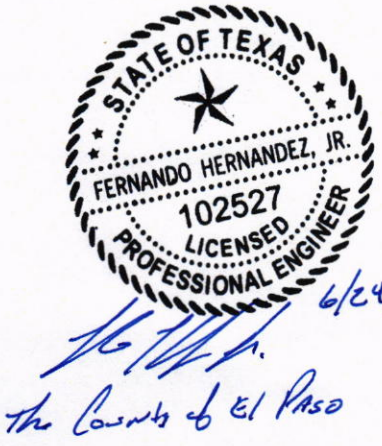
VISTA DEL ESTE

WATER DISTRIBUTION SYSTEM



TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

COUNTY OF EL PASO

VISTA DEL ESTE WATER DISTRIBUTION SYSTEM

COUNTY OF EL PASO, TEXAS

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TECHNICAL SPECIFICATIONS

DIVISION 1

SECTION 01010 – GENERAL

PART 1 GENERAL

1.01 CONSTRUCTION SEQUENCING

A. These specifications cover the work required to complete the project. For all phases of this work, the Contractor shall reference the plans prepared by the County of El Paso under the title, "*Vista del Este Water Distribution System*," to ensure that other requirements are met.

B. All construction shall be sequenced in such a way to allow for a minimum of vehicular and pedestrian traffic interruption, while keeping the existing water lines and other utilities in service, as well as complying with the requirements of the County of El Paso (County) and Texas Commission on Environmental Quality (TCEQ).

C. The lowest, responsible, responsive bidder must meet all of the qualifications as set forth in the contract documents, shown below. **Minimum Project Specific Requirements shall be submitted with the Bid Documents in a separate individually sealed envelope.**

MINIMUM PROJECT SPECIFIC REQUIREMENTS

1. Project is to be constructed within a residential area congested with vehicular and pedestrian traffic. The Contractor shall need to coordinate with the County of El Paso R&B. Bidder must provide/demonstrate they has successfully completed project with similar complexity and depth with regards to development, employing traffic control plans and maintaining them that was completed within the past five years. Experienced subcontractor is acceptable.

2. Project involves the installation of water pipe mains and services that included installation requirements for the contractor to coordinate with El Paso Water Utilities and the County of El Paso. The bidder must demonstrate successful completion of at least one project with similar complexity and depth within the past five years. The project must show the installation of at least 10,000 ft of 12" water lines or larger.

3. Project involves the replacement of pavement along the pipeline route. Bidder must demonstrate one successful project within the past five years where pavement was replaced as required and performed under the direction of the bidder. The project must show the pavement replacement of no less than 1,000 square yards with similar complexity. Experienced subcontractor is acceptable.

4. The key personnel required for this project are: a project manager, full time superintendent, full time foreman, project scheduler and owners or principals of the bidder to be assigned to the project for the duration of by the Contractor, in order to assure a completely functional and timely completion of the project. The project manager, full time superintendent and full time foreman shall have performed one project with similar complexity within the past five years. The Owner reserves the right to review and approve or reject the persons listed as key personnel. Resumes of each Key personnel must be submitted with the bid and accepted by the Owner in order for the Bidder to receive award.

1.02 COMPLETE FACILITY

A. It is the intent of these specifications that the required items function in accordance with the specified purpose. Therefore, it is the direct responsibility of the Contractor to furnish, install, and construct the complete improvements as required by the plans, specifications and code for the price(s) stated in the Contract, and to take account of all subsidiary requirements in accordance with the specified requirements.

1.03 RIGHTS-OF-WAY

A. The proposed construction shall be installed within County right-of-ways. The Contractor shall use the minimum area practicable for construction of the water lines. Excess excavated material shall be removed from the street right-of-way and disposed of by the Contractor as required by the Specifications and by local, state and federal law. All street right-of-way shall be restored to their original or better condition upon completion of work in the immediate area.

B. Construction within the County right-of-way shall be performed in a manner causing a minimum of inconvenience to pedestrian and vehicular traffic and adjacent property. Safe passage shall be provided at all times for the public in those areas where the construction is occurring. Provisions shall be made by Contractor for the notification to the County whenever work is to be carried out in any street in County and care shall be taken for the control of traffic. The Contractor is responsible for all traffic control and safety and plans and permits and with complaining with the requirements of the jurisdictional agency. Permits required by the County may be obtainable through their office. Permits must be acquired by the Contractor.

1.04 CONTRACTOR'S SUPERINTENDENCE

A. The Contractor's Superintendent shall be assigned to this project on a full-time basis. This will require that the Contractor's Superintendent be at the project site at all times when construction activities are occurring. If the Contractor's Superintendent is not at the site, the Owner has the right, at his discretion, to stop the Contractor's entire operation at that given time. The Contractor's Superintendent will not operate any equipment at any time during the project.

   If at any time during the progress of the Work, the Owner, at his discretion, finds that the Contractor's Superintendent is not found to be competent to perform the duties for this project, the Owner may require that the Contractor change Superintendents.

1.05 TESTING LABORATORY

A. The Owner will retain a testing laboratory to perform inspections, sampling and confirmation tests to determine Quality Assurance (QA) compliance of the work. Procedures and methods for determining compliance shall be as directed by the Engineer. Owner shall be responsible for payment for all costs associated with initial confirmation tests required to determine compliance with the Contract Documents. Costs for retests performed because the initial test resulted in a failure and any delay or extra time during the test, shall be paid for by the Contractor. Any costs incurred by the Owner for retesting shall be deducted from subsequent Contractor pay requests.

B. Contractor may employ services of independent testing laboratory to perform services and testing required in ensuring compliance Quality Control (QC) with the Contract or for his convenience. Contractor is responsible and shall pay for all independent testing laboratory services in connection with compaction, design mixes, job mix formula and materials and manufacture items in accordance with the General Conditions. Contractor is responsible and shall pay for all independent testing laboratory services in connection with establishing suitability of excavated on-site materials for use as fill or embankment. Owner may employ independent testing laboratory to verify suitability of these materials proposed for use in the project at Owner's cost.

C. If the Contractor elects to utilize a testing laboratory for the Contractor's convenience, it shall not be the same firm retained by the Owner.

D. Engineer will contact the Owner's independent testing laboratory and order Owner paid appropriate QA field testing, will select sample locations, and shall be furnished copies of all test results.

E. Contractor's Responsibilities

1. Cooperate with laboratory personnel, provide access to Work.

2. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.

3. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.

4. Furnish copies of products' test reports as required.

5. Furnish incidental labor and facilities:

a. To provide access to Work to be tested.

b. To facilitate tests including obtaining and handling samples at Project site if so requested.

6. Notify Owner and Engineer sufficiently (at least 24 hours) in advance of operations to allow for laboratory assignment of personnel and scheduling of tests. When tests cannot be performed because of inadequate notice, Contractor shall bear all additional expenses incurred for laboratory personnel and travel due to Contractor's negligence. Contractor shall also not be entitled to extension of Time in such event, if Work cannot proceed prior to performance of tests.

7. If so desired, make arrangements with its own laboratory and pay for additional samples and tests required for the Contractor's convenience.

8. The Contractor is responsible for all tests and certifications regarding pipeline materials and appurtenances and pipeline testing for conformance with specifications.

1.06 TESTS

A. Where tests of materials or any portions of the Work are required by standards, law/ordinance or public authority, the Contractor shall bear all costs of such tests, shall give timely notice of readiness therefore and shall furnish to the Engineer the required certification of testing or approval.

B. Tests specified in the Technical Specifications shall fall into four categories: (1) those required for approval of materials prior to use, which serve the same purpose as shop drawings or samples; (2) those required by law; (3) those necessary for acceptance of equipment, or facilities; and (4) those made during the progress of the Work to check compliance with the requirements of the Contract Documents. The Contractor shall bear all the costs of the tests in the first three categories.

C. The tests made in the fourth category will be made at the discretion of the Engineer and all costs thereof will be borne by the Owner, except that the Contractor shall furnish the materials or samples for the test and shall cooperate with the Engineer or Testing Laboratory in securing such samples. In addition, the costs for all failing tests in this category shall be borne by the Contractor.

D. For any density failure on the subgrade or base course, the contractor needs to re-compact the area approximately 25 feet before and after the location of failure and to the same depth. The retest shall be at the same station of failure and same proctor shall be used from the Laboratory unless the soils material is different.

1.07 EMERGENCY COMMUNICATION

A. The Contractor shall maintain at all times during construction, a local telephone number of where responsible supervisory personnel may be contacted twenty-four hours a day of every day the project is under construction and not yet accepted by the Owner. The telephone number shall be given to the County Project Manager and to the Engineer and Engineer Representative (915-544-5232) so that contact can be made in the event of any emergency.

