions include, but are not limited to, cleaning, replacing, straightening, covering, and removing devices. Maintain the devices such that they are properly positioned and spaced, legible, and have retroreflective characteristics that meet requirements day or night and in all weather conditions.

The Engineer may authorize or direct in writing the removal or relocation of project limit advance warning signs. When project limit advance warning signs are removed before final acceptance, provide traffic control in accordance with the TMUTCD for minor operations as approved.

Remove all traffic control devices upon completion of the work as shown on the plans or as directed.

3. MEASUREMENT

Barricades, Signs, and Traffic Handling will be measured by the month. Law enforcement personnel with patrol vehicles will be measured by the hour for each person.

4. PAYMENT

4.1. **Barricades, Signs, and Traffic Handling**. Except for Contracts with callout work and work orders, the work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Barricades, Signs, and Traffic Handling." This price is full compensation for installation, maintenance, adjustments, replacements, removal, materials, equipment, labor, tools, and incidentals.

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Barricades, Signs, and Traffic Handling." This price is full compensation for installation, maintenance, adjustments, replacements, removal, materials, equipment, labor, tools, and incidentals.

When the plans establish pay items for particular work in the TCP, that work will be measured and paid under pertinent Items.

4.1.1. **Initiation of Payment**. Payment for this Item will begin on the first estimate after barricades, signs, and traffic handling devices have been installed in accordance with the TCP and construction has begun.

4.1.2. **Paid Months**. Monthly payment will be made each succeeding month for this Item provided the barricades, signs, and traffic handling devices have been installed and maintained in accordance with the TCP until the Contract amount has been paid.

If, within the time frame established by the Engineer, the Contractor fails to provide or properly maintain signs and barricades in compliance with the Contract requirements, as determined by the Engineer, the Contractor will be considered in noncompliance with this Item. No payment will be made for the months in question, and the total final payment quantity will be reduced by the number of months the Contractor was in noncompliance.

4.1.3. **Maximum Total Payment Before Acceptance**. The total payment for this Item will not exceed 10% of the total Contract amount before final acceptance in accordance with Article 5.12., “Final Acceptance.” The remaining balance will be paid in accordance with Section 502.4.1.5., “Balance Due.”

4.1.4. **Total Payment Quantity**. The quantity paid under this Item will not exceed the total quantity shown on the plans except as modified by change order and as adjusted by Section 502.4.1.2., “Paid Months.” An overrun of the plans quantity for this Item will not be allowed for approving designs; testing; material shortages; closed construction seasons; curing periods; establishment, performance, test, and maintenance periods; failure to complete the work in the number of months allotted; nor delays caused directly or indirectly by requirements of the Contract.

4.1.5. **Balance Due**. The remaining unpaid months of barricades less non-compliance months will be paid on final acceptance of the project, if all work is complete and accepted in accordance with Article 5.12., “Final Acceptance.”

4.1.6. **Contracts with Callout Work and Work Orders**. The work performed and the materials furnished with this Item and measured as provided under “Measurement,” will be considered subsidiary to pertinent Items, except for federally funded Contracts.

4.2. **Law Enforcement Personnel**. The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement,” will be paid by Contractor force account for “Law Enforcement Personnel.” This price is full compensation for furnishing all labor, materials, supplies, equipment, patrol vehicle, fees, and incidentals necessary to complete the work as directed.

Item 506

Temporary Erosion, Sedimentation, and Environmental Controls

1. DESCRIPTION

Install, maintain, and remove erosion, sedimentation, and environmental control measures to prevent or reduce the discharge of pollutants in accordance with the Storm Water Pollution Prevention Plan (SWP3) on the plans and the Texas Pollutant Discharge Elimination System (TPDES) General Permit TXR150000. Control measures are defined as Best Management Practices used to prevent or reduce the discharge of pollutants. Control measures include, but are not limited to, rock filter dams, temporary pipe slope drains, temporary paved flumes, construction exits, earthwork for erosion control, pipe, construction perimeter fence, sandbags, temporary sediment control fence, biodegradable erosion control logs, vertical tracking, temporary or permanent seeding, and other measures. Erosion and sediment control devices must be selected from the *Erosion Control Approved Products* or *Sediment Control Approved Products* lists. Perform work in a manner to prevent degradation of receiving waters, facilitate project construction, and comply with applicable federal, state, and local regulations. Ensure the installation and maintenance of control measures is performed in accordance with the manufacturer's or designer's specifications.

Provide the Contractor Certification of Compliance before performing SWP3 or soil disturbing activities. By signing the Contractor Certification of Compliance, the Contractor certifies they have read and understand the requirements applicable to this project pertaining to the SWP3, the plans, and the TPDES General Permit TXR150000. The Contractor is responsible for any penalties associated with non-performance of installation or maintenance activities required for compliance. Ensure the most current version of the certificate is executed for this project.

2. MATERIALS

Furnish materials in accordance with the following:

- Item 161, "Compost,"
- Item 432, "Riprap," and
- Item 556, "Pipe Underdrains."

2.1. **Rock Filter Dams**.

2.1.1. **Aggregate**. Furnish aggregate with approved hardness, durability, cleanliness, and resistance to crumbling, flaking, and eroding. Provide the following:

- Types 1, 2, and 4 Rock Filter Dams. Use 3 to 6 in. aggregate.
- Type 3 Rock Filter Dams. Use 4 to 8 in. aggregate.

2.1.2. **Wire**. Provide minimum 20 gauge galvanized wire for the steel wire mesh and tie wires for Types 2 and 3 rock filter dams. Type 4 dams require:

- a double-twisted, hexagonal weave with a nominal mesh opening of 2-1/2 × 3-1/4 in.;
- minimum 0.0866 in. steel wire for netting;
- minimum 0.1063 in. steel wire for selvages and corners; and
- minimum 0.0866 in. for binding or tie wire.

2.1.3. **Sandbag Material**. Furnish sandbags meeting Section 506.2.8., "Sandbags," except that any gradation of aggregate may be used to fill the sandbags.

2.2. **Temporary Pipe Slope Drains**. Provide corrugated metal pipe, polyvinyl chloride (PVC) pipe, flexible tubing, watertight connection bands, grommet materials, prefabricated fittings, and flared entrance sections that conform to the plans. Recycled and other materials meeting these requirements are allowed if approved.