1.08 EXISTING UTILITIES AND FACILITIES

A. The Contractor shall be fully responsible for all underground facilities which are shown on the drawings or which can be located by the Contractor with reasonable effort, or which are brought to the attention of the Contractor in any manner. The Contractor shall be responsible for notifying the Engineer if any unknown facilities are uncovered and for protecting those facilities after they are uncovered.

B. The drawings only indicate the approximate location of existing utilities that could be located or approximated during design. Therefore, the Contractor shall be responsible for determining the exact location of all buried utilities within the project area prior to starting any excavation activities. The Contractor shall be responsible for locating, protecting, and repairing any damages utilities and service connections resulting from the work done within the construction site their cost.

C. The Contractor shall be responsible for the protection of all electric power poles, overhead lines, light poles, etc. which occur within/near private properties. The Contractor shall provide whatever temporary shoring is necessary to ensure that all poles are adequately supported, braced, etc. so that the pole does not sink, shift, tilt, or otherwise move from its original position. Any removal of guy wires or anchors and setting of any guy wires or anchors shall be done at the Contractors expense. Any measures the Contractor takes to support any type of pole shall be based upon approval of the owner of the pole and the Engineer. The owner of the pole and the Engineer shall be notified of probable work on the pole no later than within the first week of Contractor's work, and again 5 business days prior to the work being done. Removal of temporary supports of guy wires shall be with the approval of the owner of the pole and the Engineer. Said removals of temporary facilities shall only be accomplished upon 5 business day's notification to the owner of the pole and the Engineer.

D. The Contractor shall coordinate the work with all utility companies having facilities within the area of work, including but not limited to the Texas Gas Service Company, El Paso Electric, El Paso County Public Works Department, MCI Telecommunications Company, U.S. Sprint Telecommunications Company, A.T. & T. and Time Warner Cable for the relocation, by-passing or protection of their existing utility lines. Any work associated with the protection, hanging, relocation or by-passing of existing utility lines shall be reflected in the Contractor's project schedule so that the work may be completed without delay to the project. All the requirements of the contract documents will apply to any subcontractor who performs any relocation, hanging, by-passing, or protection of existing utility lines. All work associated with the relocating, hanging, by-passing, or protection of existing utility lines shall be at the expense of the Contractor. Prior to the commencement of any protection, hanging, relocation, or by-pass work the Contractor shall submit a work plan to the utility line owner and the Engineer for approval. No relocation or by-pass work shall be performed without prior written approval of the work by the owner of the utility line and the Engineer. Emergency protection of existing utility lines to protect the line from immediate damage may be performed by the Contractor without prior approval; however, the Contractor shall take every action available to notify the Owner and the Engineer of the situation as quickly as possible.

1.09 DAMAGE TO PRIVATE PROPERTY

A. The Contractor shall be responsible for any damage to private property caused by the construction project. The Contractor upon receipt of a complaint of damage shall within 24 hours respond in writing with a proposal to repair said damage or a letter with reasons explaining why the damage was not caused by the construction. The damage shall be repaired completely within 15 days of the complaint. If the damages are not repaired within the 15 days stated above, the owner may perform the repairs and back charge the contractor.

1.10 TRENCH EXCAVATION SAFETY SYSTEM

A. The Contractor will be required to install a trench safety system to provide for the safe excavating of all trenches in accordance with OSHA standards.

B. It shall be the duty and responsibility of the Contractor and all his subcontractors to be familiar with and comply with all requirements of Public Law 91-586, 29 U.S.C. Secs. 651 et seq., the Occupational Safety and Health Act of 1970 (OSHA), and all amendments thereto, and to enforce and comply with all of the provisions of the Act. In addition, on a project in which trench excavation will exceed a depth of five feet, the Contractor and all of his subcontractors shall comply with all requirements of 29 C.F.R. Secs, 1926.652 and 1926.653, OSHA Safety and Health Standards, which are more fully described above, for the particular safety system to be utilized by the Contractors.

C. The successful low bidder will be required to submit an original and 5 copies of trench excavation plans with a trench safety system to the Program (Project) Manager for informational purposes within ten (10) calendar days after Award of Contract.

D. Plans must be designed and sealed by a professional engineer registered in the State of Texas with professional experience in geotechnical engineering. The Contractor is responsible for obtaining borings and soil analysis as required for the design and preparation of the trench excavation plan and trench safety system.

E. No trenching will be allowed without the use of the trench safety system in accordance with OSHA standards. Any changes in the trench excavation plan after initiation of construction will not be cause of Extension of Time or Change Order.

F. The Contractor accepts sole responsibility for compliance with all applicable safety requirements. Reviews by the Engineer are only for an evaluation of general conformance with OSHA safety standards; and review of the trench excavation plan does not relieve the Contractor of any or all construction means, methods, techniques, and procedures. Any property damage or bodily injury, including death, which arises from use of the trench, remains the sole responsibility and liability of the Contractor.

G. No open trenches will be allowed overnight for any reason, unless approved in writing by R.O.W. agency.

1.11 VIDEO TAPING

A. Prior to and after construction, the project site and all other construction sites shall be videotaped by the Contractor accompanied by the Engineer or his representative, to show existing conditions of roadways, adjacent properties, within property, easements, structures, utilities, rockwalls, chainlink fence, sidewalks, curb and gutter, power poles, light poles, landscaping, driveways, and other existing improvements and if it is possible Contractor should videotape inside the private property. The video shall be used to determine any residential complaints. If the Contractor cannot show on the video tape that the damage was present prior to construction, the Contractor's will be responsible for repairing the damages at his expense as described in Item 1.09 of this section. Two copies of the videotaping shall be given to the Engineer in D.V.D Format. Payment for videotaping shall be lump sum as shown on the Proposal.

1.12 APPROVAL OF EQUIPMENT AND MATERIALS

A. All materials shall be new and shall be designed and manufactured for the function and service specified herein. No materials shall be used in the project except those which have been approved by the Engineer. Approval for installation or incorporation in the project will be made only after submittal and examination of shop and installation drawings, manufacturer's specifications, test results or other data required in the paragraph SHOP AND INSTALLATION DRAWINGS or in connection with the Technical Specifications. Final approval and acceptance of equipment will be made only after such equipment is in operation and has met all specified tests.

1.13 SHOP AND INSTALLATION DRAWINGS

A. Shop and Installation Drawings, Installation Instructions, Manufacturer's Specifications, and all other pertinent data required by the Engineer to determine approval for installation of the materials and equipment, shall be submitted to the Engineer, as required by the General Conditions and Section 01300, of the Specifications. Such drawings and other data as required shall be submitted to the Engineer at the earliest practicable date. Delay in submission of shop drawings will not of itself be grounds for granting an extension of time. Shop Drawings submitted to the Engineer without first having been checked by Contractor will be returned to the Contractor for such checking before being examined by the Engineer.

B. Shop Drawings shall be complete, showing all pipelines pieces and fittings dimensions, anchor bolts or other mounting devices, openings in structures required for installation of connecting piping, and any other pertinent data necessary for determining compliance with the specifications and suitability of the installation and for the service intended.

C. One initial shop drawing submittal consisting of the Contractor's requirement plus 4 complete sets and one re-submittal of an equal number of complete sets will be reviewed by the Engineer at no cost to the Contractor. Subsequent reviews on resubmitted shop drawings will be reviewed at a cost to the Contractor equal to the billing rate of the reviewing Engineer times the hours required to review the submittal.

1.14 TRAFFIC CONTROL

A. Traffic control for all areas of the project shall be the responsibility of the Contractor. Two weeks prior to commencing any work in specific areas of the project, the Contractor shall prepare and submit for County of El Paso for approval, Traffic Control plans for that particular work area. The traffic control plans shall conform to the specifications and principles given in the "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", PART IV, latest edition and version issued by the Texas Department of Transportation. Six (6) copies of the Approved Traffic Control Plan shall be submitted to the Engineer.

1.15 DELIVERIES TO OWNER

A. Contractor shall provide copies of paid receipts with the monthly partial payment request to the Owner.

B. Contractor shall keep delivery receipts with Project Record Documents.

C. All deliveries to Owner shall be at the Owner's designated location on the job site. Location may vary according to materials delivered.

1.15 OWNER FURNISHED ITEMS

A. N/A

1.17 NIGHTTIME, WEEKEND AND HOLIDAY WORK

A. If the Contractor desires to perform any work between the hours of 5 p.m. and 6 a.m., or on Saturdays, Sundays or national holidays, he shall request in writing to do so before he starts such work. The Contractor shall acquire any necessary permits associated with such work and comply with all permit conditions and all laws and ordinances relating thereto.

B. The Contractor shall reimburse the Owner for additional costs incurred as a result of providing additional inspection personnel when the Contractor performs the nighttime, weekend or holiday work. Additional inspection costs will be at the rate of $95.00 per hour, overtime rate will be at a rate of time and a half.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

A. No measurement shall be made for the work of this Section. Payment made for all work covered in this section except where unit bid item is provided shall be included in the unit price per for mobilization/demobilization indicated in the Bid Proposal. Videotaping of construction areas shall be paid at the lump sum price bid, as shown on the Proposal. Such payment shall be at ½ for preconstruction video and ½ for post construction video.

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SECTION 01014 – TRENCH SAFETY SYSTEM

PART 1 GENERAL

1.01 GENERAL

A. This section shall govern the Trench Safety Systems required for the construction of all trench excavation to be utilized in the project including all additional excavation and backfill necessitated by the safety system. The trench safety systems shall be suitable for construction or pipelines, utilities, etc., that are installed below grade and shall be sufficient to fully protect public or private property including other existing utilities and structures below, or above grade. Trench Safety Systems include but are not limited to sloping of side of excavation, sheeting, trench boxes or trench shields, sheet piling, cribbing, bracing, shoring, dewatering, or diversion of water to provide adequate drainage.

1.02 SECTION INCLUDES

A. Special Conditions.

B. Indemnification.

C. Construction Methods.

D. Safety Program.

E. Emergencies.

F. OSHA.

1.03 SPECIAL CONDITIONS

A. The Contractor will be required to install a trench safety system to provide for the safe excavation of all trenches exceeding a depth of five (5) feet as per OSHA standards or when existing soil conditions dictate.

B. It shall be the duty and responsibility of the Contractor and all of its subcontractors to be familiar and comply with all requirements of Public Law 91-596, 29 U.S.C. Secs. 651 et. seq., the Occupational Safety and Health Act of 1970 (OSHA), and all amendments thereto, and to enforce and comply with all of the provisions of this Act. In addition, on projects in which trench excavation will exceed a depth of five feet, the Contractor and all of its subcontractors shall comply with all requirements of 29 C.F.R. Secs., 1926.652 and 1926.653, OSHA Safety and Health Standards, which are more fully described herein.

C. The successful responsible bidder will be required to submit 3 sets of trench excavation plans with a trench safety system to the Owner for review within 15 consecutive days after Award of Contract.

D. Plans must be **designed** and **sealed** by a professional engineer registered in the State of Texas with professional experience in geotechnical engineering. The Contractor is responsible for obtaining borings and soil analysis as required for the design and preparation of the trench excavation plan and trench safety system. The trench excavation plan and the trench safety system is to be designed in conformance with OSHA standards and regulations.

E. No trenching in excess of five (5) feet below existing grade will be allowed until the trench excavation plan is reviewed and returned as approved to the Contractor. Any changes in the trench excavation plan after initiation of construction will not cause an Extension of Time or Change Order but such changes will require the same review process as the original excavation plan.

F. The Contractor accepts sole responsibility for compliance with all applicable safety requirements. The review is only for general conformance with OSHA safety standards; and review of the trench excavation plan does not relieve the Contractor of any or all construction means, methods, techniques, and procedures. Any property damage or bodily injury, including death that arises from use of the trench excavation plan shall remain the sole responsibility and liability of the Contractor.

1.04 INDEMNIFICATION

A. The Contractor shall indemnify and hold harmless the Owner, its employees and agents, from any and all damages, costs (including without limitation, legal fees, court costs, and the cost of investigation), judgments or claims, by anyone, including workers or the general public, for injury or death of persons resulting from the collapse or failure of trenches constructed under this contract.

B. The Contractor acknowledges and agrees that this indemnity provision provides indemnity for the Owner in case that claims are made that the Owner is negligent either by act or omission in providing for trench safety, including, but not limited to inspections, failure to issue stop work orders, and the hiring of the Contractor.

C. The Contractor shall be responsible for the design of systems, and procedures such as the use of sheet piling, shoring, or other means of temporary support to protect existing buildings, streets, highways, water conveying structures, or any other structures. In the case of existing utilities, the contractor may elect to remove the utilities under the stipulated condition that the removal and subsequent replacement of these utilities shall meet with the approval of the Engineer, the Owner, the Utility Owner, and all agencies having jurisdiction of the structure or property. In all cases, the Contractor shall be fully responsible for the protection of public, or private property and for the protection of any person or persons who, as a result of the Contractor's work, may be injured.

1.05 CONSTRUCTION METHODS

A. Trench safety systems shall be accomplished in accordance with the detailed specifications set out in the provisions of Excavations, Trenching, and Shoring, Federal Occupational Safety and Health Administration (OSHA) Standards, 29 CFR, Part 1926. Subpart P, as amended including proposed Rules published in the Federal Register (Vol. 54, No. 209) on Tuesday, October 31, 1989. The sections that are incorporated into these specifications by reference include Sections 1926-650 through 1926-652. Legislation that has been enacted by the Texas Legislature (H.B. No. 662 and H.B. No. 665) with regard to Trench Safety Systems, is hereby also incorporated, by reference, into these specifications.

1.06 SAFETY PROGRAM

A. The Contractor shall submit a safety program specifically for the construction of trench excavations together with the trench excavation plans for Trench Safety Systems. The trench safety program shall be in accordance with OSHA standards governing the presence and activities of individuals working in and around trench excavation.

B. Contractors have two generally accepted methods, or combinations thereof, to meet OSHA Standards for Trench Excavations:

1. Utilization of Trench Box.

2. Shoring, Sheeting, and Bracing Methods.

C. A Contractor electing to utilize a Trench Box must submit physical dimensions, materials, position in the trench, expected loads, and the strength of the box. The Trench Box shall be designed by a Professional Engineer. No claims for delay will be permitted.

D. Contractor electing to utilize Shoring, Sheeting, and Bracing must submit dimensions and materials of all uprights, stringers, cross-bracing, and spacing required to meet OSHA requirements, all designed by a Professional Engineer. No claims for delay will be permitted.

1.07 INSPECTION

A. The Contractor shall provide a qualified person to make daily inspections of the Trench Safety Systems to ensure that the systems meet OSHA requirements. The Contractor shall maintain a permanent record of daily inspections.

B. If evidence of possible cave-ins, or slides, is apparent, all work in the trench shall cease until the necessary precautions have been taken by the contractor to safeguard personnel entering the trench. It is the sole duty, responsibility, and prerogative of the contractor, not the Owner or the Owner's designated representative, to determine the specific applicability of the designed trench safety systems to each field condition encountered on the project.

1.08 EMERGENCIES

A. In an emergency situation, which may threaten or affect the safety or welfare of persons or property, the Contractor shall act at his discretion to prevent possible damage, injury, or loss. Any additional compensation or extension of time claimed for such action shall be considered in view of the cause of the emergency and in accordance with the General Conditions.

1.09 OSHA SAFETY AND HEALTH REGULATIONS PART 1926: *(see 02221)*

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

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SECTION 01015 – CONTROL OF WORK

PART 1 GENERAL

1.01 WORK PROGRESS

A. The Contractor shall furnish personnel and equipment which will be efficient, appropriate and skilled enough to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Agreement. If at any time such personnel or equipment appears to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

1.02 PRIVATE LAND

A. The Contractor shall not enter or occupy private land outside of acquired rights-of-way or easements, except by written permission of the Land/Easement Owner.

1.03 WORK LOCATIONS

A. Work shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or utilities or for other reasons. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required to make a complete working system.

1.04 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights, and other means to prevent accidents to persons and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access during construction shall be removed when no longer required. The length or size of excavation will be controlled by the particular surrounding conditions but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of open trench, prohibiting stacking of excavated material in the street, and requiring that the trench shall not remain open overnight.

B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be protected with barricades having flashing warning lights at all times when appropriate to insure safety and when construction is not in progress.

C. The Contractor shall take appropriate measures to prevent any surface flow from entering any open excavation at any time, including flow from any defined watercourse or overland flow during or following a rainfall event or storm.

D. No open trenches will be allowed overnight for any reason, unless approved in writing by R.O.W. agency.

1.05 TEST PITS

A. Test pits for the purpose of locating underground utilities or structures in advance of the construction shall be excavated and backfilled by the Contractor. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer.

1.06 DISTRIBUTION SYSTEMS AND SERVICES

A. The Contractor shall not interrupt water, sewer, gas, telephone, cable TV, or other utility services without the written permission of the utility owner.

B. If it appears that utility service will be interrupted for an extended period, the Engineer may order the Contractor to provide temporary service lines. Inconvenience to the users shall be minimized, consistent with existing conditions. The safety and integrity of the system is of prime importance in scheduling work.