Furnish concrete in accordance with Item 432, "Riprap."

2.3. **Temporary Paved Flumes**. Furnish asphalt concrete, hydraulic cement concrete, or other comparable non-erodible material that conforms to the plans. Provide rock or rubble with a minimum diameter of 6 in. and a maximum volume of 1/2 cu. ft. for the construction of energy dissipaters.

2.4. **Construction Exits**. Provide materials that meet the details shown on the plans and this Section.

2.4.1. **Rock Construction Exit**. Provide crushed aggregate for long- and short-term construction exits. Furnish aggregates that are clean, hard, durable, and free from adherent coatings such as salt, alkali, dirt, clay, loam, shale, soft or flaky materials, and organic and injurious matter. Use 4- to 8-in. aggregate for Type 1. Use 2- to 4-in. aggregate for Type 3.

2.4.2. **Timber Construction Exit**. Furnish No. 2 quality or better railroad ties and timbers for long-term construction exits, free of large and loose knots and treated to control rot. Fasten timbers with nuts and bolts or lag bolts, of at least 1/2 in. diameter, unless otherwise shown on the plans or allowed. Provide plywood or pressed wafer board at least 1/2 in. thick for short-term exits.

2.4.3. **Foundation Course**. Provide a foundation course consisting of flexible base, bituminous concrete, hydraulic cement concrete, or other materials as shown on the plans or directed.

2.5. **Embankment for Erosion Control**. Provide rock, loam, clay, topsoil, or other earth materials that will form a stable embankment to meet the intended use.

2.6. **Pipe**. Provide pipe outlet material in accordance with Item 556, "Pipe Underdrains," and details shown on the plans.

2.7. **Construction Perimeter Fence**.

2.7.1. **Posts**. Provide essentially straight wood or steel posts that are at least 60 in. long. Furnish soft wood posts with a minimum diameter of 3 in., or use nominal 2 × 4 in. boards. Furnish hardwood posts with a minimum cross-section of 1-1/2 × 1-1/5 in. Furnish T- or L-shaped steel posts with a minimum weight of 1.25 lb. per foot.

2.7.2. **Fence**. Provide orange construction fencing as approved.

2.7.3. **Fence Wire**. Provide 14 gauge or larger galvanized smooth or twisted wire. Provide 16 gauge or larger tie wire.

2.7.4. **Flagging**. Provide brightly-colored flagging that is fade-resistant and at least 3/4 in. wide to provide maximum visibility both day and night.

2.7.5. **Staples**. Provide staples with a crown at least 1/2 in. wide and legs at least 1/2 in. long.

2.7.6. **Used Materials**. Previously used materials meeting the applicable requirements may be used if approved.

2.8. **Sandbags**. Provide sandbag material of polypropylene, polyethylene, or polyamide woven fabric with a minimum unit weight of 4 oz. per square yard, a Mullen burst-strength exceeding 300 psi, and an ultraviolet stability exceeding 70%.

Use natural coarse sand or manufactured sand meeting the gradation given in Table 1 to fill sandbags. Filled sandbags must be 24 to 30 in. long, 16 to 18 in. wide, and 6 to 8 in. thick.

Table 1
Sand Gradation

Sieve Size	Retained (% by Weight)
#4	Maximum 3%
#100	Minimum 80%
#200	Minimum 95%

Aggregate may be used instead of sand for situations where sandbags are not adjacent to traffic. The aggregate size must not exceed 3/8 in.

2.9. **Temporary Sediment Control Fence**. Provide a net-reinforced fence using woven geo-textile fabric. Logos visible to the traveling public will not be allowed.

2.9.1. **Fabric**. Provide fabric materials in accordance with DMS-6230, "Temporary Sediment Control Fence Fabric."

2.9.2. **Posts**. Provide essentially straight wood or steel posts with a minimum length of 48 in., unless otherwise shown on the plans. Furnish soft wood posts at least 3 in. in diameter, or use nominal 2 × 4 in. boards. Furnish hardwood posts with a minimum cross-section of 1-1/2 × 1-1/2 in. Furnish T- or L-shaped steel posts with a minimum weight of 1.25 lb. per foot.

2.9.3. **Net Reinforcement**. Provide net reinforcement of at least 12.5 gauge (SWG) galvanized welded wire mesh, with a maximum opening size of 2 × 4 in., at least 24 in. wide, unless otherwise shown on the plans.

2.9.4. **Staples**. Provide staples with a crown at least 3/4 in. wide and legs 1/2 in. long.

2.9.5. **Used Materials**. Use recycled material meeting the applicable requirements if approved.

2.10. **Biodegradable Erosion Control Logs**.

2.10.1. **Core Material**. Furnish core material that is biodegradable or recyclable. Use compost, mulch, aspen excelsior wood fibers, chipped site vegetation, agricultural rice or wheat straw, coconut fiber, 100% recyclable fibers, or any other acceptable material unless specifically called out on the plans. Permit no more than 5% of the material to escape from the containment mesh. Furnish compost meeting the requirements of Item 161, "Compost."

2.10.2. **Containment Mesh**. Furnish containment mesh that is 100% biodegradable, photodegradable, or recyclable such as burlap, twine, UV photodegradable plastic, polyester, or any other acceptable material.

Furnish biodegradable or photodegradable containment mesh when log will remain in place as part of a vegetative system.

Furnish recyclable containment mesh for temporary installations.

2.10.3. **Size**. Furnish biodegradable erosion control logs with diameters shown on the plans or as directed. Stuff containment mesh densely so logs do not deform.

3. QUALIFICATIONS, TRAINING, AND EMPLOYEE REQUIREMENTS

3.1. **Contractor Responsible Person Environmental (CRPE) Qualifications and Responsibilities**. Provide and designate in writing at the preconstruction conference a CRPE and alternate CRPE who have overall responsibility for the storm water management program. The CRPE will implement storm water and erosion control practices; will oversee and observe storm water control measure monitoring and management; will monitor the project site daily and produce daily monitoring reports as long as there are BMPs in place or soil disturbing activities are evident to ensure compliance with the SWP3 and TPDES General Permit TXR150000. During time suspensions when work is not occurring or on contract non-work days, daily inspections are not required unless a rain event has occurred. The CRPE will provide recommendations on

how to improve the effectiveness of control measures. Attend the Department's preconstruction conference for the project. Ensure training is completed as identified in Section 506.3.3., "Training," by all applicable personnel before employees work on the project. Document and submit a list, signed by the CRPE, of all applicable Contractor and subcontractor employees who have completed the training. Include the employee's name, the training course name, and date the employee completed the training. Provide the most current list at the preconstruction conference or before SWP3 or soil disturbing activities. Update the list as needed and provide the updated list when updated.