C. The Contractor shall not move, cut, or relocate private utilities (gas, electric, telephone, cable TV, etc.) without the written permission of the appropriate utility company.

1.07 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to building utilities, in the street, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operation shall be repaired by him at his expense, or in the case of private utilities, repaired by that utility at the Contractor's expense.

B. The Contractor shall bear full responsibility for obtaining locations of all underground structures and utilities. Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by the Contractor.

C. Protection and temporary removal and replacement of existing utilities and structures as described in this Section shall be a part of the work under the Contract and all costs in connection therewith shall be included in the unit prices established in the Bid.

D. If, in the opinion of the Engineer, permanent relocation of a utility owned by Owner is required, he may direct the Contractor in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices, if applicable, or as extra work under Article 10 of the General Conditions. If relocation of a privately owned utility is required, the Owner will notify the Utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the Owner and Utility and shall have no claim for delay due to such relocation. The Contractor shall notify public utility companies in writing at least 72 hours (excluding Saturdays, Sundays, and legal holidays) before excavating near their utilities.

1.08 MAINTENANCE OF TRAFFIC

A. Unless permission to close a street is received in writing from the appropriate authority, all excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operations cause traffic hazards, he shall repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the proper authority.

B. Detours around construction will be subject to the approval of the Traffic Control Plan. Where detours are permitted the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured, the Contractor shall expedite construction operations, and periods when traffic is being detoured will be strictly controlled by the and/or right-of-way Owner.

C. The Contractor shall take precautions to prevent injury to the public due to open trenches and boring pits. Night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in progress. The Contractor shall be fully responsible for damage or injuries whether or not police protection has been provided.

1.09 CARE AND PROTECTION OF PROPERTY

A. The Contractor shall be responsible for the preservation of all public and private property and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manner acceptable to the Engineer.

B. The Contractor upon receipt of a complaint of damage shall within 24 hours respond in writing with a proposal to repair said damage or a letter with reasons explaining why the damage was not caused by the construction. The damage shall be repaired completely within 15 days of the complaint. If the damages are not repaired within the 15 days stated above, the owner may perform the repairs and back charge the contractor.

C. All sidewalks, which are disturbed by the Contractor's operations, shall be restored to their original or better condition by the use of similar or comparable materials. All curbing shall be restored to a condition equal to or better than the original construction and in accordance with the best modern practice.

D. Along the location of this Work all fences, walks, bushes, trees, shrubbery, and other physical features shall be protected and restored to a condition equal to or better than the original construction and in accordance with the best modern practice.

E. Trees close to the work shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification of the Engineer. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods, using only approved tools and materials.

F. The protection, removal, and replacement of existing physical features along the line work, including existing utilities, of shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Bid Form.

1.10 MAINTENANCE OF FLOW

A. The Contractor shall at his own cost, provide for the flow of sewers, drains and watercourses interrupted during the progress of the Work, and shall immediately cart away and remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer and the Owner well in advance of the interruption of any flow. Restoration of water and/or sewer service, temporarily or accidentally disrupted, shall have priority over all other work. Such service shall be restored immediately.

B. Contractor shall provide sufficient personnel to assist in proper notification to all customers affected by temporary water shut-off.

C. All spillage and offensive matter to be removed from the site and disposed of by the Contractor shall be taken to waste treatment plant facilities, landfills, or other suitable facilities acceptable to the Engineer and the facility owner and in compliance with all applicable regulations. Contractor shall bear all cost of removal, transportation and disposal to the proper site.

1.11 DISPOSAL OF EXCESS EXCAVATED AND OTHER WASTE MATERIALS

A. All excess material (suitable or unsuitable) and all vegetation, trash, debris, etc., from the excavation shall be disposed of off-site at a location approved by the Owner.

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 or restrict the flows of such waters. A list of approved disposal sites can be obtained at the different state, city and county agencies.

C. The Contractor shall make his own arrangements for disposal subject to submission of proof to the Owner that the owner(s) of the proposed site(s) have 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.

E. The Contractor shall comply with all necessary permits, licenses, and authorizations regarding the removal, transport and disposal of sludge as are required by all applicable Federal, State and local laws and regulations.

F. The Owner may suspend operations of the Contractor, at its discretion, for alleged non-compliance with Texas Water Commission or Environmental Protection Agency regulations.

1.12 PROTECTION OF AIR QUALITY

A. Air pollution shall be minimized by wetting down bare soils during windy periods, or as requested by Engineer by requiring the use of properly operating combustion emission control devices on construction vehicles and equipment used by Contractors, and by encouraging the shutdown of motorized equipment not actually in use.

B. Trash burning will not be permitted on the construction site without the Owner's approval.

C. If temporary heating devices are necessary for protection of the work, such devices shall be of a type that will not cause pollution of the air.

1.13 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 other applicable regulatory agency. Use of all such chemicals and disposal of residues shall be in conformance with the manufacturer's instructions.

1.14 NOISE AND DUST CONTROL

A. The Contractor shall so conduct his operations that they will not annoy the residents in the vicinity of the work and shall comply with all applicable local ordinances. Compressors, hoists, and other apparatus shall be equipped with such mechanical devices as may be necessary to minimize noise and dust. Compressors shall be equipped with silencers on intake lines. All gasoline or oil operated equipment shall be equipped with silencers or mufflers on intake and exhaust lines. Storage bins and hoppers shall be lined with material that will deaden the sounds if directed by Engineer. The operation of dumping rock and of carrying rock away in trucks shall be so conducted as to cause a minimum of noise and dust. Vehicles carrying rock, concrete, or other material shall be routed over such streets as will cause the least annoyance to the public and shall not be operated on public streets between the hours of 6 p.m. and 7 a.m. or on Saturdays, Sundays or legal holidays unless approved by the Owner. The Contractor shall comply with the County of El PAso for exterior noise standards as per applicable noise zone. The County Department of Health will ultimately determine the actual noise level readings in case of a complaint. The Contractor shall immediately correct its actions to minimize the noise and to bring it to County compliance.

B. All unpaved streets, roads, detours, or haul roads used in the construction area shall be given an approved dust-preventive treatment or periodically watered to prevent dust of at least twice a day or as directed by the R.O.W. jurisdictional agency Inspector, Owner and/or Engineer. Applicable environmental regulations for dust prevention shall be strictly enforced.

1.15 CLEANUP

A. During the course of the Work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, pipe, lumber, equipment, temporary structures, vegetation and any other refuse remaining from the construction operations, and shall leave the entire site of the Work in a neat and orderly condition at the end of each working day.

1.16 CONTRACTOR'S QUALITY CONTROL

A. All material shall be new and of the specified quality and equal to the accepted samples, if samples have been submitted. All work shall be done and completed in a thorough, workmanlike manner, notwithstanding any omission from these Contract Documents; and it shall be the duty of the Contractor to call the Engineer's attention to apparent errors or omissions and request instructions before proceeding with the work. The Engineer may, by appropriate instructions, correct errors and supply omissions, which instructions shall be as binding upon the Contractor as though contained in the original Contract Documents.

B. At the option of the Engineer, materials to be supplied under this Contract will be tested and/or inspected either at their place of origin or at the site of the work. The Contractor shall give the Engineer written notification well in advance of actual readiness of materials to be tested and/or inspected at point of origin. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the material nor shall it preclude retesting or reinspection at the site of the work.

C. Material, which will require testing and inspection at the place of origin, shall not be shipped prior to such testing and inspection.

END OF SECTION

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SECTION 01020 – TPDES REQUIREMENTS

PART 1—GENERAL

The Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit No. TXR 150000, was issued March 5, 2003 (Construction General Permit). The Construction General Permit allows operators to obtain permit coverage for storm water conveyance from Small and Large Construction Activities. The TPDES program implements the federal National Pollutant Discharge Elimination System (NPDES) program in the state of Texas, which requires that operators of Small or Large Construction Activities obtain permit coverage prior to the commencement of construction activities.

The engineer has estimated that the project will disturb approximately 3.5 acres of land and has included the forms to be filled out and submitted to TCEQ for a Storm Water Pollution Prevention Plan (SW3P). It is the Contractor's responsibility to obtain and implement a SW3P for this project.

1.01 SECTION INCLUDES

A. Documentation to be prepared and signed by Contractor before conducting construction operations, in accordance with the Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit Number TXR 150000, issued on March 5, 2003 (Construction General Permit).

B. Implementation, maintenance inspection, and termination of storm water pollution prevention control measures including, but not limited to, erosion and sediment controls, storm water management plans, waste collection and disposal, and other applicable practices shown on the drawings or specified elsewhere in the Contract.

1.02 DEFINITIONS

A. Commencement of Construction Activities: The exposure of soil resulting from activities such as clearing, grading, and excavating.

B. Large Construction Activity is defined as a project that:

1. Disturbs five acres or more, or

2. Disturbs less than five acres but is part of a large common plan of development that will disturb five acres or more of land.

C. Small Construction Activity is a project that:

1. Disturbs one or more acres but less than five acres, or

2. Disturbs less than one acre but is part of a larger common plan of development that will ultimately disturb one or more acres but less than five acres.

D. Operator is a person or persons who have day-to-day operation control of the construction activities, which are necessary to ensure compliance with the SW3P for the site.

PART 2—PRODUCTS

Not Used

PART 3—EXECUTION

3.01 STORM WATER POLLUTION PREVENTION PLAN (SW3P)

A. The Contractor shall have an SW3P prepared in accordance with Part III of the Construction General Permit for Small or Large Construction Activities. A professional engineer licensed in the state of Texas shall prepare the SW3P, in accordance with City of El Paso ordinance.

B. Support Activities within 1-mile distance of project boundary of the permitted construction site, which directly supports the project, should be included in the Storm Water Pollution Control Plan prepared for the Contractor. These activities include but are not limited to:

1. Equipment Staging Areas

2. Material Storage yards

3. Material Borrow areas

4. Excavated material disposal areas

5. Concrete batch plants

6. Asphalt batch plants

Refer to Part II, Section A of the Construction General Permit for a description of Discharges Eligible for Authorization under the Construction General Permit.

C. The SW3P will be updated as needed during construction following Part III, Section E of the Construction General Permit.

D. The SW3P shall be submitted to the engineer 15 days after award of the contract. Any comments provided shall be addressed prior to commencing construction activities.

E. The SW3P shall be implemented prior to commencement of construction activities and maintained through the duration of construction.

3.02 LARGE CONSTRUCTION ACTIVITY

A. NOTICE OF INTENT (NOI)

1. The Contractor shall fill out, sign, and date the TCEQ Form 20022 (03/13) Notice of Intent for Storm Water Discharges Associated with Construction Activity under the TPDES Construction General Permit (TXR 150000), included at the end of this Section.

2. The Contractor shall submit a copy of the Notice of Intent (NOI) form, along with a signed check for $350.00, made out to the Texas Commission on Environmental Quality, and completed payment submittal form to the TCEQ. A copy of the package will be submitted to the engineer.

3. Submission of the NOI form by the Contractor to TCEQ is required a minimum of two days before Commencement of Construction Activities.

4. The Contractor shall submit to the Engineer copies of the NOI.

5. Post a signed copy of the NOI near the main entrance of a construction site in a prominent place for viewing by the general public and local, state, and federal authorities prior to commencing construction activities, and maintain it in that location until completion of the construction. Post name and telephone number of Contractor's local contact person, brief project description and location of SW3P.

   If Project is a linear construction project (e.g.: road, utilities, etc), post notice in a publicly accessible location near active construction. Move notice as necessary.

B. NOTICE OF CHANGE (NOC) LETTER

If the operator becomes aware that he failed to submit any relevant facts or submitted incorrect information in the NOI, the correct information must be provided to the executive director in a NOC letter within 14 days after discovery. If relevant information provided in the NOI changes, a NOC letter must be submitted within 14 days of the change. A copy of the NOC must be provided to the Owner and Engineer.

C. ANNUAL WATER QUALITY FEES

Large Construction activities authorized under the construction general permit must pay an annual Water Quality Fee of $100 per Part VII, Section B of the Construction General Permit.

D. NOTICE OF TERMINATION (NOT)

1. Submit a Notice of Termination (NOT) to the TCEQ and the engineer ten (10) days after:

   (a) Final stabilization has been achieved on all portions of the site that are the responsibility of the Contractor; or

   (b) Another operator has assumed control over all areas of the site that have not been stabilized.

   (c) All silt fences and other temporary erosion controls have either been removed, scheduled to be removed as defined in the SW3P, or transferred to a new operator if the new operator has sought permit coverage.

2. Submittal of the NOT to the engineer is required for final acceptance of the project.

3. The Contractor shall submit a signed copy of the NOT to the Engineer.

3.03 SMALL CONSTRUCTION ACTIVITY

A. CONSTRUCTION SITE NOTICE

1. Fill out, sign, and date the Construction Site Notice, included at the end of this Section. Submit the signed copy of the Construction Site Notice to the Engineer at least two days before commencement of construction activities.

2. Post a signed copy of the Construction Site Notice near the main entrance of a construction site in a prominent place for viewing by the general public and local, state, and federal authorities prior to commencing construction activities, and maintain it in that location until completion of the construction. Post name and telephone number of Contractor's local contact person, brief project description and location of SW3P.

   If Project is a linear construction project (e.g.: road, utilities, etc), post notice in a publicly accessible location near active construction. Move notice as necessary.

3. The Contractor shall submit a signed copy of the Construction Site Notice to the Engineer and Engineer.

3.04 CERTIFICATION REQUIREMENTS

A. Fill out Pollution Prevention Plan Certification Form to include the Operator's signature, name, title and organization.

B. Contractor and Subcontractors shall sign and date Contractor's / Subcontractor's Certification for TPDES Permitting included at the end of this Section including Contractor's name, address, and telephone number, and the names of persons or firms responsible for maintenance and inspection of erosion and sediment control measures. Use multiple copies as required to document full information. Include this certification with other Project certification forms.

C. Submit properly completed certification forms to the engineer for review before commencing construction.

D. Conduct inspections in accordance with TCEQ requirements. Ensure persons or firms responsible for maintenance and inspection of erosion and sediment control measure read, fill out, sign, and date the Erosion Control Contractor's Certification for Inspection and Maintenance. Use EPA's NPDES Construction Inspection Form included at the end of this Section. Controls must be inspected once every fourteen (14) calendar days and within twenty four (24) hours of the end of a storm event of 0.5 inches or greater, in accordance with Part III, Section F, of the Construction General Permit.

3.05 RETENTION OF RECORDS

A. Keep a copy of this document and the SW3P in a readily accessible location at the construction site from Commencement of Construction Activity, and maintain it in that location until completion of the construction. Contractors with day-to-day operational control over SW3P implementation shall have a copy of the SW3P available at a central location, on-site, for the use of all operators and those identified as having responsibilities under the SW3P.

3.06 ON-SITE WASTE MATERIAL STORAGE

A. On site waste material storage shall be self-contained and shall satisfy appropriate local, state, and federal rules and regulations.

B. Prepare list of waste material to be stored on-site. Update list as necessary to include up-to-date information. Keep a copy of the updated list with the SW3P.

C. Prepare description of controls to reduce pollutants generated from on-site storage. Include storage practices necessary to minimize exposure of materials to storm water, and spill prevention and response measures consistent with best management practices. Keep a copy of the description with the SW3P.

3.07 SUPPLEMENTS

A. The supplements listed below are part of the Specification.

1. Notice of Intent (NOI) Instructions
2. NOI Form
3. Notice of Termination (NOT) Instructions
4. NOT Form
5. Contractor's Certification
6. Pollution Prevention Plan Certificate
7. Construction Site Notice
8. EPA's NPDES Construction Inspection Form

END OF SECTION

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SECTION 01025 – MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 REQUIREMENTS

A. Measurement and payment shall be as specified in this Section.

B. General Scope of work under each bid item includes all labor and materials required for construction of completely functional and operational facilities as shown on the Drawings and in these Specifications.

C. All estimated quantities for unit price bid items stipulated in the bid proposal are approximate and are to be used only (a) as a basis for estimating the probable cost of the work and (b) for the purpose of comparing the bids submitted for the work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for unit price work and materials will be the actual amount of work done and materials furnished.

D. All measurements and payments will be based on completed and accepted work performed in strict accordance with the Drawings and Specifications and in accordance with contract-unit prices and schedule of values. Incidental work and items not listed in the contract-unit price schedule will not be paid for separately, but will be included in the payment for the listed item or items and shall be full compensation for all labor, equipment, materials, testing and incidentals necessary to perform the work in accordance with these contract documents.

E. Cost of work or materials shown on the Drawings, called for in the Specifications and on which no separate payment is made shall be included in the bid price on the various pay items for which they are associated. A claim by the Contractor for extra compensation for an item shown on the Drawings or described in the Specifications will not be considered for any reason including but not limited to the claim that it does not fall within the scope of one of the Bid items.