3.2. **Contractor Superintendent Qualifications and Responsibilities**. Provide a superintendent that is competent, has experience with and knowledge of storm water management, and is knowledgeable of the requirements and the conditions of the TPDES General Permit TXR150000. The superintendent will manage and oversee the day to day operations and activities at the project site; work with the CRPE to provide effective storm water management at the project site; represent and act on behalf of the Contractor; and attend the Department's preconstruction conference for the project.

3.3. **Training**. All Contractor and subcontractor employees involved in soil disturbing activities, small or large structures, storm water control measures, and seeding activities must complete training as prescribed by the Department.

4. CONSTRUCTION

4.1. **Contractor Responsibilities**. Implement the SWP3 for the project site in accordance with the plans and specifications, TPDES General Permit TXR150000, and as directed. Coordinate storm water management with all other work on the project. Develop and implement an SWP3 for project-specific material supply plants within and outside of the Department's right of way in accordance with the specific or general storm water permit requirements. Prevent water pollution from storm water associated with construction activity from entering any surface water or private property on or adjacent to the project site.

4.2. **Implementation**. The CRPE, or alternate CRPE, must be accessible by phone and able to respond to project-related storm water management or other environmental emergencies 24 hr. per day.

4.2.1. **Commencement**. Implement the SWP3 as shown and as directed. Contractor-proposed recommendations for changes will be allowed as approved. Conform to the established guidelines in the TPDES General Permit TXR150000 to make changes. Do not implement changes until approval has been received and changes have been incorporated into the plans. Minor adjustments to meet field conditions are allowed and will be recorded in the SWP3.

4.2.2. **Phasing**. Implement control measures before the commencement of activities that result in soil disturbance. Phase and minimize the soil disturbance to the areas shown on the plans. Coordinate temporary control measures with permanent control measures and all other work activities on the project to assure economical, effective, safe, and continuous water pollution prevention. Provide control measures that are appropriate to the construction means, methods, and sequencing allowed by the Contract. Exercise precaution throughout the life of the project to prevent pollution of ground waters and surface waters. Schedule and perform clearing and grubbing operations so that stabilization measures will follow immediately thereafter if project conditions permit. Bring all grading sections to final grade as soon as possible and implement temporary and permanent control measures at the earliest time possible. Implement temporary control measures when required by the TPDES General Permit TXR150000 or otherwise necessitated by project conditions.

Do not prolong final grading and shaping. Preserve vegetation where possible throughout the project, and minimize clearing, grubbing, and excavation within stream banks, bed, and approach sections.

4.3. **General**.

4.3.1. **Temporary Alterations or Control Measure Removal**. Altering or removal of control measures is allowed when control measures are restored within the same working day.

4.3.2. **Stabilization**. Initiate stabilization for disturbed areas no more than 14 days after the construction activities in that portion of the site have temporarily or permanently ceased. Establish a uniform vegetative cover or use another stabilization practice in accordance with the TPDES General Permit TXR150000.

4.3.3. **Finished Work**. Remove and dispose of all temporary control measures upon acceptance of vegetative cover or other stabilization practice unless otherwise directed. Complete soil disturbing activities and establish a uniform perennial vegetative cover. A project will not be considered for acceptance until a vegetative cover of 70% density of existing adjacent undisturbed areas is obtained or equivalent permanent stabilization is obtained in accordance with the TPDES General Permit TXR150000. An exception will be allowed in arid areas as defined in the TPDES General Permit TXR150000.

4.3.4. **Restricted Activities and Required Precautions**. Do not discharge onto the ground or surface waters any pollutants such as chemicals, raw sewage, fuels, lubricants, coolants, hydraulic fluids, bitumens, or any other petroleum product. Operate and maintain equipment on-site to prevent actual or potential water pollution. Manage, control, and dispose of litter on-site such that no adverse impacts to water quality occur. Prevent dust from creating a potential or actual unsafe condition, public nuisance, or condition endangering the value, utility, or appearance of any property. Wash out concrete trucks only as described in the TPDES General Permit TXR150000. Use appropriate controls to minimize the offsite transport of suspended sediments and other pollutants if it is necessary to pump or channel standing water (i.e., dewatering). Prevent discharges that would contribute to a violation of Edwards Aquifer Rules, water quality standards, the impairment of a listed water body, or other state or federal law.

4.4. **Installation, Maintenance, and Removal Work**. Perform work in accordance with the SWP3, according to manufacturers' guidelines, and in accordance with the TPDES General Permit TXR150000. Install and maintain the integrity of temporary erosion and sedimentation control devices to accumulate silt and debris until soil disturbing activities are completed and permanent erosion control features are in place or the disturbed area has been adequately stabilized as approved.

The Department will inspect and document the condition of the control measures at the frequency shown on the plans and will provide the Construction SWP3 Field Inspection and Maintenance Reports to the Contractor. Make corrections as soon as possible before the next anticipated rain event or within 7 calendar days after being able to enter the worksite for each control measure. The only acceptable reason for not accomplishing the corrections with the time frame specified is when site conditions are "Too Wet to Work." Take immediate action if a correction is deemed critical as directed. When corrections are not made within the established time frame, all work will cease on the project and time charges will continue while the control measures are brought into compliance. Commence work once the Engineer reviews and documents the project is in compliance. Commencing work does not release the Contractor of the liability for noncompliance of the SWP3, plans, or TPDES General Permit TXR150000.

The Engineer may limit the disturbed area if the Contractor cannot control soil erosion and sedimentation resulting from the Contractor's operations. Implement additional controls as directed.

Remove devices upon approval or as directed. Finish-grade and dress the area upon removal. Stabilize disturbed areas in accordance with the permit, and as shown on the plans or directed. Materials removed are considered consumed by the project. Retain ownership of stockpiled material and remove it from the project when new installations or replacements are no longer required.

4.4.1. **Rock Filter Dams for Erosion Control**. Remove trees, brush, stumps, and other objectionable material that may interfere with the construction of rock filter dams. Place sandbags as a foundation when required or at the Contractor's option.

Place the aggregate to the lines, height, and slopes specified, without undue voids for Types 1, 2, 3, and 5. Place the aggregate on the mesh and then fold the mesh at the upstream side over the aggregate and secure it to itself on the downstream side with wire ties, or hog rings for Types 2 and 3, or as directed. Place rock filter dams perpendicular to the flow of the stream or channel unless otherwise directed. Construct filter dams according to the following criteria unless otherwise shown on the plans:

4.4.1.1. **Type 1 (Non-Reinforced)**.

- **Height**. At least 18 in. measured vertically from existing ground to top of filter dam.
- **Top Width**. At least 2 ft.
- **Slopes**. No steeper than 2:1.

4.4.1.2. **Type 2 (Reinforced)**.

- **Height**. At least 18 in. measured vertically from existing ground to top of filter dam.
- **Top Width**. At least 2 ft.
- **Slopes**. No steeper than 2:1.

4.4.1.3. **Type 3 (Reinforced)**.

- **Height**. At least 36 in. measured vertically from existing ground to top of filter dam.
- **Top Width**. At least 2 ft.
- **Slopes**. No steeper than 2:1.

4.4.1.4. **Type 4 (Sack Gabions)**. Unfold sack gabions and smooth out kinks and bends. Connect the sides by lacing in a single loop–double loop pattern on 4- to 5-in. spacing for vertical filling. Pull the end lacing rod at one end until tight, wrap around the end, and twist 4 times. Fill with stone at the filling end, pull the rod tight, cut the wire with approximately 6 in. remaining, and twist wires 4 times.

Place the sack flat in a filling trough, fill with stone, connect sides, and secure ends as described above for horizontal filling.

Lift and place without damaging the gabion. Shape sack gabions to existing contours.

4.4.1.5. **Type 5**. Provide rock filter dams as shown on the plans.

4.4.2. **Temporary Pipe Slope Drains**. Install pipe with a slope as shown on the plans or as directed. Construct embankment for the drainage system in 8-in. lifts to the required elevations. Hand-tamp the soil around and under the entrance section to the top of the embankment as shown on the plans or as directed. Form the top of the embankment or earth dike over the pipe slope drain at least 1 ft. higher than the top of the inlet pipe at all points. Secure the pipe with hold-downs or hold-down grommets spaced a maximum of 10 ft. on center. Construct the energy dissipaters or sediment traps as shown on the plans or as directed. Construct the sediment trap using concrete or rubble riprap in accordance with Item 432, “Riprap,” when designated on the plans.

4.4.3. **Temporary Paved Flumes**. Construct paved flumes as shown on the plans or as directed. Provide excavation and embankment (including compaction of the subgrade) of material to the dimensions shown on the plans unless otherwise indicated. Install a rock or rubble riprap energy dissipater, constructed from the materials specified above, to a minimum depth of 9 in. at the flume outlet to the limits shown on the plans or as directed.

4.4.4. **Construction Exits**. Prevent traffic from crossing or exiting the construction site or moving directly onto a public roadway, alley, sidewalk, parking area, or other right of way areas other than at the location of construction exits when tracking conditions exist. Construct exits for either long- or short-term use.

4.4.4.1. **Long-Term**. Place the exit over a foundation course as required. Grade the foundation course or compacted subgrade to direct runoff from the construction exits to a sediment trap as shown on the plans or as directed. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed.

4.4.4.1.1. **Type 1**. Construct to a depth of at least 8 in. using crushed aggregate as shown on the plans or as directed.

4.4.4.1.2. **Type 2**. Construct using railroad ties and timbers as shown on the plans or as directed.

4.4.4.2. **Short-Term**.

4.4.4.2.1. **Type 3**. Construct using crushed aggregate, plywood, or wafer board. This type of exit may be used for daily operations where long-term exits are not practical.

4.4.4.2.2. **Type 4**. Construct as shown on the plans or as directed.

4.4.5. **Earthwork for Erosion Control**. Perform excavation and embankment operations to minimize erosion and to remove collected sediments from other erosion control devices.

4.4.5.1. **Excavation and Embankment for Erosion Control Features**. Place earth dikes, swales, or combinations of both along the low crown of daily lift placement, or as directed, to prevent runoff spillover. Place swales and dikes at other locations as shown on the plans or as directed to prevent runoff spillover or to divert runoff. Construct cuts with the low end blocked with undisturbed earth to prevent erosion of hillsides. Construct sediment traps at drainage structures in conjunction with other erosion control measures as shown on the plans or as directed.

Create a sediment basin, where required, providing 3,600 cu. ft. of storage per acre drained, or equivalent control measures for drainage locations that serve an area with 10 or more disturbed acres at one time, not including offsite areas.

4.4.5.2. **Excavation of Sediment and Debris**. Remove sediment and debris when accumulation affects the performance of the devices, after a rain, and when directed.

4.4.6. **Construction Perimeter Fence**. Construct, align, and locate fencing as shown on the plans or as directed.

4.4.6.1. **Installation of Posts**. Embed posts 18 in. deep or adequately anchor in rock, with a spacing of 8 to 10 ft.

4.4.6.2. **Wire Attachment**. Attach the top wire to the posts at least 3 ft. from the ground. Attach the lower wire midway between the ground and the top wire.

4.4.6.3. **Flag Attachment**. Attach flagging to both wire strands midway between each post. Use flagging at least 18 in. long. Tie flagging to the wire using a square knot.

4.4.7. **Sandbags for Erosion Control**. Construct a berm or dam of sandbags that will intercept sediment-laden storm water runoff from disturbed areas, create a retention pond, detain sediment, and release water in sheet flow. Fill each bag with sand so that at least the top 6 in. of the bag is unfilled to allow for proper tying of the open end. Place the sandbags with their tied ends in the same direction. Offset subsequent rows of sandbags 1/2 the length of the preceding row. Place a single layer of sandbags downstream as a secondary debris trap. Place additional sandbags as necessary or as directed for supplementary support to berms or dams of sandbags or earth.

4.4.8. **Temporary Sediment-Control Fence**. Provide temporary sediment-control fence near the downstream perimeter of a disturbed area to intercept sediment from sheet flow. Incorporate the fence into erosion-control measures used to control sediment in areas of higher flow. Install the fence as shown on the plans, as specified in this Section, or as directed.