PART 2 MEASUREMENT AND PAYMENT

2.01 MOBILIZATION/DEMOBILIZATION (Bid Item #1)

A. Shall include all costs for Contractor's mobilization and demobilization, insurance and bond, construction permits and fees, job/office trailers, site administration expenses, and utilities to the job trailers including power, telephone, etc. for the entire project. Shall include all costs for contract close-out, site cleanup, and all costs associated with Contractor's demobilization from the site. Payment for mobilization and demobilization shall be on a Lump Sum basis as noted in the Bid Form.

2.02 WATER PIPELINES (Bid Item #2 & #3)

A. Measurement shall be the actual linear feet of new pipeline installed as determined by measurement along the centerline of the pipe using horizontal stationing, with no deduction being made for gate valves or fittings.

B. Payment will be made at the unit price bid for each size and type of pipe as stated in the Proposal and will be compensation in full for furnishing and installing the necessary materials and work as follows:

Construction and easement staking, potholing necessary to determine the location of existing fiber optic/telephone lines, construction facilities, submittals, coordination, quality control site preparation, barricades, excavation, hand excavation, testing, backfilling and successful passing of compaction test for utilities, protection of adjacent utilities and structures, relocation, removal and replacement and protection of power and/or light poles, filter fabric for trench bedding, furnishing and installation of stub-outs and plugs, temporary water and sewer bypasses, all pipe and accessories, removal and replacement or repair of rock walls and all fences, repair of residential driveways, repair of any damaged asphaltic pavement during pipeline installation or damaged by contractor equipment (not part of pipeline pavement crossing/access), removal and reinstallation of mailboxes, providing uninterrupted mail access, removal and reinstallation of all street signs and posts, protection and reconstruction of irrigation ditches (concrete lined or otherwise) and removal/replacement of culverts, and operation, providing temporary irrigation bypass systems, all pipe bedding material, repair/replacement of curb and gutter, header curb, repair/replacement of sidewalks, concrete, equipment, mechanical and electrical, access outlets, fittings and blind flanges shown and called out on the Drawings, blind flanges or dished heads and appurtenances for pressure testing, field closures, concrete encasements, concrete thrust blocks, all mechanically restrained joints or welded joints, flexible connections, couplings, tie-ins and connections to existing lines or work including the lowering or raising of existing lines to grades of new line if necessary for proper connection and cover, removal and replacement of shrubbery, miscellaneous concrete and reinforcement, brick, stone, miscellaneous painting, temporary cold mix patch where required, restoring natural drainage, restoring existing condition of terrain, protection, hanging of existing utilities, repairing and replacing broken or interfering utility mains and fiber optic/telephone lines damaged during construction, salvage operations, revegetation of easements or construction limits, SW3P or best management practices for storm water runoff, flushing and all other items of the project not indicated as being covered under the other specific bid items shown in the Proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and the provisions of these specifications.

C. A maximum of 80% of the unit bid price for water pipe shall be paid until such time that each section of water line passes all tests and is accepted by the Owner.

2.03 GATE VALVES (Bid Item #4 & #5)

A. Gate valves of the various types and sizes, shall be paid for at the unit price per item installed/constructed (each) and the number of valves actually installed. This unit price will include manholes, manhole covers, manhole base, valve and operator supports, gravel sumps, pipe penetrations, valve boxes, vent pipes and other pipe and valve appurtenances as shown on the drawings as they pertain to the particular valve and size of valve installed.

B. This item will be measured for payment per each.

2.04 WATER SERVICE CONNECTIONS BY BORING METHODS (BID ITEM #6)

A. Measurement shall be for each service lateral connection, tee or tap, HDPE sleeve, installed by boring methods furnished and completely installed and accepted by the Engineer.

B. Payment for service, service taps and related appurtenances shall be made at the unit price bid as stated in the Proposal and will be compensation in full for furnishing and installing the necessary materials and work as follows:

C. Removal and replacement with new of concrete structures (curb & gutter, roadway, sidewalk, etc.), excavation, meter box and cover, service saddle with all necessary valves and fittings, horizontal and vertical location, boring equipment, As-Built records, plugs and/or caps, stakes, metallic marking tape, coordination with home/business owners for location of services, and any other work or appurtenance as required for the successful installation as indicated on the Drawings and specified in these Specifications.

2.05 WATER SERVICE CONNECTIONS (BID ITEM #7)

A. Measurement shall be for each service lateral connection, tee or tap installed, furnished and completely installed and accepted by the Engineer.

B. Payment for service, service taps and related appurtenances shall be made at the unit price bid as stated in the Proposal and will be compensation in full for furnishing and installing the necessary materials and work as follows:

C. Removal and replacement of with new concrete structures (curb & gutter, roadway, sidewalk, etc.), excavation, meter box and cover, service saddle with all necessary valves and fittings, horizontal and vertical location, As-Built records, plugs and/or caps, stakes, metallic marking tape, coordination with home/business owners for location of services, and any other work or appurtenance as required for the successful installation as indicated on the Drawings and specified in these Specifications.

2.06 ¾" PVC WATER SERVICE "YARD LINE" (BID ITEM #8)

A. Measurement shall be for each service "Yard Line" connection, tee or tap installed, furnished and completely installed and accepted by the Engineer.

B. Payment for service and all related appurtenances shall be made at the unit price bid as stated in the Proposal and will be compensation in full for furnishing and installing the necessary materials and work as follows:

C. Removal and replacement of with new concrete structures (sidewalk, etc.), excavation, with all necessary valves and fittings, horizontal and vertical location, As-Built records, plugs and/or caps, stakes, metallic marking tape, coordination with home/business owners for location of services, and any other work or appurtenance as required for the successful installation as indicated on the Drawings and specified in these Specifications.

2.07 ¾" WATER METERS (BID ITEM #9)

A. Payment shall be for each water meter paid for by the Contractor to EPWater. Water Meters and all appurtenances shall meet the latest specifications and technologies of the EPWater. Contractor will be required to submit to Engineer paid receipt prior to payment.

B. Payment shall consist of all coordination between Contractor, EPWater, County, Engineer and property owner, needed to complete the connection of the new meter. EPWater will be responsible for installation of the water meters.

2.08 EXISTING WATER METER DECOMMISSIONING, REMOVAL AND SALVAGING (BID ITEM #10)

A. The decommissioning, removal and salvaging of the existing water meters shall be paid for at the unit price per item each.

B. This unit price will include all related appurtenances required to decommissioning, remove and deliver of the existing water meter per EPWater and County of El Paso Standards and Requirements.

2.09 FIRE HYDRANT ASSEMBLY (BID ITEM #11)

A. Fire hydrants shall be paid for at the unit price per item installed/constructed (each) and the number of hydrants actually installed. This unit price will include the tee, gate valve, pipe, hydrant and other valve and hydrant appurtenances in accordance with the Drawings and Specifications.

2.10 FIRE HYDRANT TO BE REMOVE AND DISPOSE (BID ITEM #12)

A. The removal and disposal of the existing fire hydrants shall be paid for at the unit price per item each.

B. This unit price will include all related appurtenances required to remove and dispose of the existing fire hydrants per EPWater Standards.

2.11 DRIVEWAY REMOVAL & REPLACEMENT (Bid Item #13)

A. Work under this item shall include furnishing all labor, material, equipment and performing all operations required to remove and replace the existing concrete driveway. Concrete and base course is to be removed and replaced per the Drawings and these Specifications and will be paid to the limits described therein. Payment will be made at the unit price bid and will be compensation in full for all removals and for furnishing and placing all material, labor, compaction, equipment, and incidentals necessary to complete the work. Driveway replacement costs shall include saw cutting, concrete, rebar, forming, base course, subgrade rework, removal and disposal of waste, re-striping and testing. Pavements damaged as a result of Contractor operations or as a result of the movement of Contractor equipment or vehicles shall be replaced to pre-existing conditions at Contractor's expense.

B. This item will be measured for payment per square yard.

2.12 TRENCH SAFETY SYSTEM FOR WATER LINES (Bid Item #14)

A. Measurement of Trench Safety Systems shall be determined by the length along the center line of the installed pipe using horizontal stationing with no deduction being made for manholes, valves or fittings. However, the length of casing/carrier pipe installed by jacking/boring shall be deducted from the total length.

B. Payment for Trench Safety Systems, measured as described above, shall be made at the unit price bid per linear foot of "Trench Safety Systems". Payment of all work under this item shall be full compensation for the Trench Safety Systems including any design, testing, inspection, or additional excavation and backfill required, for furnishing, placing, maintaining and removing all shoring, sheeting, or bracing, for required compaction, and for all other labor, materials, tools, equipment, and incidentals necessary to complete the "Trench Safety System" work, in conformance with the approved Trench Safety Plan.