4.4.8.1. **Installation of Posts**. Embed posts at least 18 in. deep, or adequately anchor, if in rock, with a spacing of 6 to 8 ft. and install on a slight angle toward the runoff source.

4.4.8.2. **Fabric Anchoring**. Dig trenches along the uphill side of the fence to anchor 6 to 8 in. of fabric. Provide a minimum trench cross-section of 6 × 6 in. Place the fabric against the side of the trench and align approximately 2 in. of fabric along the bottom in the upstream direction. Backfill the trench, then hand-tamp.

4.4.8.3. **Fabric and Net Reinforcement Attachment**. Attach the reinforcement to wooden posts with staples, or to steel posts with T-clips, in at least 4 places equally spaced unless otherwise shown on the plans. Sewn

vertical pockets may be used to attach reinforcement to end posts. Fasten the fabric to the top strand of reinforcement by hog rings or cord every 15 in. or less.

4.4.8.4. **Fabric and Net Splices**. Locate splices at a fence post with a minimum lap of 6 in. attached in at least 6 places equally spaced unless otherwise shown on the plans. Do not locate splices in concentrated flow areas.

Requirements for installation of used temporary sediment-control fence include the following:

- fabric with minimal or no visible signs of biodegradation (weak fibers),
- fabric without excessive patching (more than 1 patch every 15 to 20 ft.),
- posts without bends, and
- backing without holes.

4.4.9. **Biodegradable Erosion Control Logs**. Install biodegradable erosion control logs near the downstream perimeter of a disturbed area to intercept sediment from sheet flow. Incorporate the biodegradable erosion control logs into the erosion measures used to control sediment in areas of higher flow. Install, align, and locate the biodegradable erosion control logs as specified below, as shown on the plans, or as directed.

Secure biodegradable erosion control logs in a method adequate to prevent displacement as a result of normal rain events, prevent damage to the logs, and as approved, such that flow is not allowed under the logs. Temporarily removing and replacing biodegradable erosion logs as to facilitate daily work is allowed at the Contractor's expense.

4.4.10. **Vertical Tracking**. Perform vertical tracking on slopes to temporarily stabilize soil. Provide equipment with a track undercarriage capable of producing a linear soil impression measuring a minimum of 12 in. long × 2 to 4 in. wide × 1/2 to 2 in. deep. Do not exceed 12 in. between track impressions. Install continuous linear track impressions where the 12 in. length impressions are perpendicular to the slope. Vertical tracking is required on projects where soil disturbing activities have occurred unless otherwise approved.

4.5. **Monitoring and Documentation**. Monitor the control measures on a daily basis as long as there are BMPs in place and/or soil disturbing activities are evident to ensure compliance with the SWP3 and TPDES General Permit TXR150000. During time suspensions when work is not occurring or contract non-work days, daily inspections are not required unless a rain event has occurred. Monitoring will consist of, but is not limited to, observing, inspecting, and documenting site locations with control measures and discharge points to provide maintenance and inspection of controls as described in the SWP3. Keep written records of daily monitoring. Document in the daily monitoring report the control measure condition, the date of inspection, required corrective actions, responsible person for making the corrections, and the date corrective actions were completed. Maintain records of all monitoring reports at the project site or at an approved place. Provide copies within 7 days. Together, the CRPE and an Engineer's representative will complete the Construction Stage Gate Checklist on a periodic basis as directed.

5. MEASUREMENT

5.1. **Rock Filter Dams**. Installation or removal of rock filter dams will be measured by the foot or by the cubic yard. The measured volume will include sandbags, when used.

5.1.1. **Linear Measurement**. When rock filter dams are measured by the foot, measurement will be along the centerline of the top of the dam.

5.1.2. **Volume Measurement**. When rock filter dams are measured by the cubic yard, measurement will be based on the volume of rock computed by the method of average end areas.

5.1.2.1. **Installation**. Measurement will be made in final position.

5.1.2.2. **Removal**. Measurement will be made at the point of removal.

5.2. **Temporary Pipe Slope Drains**. Temporary pipe slope drains will be measured by the foot.

5.3. **Temporary Paved Flumes**. Temporary paved flumes will be measured by the square yard of surface area. The measured area will include the energy dissipater at the flume outlet.

5.4. **Construction Exits**. Construction exits will be measured by the square yard of surface area.

5.5. **Earthwork for Erosion and Sediment Control**.

5.5.1. **Equipment and Labor Measurement**. Equipment and labor used will be measured by the actual number of hours the equipment is operated and the labor is engaged in the work.

5.5.2. **Volume Measurement**.

5.5.2.1. **In Place**.

5.5.2.1.1. **Excavation**. Excavation will be measured by the cubic yard in its original position and the volume computed by the method of average end areas.

5.5.2.1.2. **Embankment**. Embankment will be measured by the cubic yard in its final position by the method of average end areas. The volume of embankment will be determined between:

- the original ground surfaces or the surface upon that the embankment is to be constructed for the feature and
- the lines, grades and slopes of the accepted embankment for the feature.

5.5.2.2. **In Vehicles**. Excavation and embankment quantities will be combined and paid for under "Earthwork (Erosion and Sediment Control, In Vehicle)." Excavation will be measured by the cubic yard in vehicles at the point of removal. Embankment will be measured by the cubic yard in vehicles measured at the point of delivery. Shrinkage or swelling factors will not be considered in determining the calculated quantities.

5.6. **Construction Perimeter Fence**. Construction perimeter fence will be measured by the foot.

5.7. **Sandbags for Erosion Control**. Sandbags will be measured as each sandbag or by the foot along the top of sandbag berms or dams.

5.8. **Temporary Sediment-Control Fence**. Installation or removal of temporary sediment-control fence will be measured by the foot.

5.9. **Biodegradable Erosion Control Logs**. Installation or removal of biodegradable erosion control logs will be measured by the foot along the centerline of the top of the control logs.

5.10. **Vertical Tracking**. Vertical tracking will not be measured or paid for directly but is considered subsidiary to this Item.