2.13 ASPHALT PAVEMENT REPLACEMENT (Bid Item #15)

A. Work under this item shall include furnishing all labor, material, equipment and performing all operations required to install the asphalt pavement. This item will be measured for payment on a square yard basis where the centerline of the pipeline is located within the pavement. Paving is to be removed and replaced per the Drawings and these Specifications and will be paid to the limits described therein. No extra payment for excess pavement cut and/or replacement as called for on the plans shall be made without prior written approval by the Engineer. Payment will be made at the unit price bid and will be compensation in full for all removals and for furnishing and placing all material, labor, compaction, equipment, and incidentals necessary to complete the work in accordance with the Plans and the Standard Specifications. Pavement replacement costs shall include saw cutting, subgrade rework, removal and disposal of waste, re-striping and testing. Pavements damaged as a result of Contractor operations or as a result of the movement of Contractor equipment or vehicles shall be replaced to pre-existing conditions at Contractor's expense.

B. This item will be measured for payment per square yard.

2.14 FURNISH AND REPLACE MILLINGS ALONG COUNTY OF EL PASO RIGHT OF WAY (Bid Item #18)

A. Measurement shall be made on a square yard basis from where the millings will be replaced from the edge of pavement to the existing limits of the millings. Millings are to be removed and replaced per TXDOT and/or County of El Paso specifications and will be paid to the limits described therein.

B. No extra payment for excess milling replacement shall be made without prior written approval by the Engineer. Payment will be made at the unit price bid and will be compensation in full for all removals and for furnishing and placing all material, labor, compaction, equipment, and incidentals necessary to complete the work in accordance with the plans and these specifications. Millings damaged as a result of Contractor operations or as a result of the movement of Contractor equipment or vehicles shall be replaced to pre-existing conditions at Contractor's expense.

2.15 TRAFFIC CONTROL (Bid Item #19)

A. Measurement of this item shall be made at the lump sum price stated in the bid form.

B. Payment shall be full compensation for the traffic control including but not limited to permits, plans, coordination, barrels, concrete barricades, water barricades, traffic cones, caution signs, warning signs, construction signs, barrels with flashing lights, speed bumps, flag man, message boards, sand bags, impact attenuators, and any other item required to have a complete and operational traffic control system and any other jurisdictional R.O.W. requirements.

2.16 OTHER LUMP SUM ITEMS

A. Lump sum items include, but are necessarily not limited to:

1. Videotape of Project Area Before and After Construction (provide 2 copies in DVD format) (Bid Item #20)

No separate measurement will be made of any materials, equipment, supplies, testing, labor, earthworks or any other individual work item associated with the work for any individual lump sum item noted in the Proposal.

B. Lump sum items shall be paid for at the lump sum price bid for each individual work item as noted in the Proposal.

END OF SECTION

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SECTION 01040 – COORDINATION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall be responsible for ascertaining the nature and extent of any collateral work done by others or work by other trades. The Contractor shall include in his bid all costs associated with coordinating with others or work by other trades. The Contractor shall not be entitled to additional compensation from the Owner resulting from such simultaneous or collateral work, nor shall concurrent work be the reason extension to the contract time. Contractor shall be aware of any and all concurrent work in the area that will require coordination for tie-ins and/or closure streets of his work. If necessary to avoid or minimize damage or delay, the Contractor shall redeploy his work force to other areas of the Work, at no cost to the Owner.

B. Bidders shall be informed of planned concurrent work at the Pre-Bid meeting. The successful bidder shall be updated at the Pre-Construction meeting.

C. The Contractor shall be responsible for the notification of property owners and residents within the project area to explain the construction to them at least 15 days prior to any construction in the area. The Contractor shall be responsible for providing access to the residences for all property owners and residents at all times. Contractor shall provide temporary parking for resident and notify him/her prior to trench operations.

D. Notification to be sent to all residents and property owners shall be by printed handout in English and Spanish, approved by the Owner. The Contractor shall furnish proof to the Owner that each resident within the project area has been notified.

E. Any resident unable to park their vehicle at their residence due to the construction shall be provided with a secure place to park as near to the residence as possible by the Contractor at no cost to the Owner.

F. The Contractor shall be responsible for the coordination between the El Paso Water and County of El Paso, and any other Contractors that may be working in the area for all coordination with utility companies as necessary for the timely completion of the project as specified in Section 01010 - GENERAL CONDITIONS.

G. There will be an El Paso Water sanitary sewer project being performed concurrently with this project. The Contractor shall be responsible for coordinating with the EPWater Contractor to avoid any issues or delays between both projects.

H. The Contractor shall be responsible of notifying the Engineer of any variation, discrepancy, and/or inconsistency of the Construction Drawings. The Contractor shall submit a Reference for Information (RFI) to the Engineer for clarification and/or direction. The Contractor shall give the Engineer five (5) working days to respond to any RFI or to issue a Work Directive.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement will be made for any coordination required by this Section. Payment for all work covered in this section will be included as part of the unit price bid for the installation of the pipelines as indicated in the Proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and specifications.

END OF SECTION

SECTION 01050 – SURVEY INFORMATION

PART 1 GENERAL

1.01 SURVEY BY OWNER

A. The Engineer's surveyor will establish a reference bench mark and baseline as specified. From the information provided, the Contractor shall develop and make such additional surveys as are needed for construction, such as control lines, slope stakes, batter boards, stakes for pipe locations and other working points, lines, and elevations. Survey work shall be performed under the supervision of a licensed land surveyor licensed in the State of Texas. Contractor shall reestablish reference bench marks and survey control monuments destroyed by his operations at no cost to the Owner.

1.02 SURVEY BY CONTRACTOR

A. The Contractor shall complete the layout of the work beyond that provided by the survey stakes, and shall be responsible for all measurements that may be required for the execution of the work to the location and limits prescribed on the drawings.

B. The Contractor shall be responsible for surveying and staking all proposed temporary construction, permanent utility easements, property Right-Of-Way (ROW) shown on the plans.

C. It shall be the responsibility of the Contractor to maintain and preserve all stakes and other marks established by the Owner until authorized to remove them, and if such marks are destroyed by the Contractor or through its negligence prior to their authorized removal, they may be replaced by the Engineer, at the Engineer's discretion, and the expense of replacement will be deducted from any amounts due, or to become due the Contractor.

D. The Engineer may require that work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking of the work.

E. Precise survey measurements shall be taken on all final locations of buried or concealed items. Coordinates and elevations shall be listed at starting and ending points and every 30 feet along any deviation from a linear line. Coordinates from the survey shall be marked on the as-built drawings. Contractor shall provide a copy of the cut sheet field survey notes to the Engineer prior to any excavation. Failure to provide notes will not allow Contractor to begin excavation.

1.03 PROTECTION OF EXISTING FACILITIES

A. Care shall be taken to control and minimize settlements and displacements of existing facilities. Settlement monitoring shall be installed on all utility mains at the Contractors discretion. All the existing mains are active year round. The Contractor shall place settlement monitoring on the existing mains and take daily readings while all the mains are exposed. Work shall be stopped immediately if detrimental settlement is detected. The Contractor shall identify the causes, develop and install corrective measures. Measures shall be subject to review by the Engineer.

B. The Contractor may take the option of having the existing utilities be removed and replaced by the utility companies to install the water line; however the cost shall be borne by the Contractor. Contractor shall make all necessary arrangements with the utility companies and schedule this event if the option is taken. This option will not be considered a change in scope or change order to the work.

END OF SECTION

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SECTION 01062 – PERMITS

PART 1 GENERAL

1.01 GENERAL

A. The Contractor shall keep itself fully informed of all local ordinances as well as state and federal laws, which in any manner affect the work herein specified. The Contractor shall at all times comply with said ordinances, laws and regulations.

1.02 PERMITS TO BE OBTAINED BY CONTRACTOR

A. The Contractor shall obtain permits required to perform the work. The Contractor shall prepare and submit to the proper authority all information required for the issuance of such permits and shall pay all costs thereof, including agency inspections unless specifically provided otherwise in these Contract Documents. The Contractor shall provide a copy of each such permit to the Engineer. Such additional permits may include, but shall not be limited to:

1 TPDES Permit.

2 **El Paso County: Paving Cut Permit.** This project will have an exemption of the road cut permit fees but will be required to be obtained by the Contractor.

3 **El Paso County: Traffic Control Permit.** This project will have an exemption of the traffic control permit fees but will be required to be obtained by the Contractor.

4 **Waste Disposal Permit and Hauling Route**: All applicable permit fees shall be paid by the Contractor.

5 A Licensed Master Plumber is required to perform the residential water service connections as required by the current Texas Plumbing Code.