6. PAYMENT

The following will not be paid for directly but are subsidiary to pertinent Items:

- erosion-control measures for Contractor project-specific locations (PSLs) inside and outside the right of way (such as construction and haul roads, field offices, equipment and supply areas, plants, and material sources);
- removal of litter, unless a separate pay item is shown on the plans;
- repair to devices and features damaged by Contractor operations;
- added measures and maintenance needed due to negligence, carelessness, lack of maintenance, and failure to install permanent controls;

- removal and reinstallation of devices and features needed for the convenience of the Contractor;
- finish grading and dressing upon removal of the device; and
- minor adjustments including but not limited to plumbing posts, reattaching fabric, minor grading to maintain slopes on an erosion embankment feature, or moving small numbers of sandbags.

Stabilization of disturbed areas will be paid for under pertinent Items except vertical tacking which is subsidiary.

Furnishing and installing pipe for outfalls associated with sediment traps and ponds will not be paid for directly but is subsidiary to the excavation and embankment under this Item.

6.1. **Rock Filter Dams**. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid as follows:

6.1.1. **Installation**. Installation will be paid for as "Rock Filter Dams (Install)" of the type specified. This price is full compensation for furnishing and operating equipment, finish backfill and grading, lacing, proper disposal, labor, materials, tools, and incidentals.

6.1.2. **Removal**. Removal will be paid for as "Rock Filter Dams (Remove)." This price is full compensation for furnishing and operating equipment, proper disposal, labor, materials, tools, and incidentals.

When the Engineer directs that the rock filter dam installation or portions thereof be replaced, payment will be made at the unit price bid for "Rock Filter Dams (Remove)" and for "Rock Filter Dams (Install)" of the type specified. This price is full compensation for furnishing and operating equipment, finish backfill and grading, lacing, proper disposal, labor, materials, tools, and incidentals.

6.2. **Temporary Pipe Slope Drains**. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Temporary Pipe Slope Drains" of the size specified. This price is full compensation for furnishing materials, removal and disposal, furnishing and operating equipment, labor, tools, and incidentals.

Removal of temporary pipe slope drains will not be paid for directly but is subsidiary to the installation Item. When the Engineer directs that the pipe slope drain installation or portions thereof be replaced, payment will be made at the unit price bid for "Temporary Pipe Slope Drains" of the size specified, which is full compensation for the removal and reinstallation of the pipe drain.

Earthwork required for the pipe slope drain installation, including construction of the sediment trap, will be measured and paid for under "Earthwork for Erosion and Sediment Control."

Riprap concrete or stone, when used as an energy dissipater or as a stabilized sediment trap, will be measured and paid for in accordance with Item 432, "Riprap."

6.3. **Temporary Paved Flumes**. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Temporary Paved Flume (Install)" or "Temporary Paved Flume (Remove)." This price is full compensation for furnishing and placing materials, removal and disposal, equipment, labor, tools, and incidentals.

When the Engineer directs that the paved flume installation or portions thereof be replaced, payment will be made at the unit prices bid for "Temporary Paved Flume (Remove)" and "Temporary Paved Flume (Install)." These prices are full compensation for the removal and replacement of the paved flume and for equipment, labor, tools, and incidentals.

Earthwork required for the paved flume installation, including construction of a sediment trap, will be measured and paid for under "Earthwork for Erosion and Sediment Control."

6.4. **Construction Exits**. Contractor-required construction exits from off right of way locations or on-right of way PSLs will not be paid for directly but are subsidiary to pertinent Items.

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" for construction exits needed on right of way access to work areas required by the Department will be paid for at the unit price bid for "Construction Exits (Install)" of the type specified or "Construction Exits (Remove)." This price is full compensation for furnishing and placing materials, excavating, removal and disposal, cleaning vehicles, labor, tools, and incidentals.

When the Engineer directs that a construction exit or portion thereof be removed and replaced, payment will be made at the unit prices bid for "Construction Exit (Remove)" and "Construction Exit (Install)" of the type specified. These prices are full compensation for the removal and replacement of the construction exit and for equipment, labor, tools, and incidentals.

Construction of sediment traps used in conjunction with the construction exit will be measured and paid for under "Earthwork for Erosion and Sediment Control."

6.5. **Earthwork for Erosion and Sediment Control**.

6.5.1. **Initial Earthwork for Erosion and Sediment Control**. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Excavation (Erosion and Sediment Control, In Place)," "Embankment (Erosion and Sediment Control, In Place)," "Excavation (Erosion and Sediment Control, In Vehicle)," "Embankment (Erosion and Sediment Control, (In Vehicle)," or "Earthwork (Erosion and Sediment Control, In Vehicle)."

This price is full compensation for excavation and embankment including hauling, disposal of material not used elsewhere on the project; embankments including furnishing material from approved sources and construction of erosion-control features; and equipment, labor, tools, and incidentals.

Sprinkling and rolling required by this Item will not be paid for directly but will be subsidiary to this Item.

6.5.2. **Maintenance Earthwork for Erosion and Sediment Control for Cleaning and Restoring Control Measures**. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid under a Contractor Force Account Item from invoice provided to the Engineer.

This price is full compensation for excavation, embankment, and re-grading including removal of accumulated sediment in various erosion control installations as directed, hauling, and disposal of material not used elsewhere on the project; excavation for construction of erosion-control features; embankments including furnishing material from approved sources and construction of erosion-control features; and equipment, labor, tools, and incidentals.

Earthwork needed to remove and obliterate erosion-control features will not be paid for directly but is subsidiary to pertinent Items unless otherwise shown on the plans.

Sprinkling and rolling required by this Item will not be paid for directly but will be subsidiary to this Item.

6.6. **Construction Perimeter Fence**. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Construction Perimeter Fence." This price is full compensation for furnishing and placing the fence; digging, fence posts, wire, and flagging; removal and disposal; and materials, equipment, labor, tools, and incidentals.

Removal of construction perimeter fence will be not be paid for directly but is subsidiary to the installation Item. When the Engineer directs that the perimeter fence installation or portions thereof be removed and replaced, payment will be made at the unit price bid for "Construction Perimeter Fence," which is full compensation for the removal and reinstallation of the construction perimeter fence.

6.7. **Sandbags for Erosion Control**. Sandbags will be paid for at the unit price bid for "Sandbags for Erosion Control" (of the height specified when measurement is by the foot). This price is full compensation for materials, placing sandbags, removal and disposal, equipment, labor, tools, and incidentals.

Removal of sandbags will not be paid for directly but is subsidiary to the installation Item. When the Engineer directs that the sandbag installation or portions thereof be replaced, payment will be made at the unit price bid for "Sandbags for Erosion Control," which is full compensation for the reinstallation of the sandbags.

6.8. **Temporary Sediment-Control Fence**. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid as follows:

6.8.1. **Installation**. Installation will be paid for as "Temporary Sediment-Control Fence (Install)." This price is full compensation for furnishing and operating equipment finish backfill and grading, lacing, proper disposal, labor, materials, tools, and incidentals.

6.8.2. **Removal**. Removal will be paid for as "Temporary Sediment-Control Fence (Remove)." This price is full compensation for furnishing and operating equipment, proper disposal, labor, materials, tools, and incidentals.

6.9. **Biodegradable Erosion Control Logs**. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid as follows:

6.9.1. **Installation**. Installation will be paid for as "Biodegradable Erosion Control Logs (Install)" of the size specified. This price is full compensation for furnishing and operating equipment finish backfill and grading, staking, proper disposal, labor, materials, tools, and incidentals.

6.9.2. **Removal**. Removal will be paid for as "Biodegradable Erosion Control Logs (Remove)." This price is full compensation for furnishing and operating equipment, proper disposal, labor, materials, tools, and incidentals.

6.10. **Vertical Tracking**. Vertical tracking will not be measured or paid for directly but is considered subsidiary to this Item.

SPECIAL SPECIFICATION
5202
Pipe Casing

1. General.

A. Work Included. Furnish labor, materials, equipment and incidentals necessary to install pipe casings by boring, or open cut as specified. This section sets forth the requirements for utility lines crossing roadways or railroads using open cut.

B. Quality Assurance.

1. Design Criteria.

a. Casing Insulators. Casing insulators shall be designed by the Manufacturer to adequately support and electrically isolate the carrier pipe within the casing pipe under all conditions. Number and location of spacing insulators shall be determined by the Manufacturer to protect carrier pipe from damages. One insulator shall be placed within 2 ft. of ends of casing.

2. Installer's Qualifications. Installation shall be by a competent, experienced contractor or sub-contractor. The installation contractor shall have a satisfactory experience record of at least 3 years engaged in similar work of equal scope.

3. Performance Requirements. Lateral or vertical variation in the final position of the pipe casing from the line and grade established by the Engineer shall be permitted only to the extent of 1 in. in 10 ft., provided that such variation shall be regular and only in the direction that will not detrimentally affect the function of the carrier pipe.

C. Submittals. Provide shop drawings of casing insulators including sketches of insulators with material components and dimensions and proposed locations of insulators.

D. Standards.

AWWA C-206	"Field Welding of Steel Water Pipe"
AWWA C-210	"Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines"
AASHTO M-190	"Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches"
AASHTO	Standard Specifications for Highway Bridges, 1993.
ASTM A-123	"Zinc (Hot Dipped Galvanized) Coatings on Iron and

	Steel Products”
ASTM A-135	“Electric - Resistance - Welded Steel Pipe”
ASTM A-139	“Electric - Fusion (Arc) - Welded Steel Pipe” (NPS4 and Over)
ASTM A-153	“Zinc Coating (Hot Dip) on Iron and Steel Hardware”
ASTM A-307	“Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength”
ASTM A-449	“Quenched and Tempered Steel Bolts and Studs”
ASTM A-568/A568M	“Steel, Carbon, and High Strength, Low Alloy, Hot-Rolled and Cold- Rolled for Commercial Quality”
ASTM C-76	“Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe”
ASTM D-4254	“Test Methods for Minimum Index Density of Soils and Calculation of Relative Density”

E. Delivery and Storage. [Not Used]

F. Job Conditions; Permits and Easement Requirements.

1. Where the work is in the public right-of-way or railroad company right-of-way, the Owner will secure the appropriate permits or easements. The Contractor shall observe regulations and instructions of the right-of-way Owner as to the methods of performing the work and take precautions for the safety of the property and the public. Negotiations and coordination with the right-of-way Owner shall be carried on by the Contractor, not less than 5 days prior to the time of his intentions to begin work on the right-of-way.

2. Comply with the requirements of the permit and/or easement. The work within the Texas Department of Transportation (TXDOT) shall comply with TXDOT specifications. If required by the Right-of-Way Owner, obtain Protective Liability Insurance in the amount required by the particular company or other insurance as is specified in the permit at no additional cost to the Owner. Acquire a permit, agreement, or work order from the right-of-way Owner as is required.

3. Construction along roads and railroads shall be performed in such manner that the excavated material be kept off the roads and railroads at all times, as well as, all operating equipment. Construction shall not interfere with the operations of the roads and railroads.

4. Barricades, warning signs, and flagmen, when necessary and specified, shall be provided by the Contractor.

5. No blasting shall be allowed. Existing pipelines are to be protected. The Contractor shall verify location and elevation of any pipe lines and telephone cable before proceeding with the construction and plan his construction so as to avoid damage to the existing pipe lines or telephone cables. Verification of location of existing utilities shall be the complete responsibility of the Contractor.

G. Options.

1. **Casing Material.** Unless specified otherwise, the Contractor may use steel pipe, or reinforced concrete pipe, where bore is specified. Unless specified otherwise, the Contractor may use steel pipe or reinforced concrete pipe where open cut casing is specified. The material specification for casing pipe are the minimum acceptable. The Contractor shall be fully responsible to insure the materials used are of sufficient strength for the installation method chosen and the soil conditions encountered.

2. **Bore Methods.** Unless specified otherwise, the Contractor may use boring, or jacking, for the installation method of casing material. Tunnel liner plate shall not be used where bore or jack methods are used. The Contractor shall be fully responsible to insure the methods used are adequate for the protection of workers, pipe, property, and the public. Provide a finished product as required.

H. Guarantees. [Not used]

2. Products.

A. Materials.

1. **Steel Pipe.** Steel casing pipe shall have a minimum yield strength of 35,000 psi. Casing shall meet ASTM A-36, ASTM A-568, ASTM A-135, ASTM A-139, or approved equal. Pipe shall be coated and lined in accordance with AWWA C-210 or approved equal. Pipe joints shall be welded in accordance with AWWA C-206. After pipe is welded, coating and lining shall be repaired. Unless specified otherwise, the minimum wall thickness of steel casing pipe shall be as follows:

Casing Diameter	Wall Thickness
4” - 24”	0.25”
25” - 42”	0.375”
43” - 60”	0.50”

2. **Reinforced Concrete Pipe.** Pipe casing shall conform to ASTM C-76 and shall be of the size, class and length specified. Pipe shall be a minimum of Class IV for 42 in. and smaller diameters and a minimum of Class V for diameter larger than 42 in.

B. Mixes.

1. **Cement Mortar.** Shall consist of 1 part cement to 2 parts clean sand with sufficient water to make a thick workable mix.

2. **Pressure Grout Mix.** Comprised of 1 cu. ft. of cement and 3.5 cu. ft. of clean fine sand with sufficient water added to provide a free flowing thick slurry. If desired to maintain solids in the mixture in suspension, one cu. ft. of commercial grade bentonite may be added to each 12 to 15 cu. ft. of the slurry.

C. Fabrication. [Not Used]

D. Manufactured Products.

1. Casing Insulators. Use casing insulators for any type of carrier pipe. Insulators shall consist of pre-manufactured steel bands with plastic lining and plastic runners. Insulators shall fit snug over the carrier pipe and position the carrier pipe approximately in the center of the casing pipe, to provide adequate clearance between the carrier pipe bell and the casing pipe. Fasteners for insulators shall be stainless steel or cadmium-plated. Insulators shall be as manufactured by Cascade Waterworks Manufacturing Company or Pipeline Seal and Insulators, Incorporated or Perry Equipment Corporation.

2. Mortar Bands. Concrete cylinder pipe and mortar coated steel pipe may have thickened outside mortar bands in lieu of casing insulators. Mortar bands shall be properly position the pipe within the casing.

3. Execution.

A. Preparation. [Not Used]

B. General Construction Procedures.

1. Excavation and Backfill of Access Pits.

a. Do not allow excavation over the limits of the bore as specified. Trench walls of access pits adjacent to the bore face shall be truly vertical. Shore the trench walls as necessary to protect workmen, the public, structures, roadways, and other improvements.

b. Excavations within the right-of-way and not under surfacing shall be backfilled and consolidated by tamping in 6 in. horizontal layers to 95% of maximum density as measured by ASTM D-698. Surplus material shall be removed from the right-of-way and the excavation finished to original grades. Backfill pits immediately after the installation of the carrier pipe is completed. If carrier pipe is not installed immediately after casing pipe installation, the Right-of-Way Owner may require the access pits be temporally backfilled until installation of carrier pipe.

c. Where seeding or sodding is disturbed by excavation or backfilling operations, such areas shall be replaced by seeding or sodding as specified in the North Central Texas Council of Governments Standard Specifications for Public Works Construction, Third Edition, Division 6, Underground Conduit Construction.

2. Installing Carrier Pipe In Casings.

a. Pipe to be installed within the casing shall meet the requirements for this type of pipe as specified. Where indicated, place, align, and anchor guide rails and/or casing insulators inside the casing. If guide rails are used, place cement mortar on both sides of the rails.

b. Pull or skid pipe into place inside the casing. Lubricants such as flax soap or drilling mud may be used to ease pipe installation. Do not use petroleum products, oil or grease for this purpose. If guide rails are used, install pipe and hold down jacks after installation of carrier pipe.

c. After installation of the carrier pipe, mortar inside and outside of the joints as applicable.

d. After carrier pipe installation is complete, seal or plug the ends of the casing.

3. Free Air System. If required by OSHA standards, free-air systems shall be installed and maintained.

4. Installation of Pressure Grout Mix.

a. Install pressure grout mix in the void space between the outside of the casing pipe and the excavation. For bore or jacks with casing pipe, install pressure grout mix immediately upon completion of setting casing pipe.

b. Grout fittings shall be fabricated into casing pipe at a maximum spacing of 6 ft. Remove and plug grout fittings after pressure grouting.

c. Install pressure grout from the low end for all crossings where grout fittings are not used. Seal the low end and pressure grout until grout is extruded from the opposite end.

C. Crossings Installed By Borings.

1. Perform the boring from the low or downstream end unless specified otherwise. Bore the holes mechanically and use a pilot hole. By this method, an approximate 2 in. pilot hole shall be bored the entire length of the crossing and shall be checked for line and grade. This pilot hole shall serve as the centerline of the larger diameter hole to be bored. Place excavated material near the top of the working pit and dispose of material as required. The use of water or other fluids in connection with the boring operation will be permitted only to the extent to lubricate cuttings. Jetting shall not be permitted.

2. In unconsolidated soil formations, a gel-forming colloidal drilling fluid consisting of at least 10% of high grade carefully processed bentonite may be used to consolidate cuttings of the bit, seal the walls of the hole, and furnish lubrication for subsequent removal of cuttings and installation of the pipe immediately thereafter.

3. In locations where the soil formation is other than consolidated rock, insert the casing pipe simultaneously with the boring operation. This requirement applies to all bored holes of 18 in. or greater in diameter. For smaller diameter bored holes, it is desirable that the casing be installed as the boring progresses, but because of differences in soil formations, the time for inserting the casing shall be the Contractor's responsibility. In the event that caving sand or water bearing materials are encountered, insert the casing pipe simultaneously with the boring operation regardless of the diameter of the bored hole. In all cases, the security and integrity of the roadway is the primary concern. The Contractor shall be held fully

responsible for the continued integrity of the structure of the roadway being crossed, whether or not a casing pipe is inserted simultaneously with the boring operation.

D. Crossing with Casing Installed by Open Cut. This article covers the requirements for the construction of crossings where pipe casing is required for installation by the open cut method. Excavation, backfill, and embedment of casing pipe shall be as specified in the North Central Texas Council of Governments Standard Specifications for Public Works Construction, Third Edition, Division 6, Underground Conduit Construction. All other requirements shall be as specified herein.

E. Field Quality Control. [Not Used]

F. Clean and Adjust. [Not Used]

G. Schedules. [Not Used]

4. Measurement. This Item will be measured by the foot.

5. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Pipe Casing" of the type and size specified. This price is full compensation for furnishing, hauling and laying of casing, replacement of topsoil; replacing landscaping to a condition as good or better than existed prior to construction; protecting or replacing existing structures, sidewalks or utilities; relocation of existing utilities; disposal of surplus materials; cleaning up and maintenance; surveying and replacement of monuments; dust control; removal of mud from roadways; and any incidental work and materials not otherwise provided for in these Specifications, all in strict accordance with the Contract Drawings and Project Specifications.