1.03 PERMITS & EASEMENTS TO BE OBTAINED BY OWNER FOR THE CONTRACTOR

A. N/A

1.04 POSTING PERMITS AND EASEMENTS

A. Permits and easements shall be posted at the site of the work.

1.05 WASTE DISPOSAL

A. All existing pavement, curb, soil, vegetation, and granular material which are removed under this contract shall be disposed of off-site at the Contractor's expense. The Contractor shall be responsible for obtaining necessary permits from the County of El Paso prior to disposing of the waste.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

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SECTION 01110 – ENVIRONMENTAL PROTECTION PROCEDURES

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. 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.

B. 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.

C. 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 diversion channels, sedimentation or filtration systems, berms, staked hay bales, 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.

D. 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.

E. All phases of sedimentation and erosion control shall comply with the latest TCEQ Regulations and with any Storm Water Pollution Prevention Plan (SWPPP) indicated on the plans and/or outlined in these specifications.

F. Avoid clearing activities in vegetated areas during general bird nesting season (March-August) to avoid the potential of inadvertently being out of compliance with the Migratory Bird Treaty Act.

G. Excavated trenches or borings should be covered if the site will be inactive for a week or more. This is to avoid the potential impacts to threatened western burrowing owl, which is known to move into inactive construction sites in the El Paso area.

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 may notify the Contractor in writing of any noncompliance 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, of any noncompliance with state or local requirements. The Contractor shall, after receipt of such notice from the Engineer or from the regulatory agency immediately take corrective action. Such notice, when delivered to the Contractor or his/her authorized representative at the site of the work, shall be deemed sufficient for the purpose.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 EROSION CONTROL

A. Provide positive means of erosion control such as shallow ditches around construction to carry off surface water. Erosion control measures, such as silting basins, hay check dams, mulching, jute netting and other equivalent techniques, shall be used as appropriate. Flow of surface water into excavated areas shall be prevented. At the completion of the work, ditches shall be backfilled and the ground surface restored to original condition.

3.02 PROTECTION OF STREAMS, LATERALS AND CANALS

A. Care shall be taken to prevent any damage to any stream, lateral or canal 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 oil that may reduce the quality of the water in the stream, lateral or canal shall not be returned to the stream, lateral or canal. Such waters will be removed from the site.

B. The Contractor shall not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water, or any lateral without the prior permitted approval.

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 the Environmental Protection Agency and local city ordinance.

D. In the event of a water main repair required by the Contractor, the Engineer and Owner shall be immediately notified. Upon repair, water being flushed from structures or pipelines after disinfection, with a C12 residue greater that 0.099 mg/L, shall be collected and discharged in a manner approved by the Engineer.

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 existing public rights-of-way, permanent and temporary easements.

B. Outside of areas requiring earthwork and/or facilities for dewatering/drainage 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 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 Contractor's operations, protect such trees by placing boards, planks, or poles around them. Monuments and permanent markers shall be protected similarly before beginning operations near them.

D. Any tree or other landscape feature noted to remain or left undisturbed that is 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 or healed or removed and disposed of. Damaged trees so removed shall be replaced at the Contractor's expense. All scars made on trees by equipment, construction operations, or by the removal of limbs larger that 1-inch 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.

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

E. The locations of the Contractor's staging area, storage, and other construction buildings, required temporarily in the performance of the work, shall be cleared portions of the job site. The preservation of landscape shall be an imperative consideration in the Contractor's use of these sites and in the construction of temporary facilities.

F. For temporary roads or embankments and excavations for work areas, the Contractor shall submit the following for approval at least 10 days prior to 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.

G. Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess of waste materials, or any other vestiges of construction, 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.

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. Sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides is not permitted.

D. Sprinkling must be repeated at such interval as to satisfactorily prevent dust, and the Contractor must have sufficient suitable equipment on the job to accomplish this at all times. The Contractor shall inhibit the creation of dust to the complete satisfaction of 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 his/her operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with state and federal regulations.

END OF SECTION

SECTION 01200 – PROJECT MEETINGS

PART 1 GENERAL

1.01 PRECONSTRUCTION MEETING

A. A Pre-construction meeting shall be held in accordance with the General and Supplemental Conditions.

1.02 PROGRESS AND SPECIAL MEETINGS

A. Owner may request meetings with Contractor and its Subcontractors at any time during progress of Contract. It will be Contractor's responsibility to provide to Owner whatever information is requested by Engineer.

B. Bi-weekly construction meetings will be held during the course of the construction at the Contractor's Field Office.

C. All Bi-weekly construction meetings shall be **mandatory** for the "Project Manager" and "Superintendent" of the project.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement and payment shall be made for this item, but it shall be included in the total price bid under this Contract.

END OF SECTION

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SECTION 01300 – SUBMITTALS

PART 1 GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. This Section specifies the general methods and requirements of submissions applicable to the following work-related submittals: Shop Drawings, product data, samples, video tapes, construction and submittal schedules, Operation and Maintenance Manuals, and work plans as required under specific sections of the Specifications. Detailed submittal requirements will be specified in the Technical Specifications sections.

B. All submittals shall be clearly identified by reference to Specification Section, Paragraph, Drawing Number, or Detail as applicable. Submittals shall be clear and legible and of sufficient size for adequate presentation of data and shall be submitted to the Engineer prior to construction.

1.02 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, TEST REPORTS AND CERTIFICATIONS

A. Shop drawings

1. Shop Drawings, as specified in individual work sections include, but are not necessarily limited to, custom-prepared data such as laying schedules, fabrication and erection/ installation (working) drawings, schedule information, setting diagrams, actual shop work manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection, and test reports including performance curves and certifications, as applicable to the Work.

2. All Shop Drawings submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.

3. The Contractor shall check all subcontractors' Shop Drawings regarding measurements, size of members, materials and details to determine to the Contractor's satisfaction that they conform to the intent of the Drawings and Specifications. Shop Drawings found to be inaccurate or otherwise in error shall be returned by the Contractor to the subcontractors for correction before submission thereof.

4. All details on Shop Drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before submitted for approval.

B. Product Data

1. Product data, as specified in individual sections include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production operating and maintenance instructions, and recommended spare parts listings and printed product warranties, as applicable to the work.

C. Samples

1. Samples specified in individual sections, include but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, graphic symbols and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the work.

D. Test Reports and Certifications

1. Test reports and certifications submitted by the Contractor to the Engineer shall be as specified in individual sections. These shall include, but not necessarily limited to products, materials, compaction, and Professional Engineer certification.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall review Shop Drawings, product data, and samples, including those by subcontractors, prior to submission to determine and verify the following:

1. Field measurements
2. Field construction criteria
3. Catalog numbers and similar data
4. Conformance with the specifications

B. Each Shop Drawing, sample, and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor:

"Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers, and similar data, and I have checked and coordinated each item with other applicable approved Shop Drawings and all Contract requirements."

Shop Drawings and product data sheets 11-inches x 17-inches and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Provide to the Engineer a copy of each submittal transmittal sheet for Shop Drawings, product data, and samples at the time of submittal of said drawings, product data, and samples to the Engineer. Any submittal not having the above signed Certification Statement attached to the submittal will be returned to the Contractor without review by the Engineer.

C. The Contractor shall utilize an eight-character submittal identification numbering system in the following manner:

1. The first five digits shall be the applicable Specification Section Number.

2. The next three digits shall be the 001 to 999 to sequentially number each initial separate item or drawing submitted under each specific Section number.

3. The last character shall be a letter, A to Z, indicating the submission or resubmission of the same drawing, i.e., "A = first submission, B = second submission, C = third submission, etc." A typical submittal number would be as follows:

03300-008-B

03300 = Specification Section for Concrete
008 = The eighth initial submittal under this specification section
B = The second submission (first resubmission) of that particular Shop Drawing

D. Notify the Engineer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents, and the reason for the deviation.

E. The review and approval of Shop Drawings, samples, or product data by the Engineer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therewith.

F. No portion of the work requiring a Shop Drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased, or onsite construction accomplished which does not conform to approved Shop Drawings and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity with Shop Drawings, the Plans or Specifications.

G. Project work, materials, fabrication, and installation shall conform with approved Shop Drawings, applicable samples, and product data.

H. Prior to the first submittal of any item the Contractor shall supply the Engineer with a Schedule of Anticipated Submittals. The schedule will include all the anticipated submittals, an approximate date that the submittal will be made, and reference numbers as described in Paragraph 1.03C of this section. The Contractor shall adhere to the submittal schedule as reviewed/ approved/ modified by the Engineer.

1.04 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule and in such sequence as to cause no delay in the Work or in the work of any subcontractor.

B. Each submittal, appropriately coded, will be returned within 15 working days following receipt of submittal by the Engineer.

C. Number of submittals required:

1. Shop Drawings as defined in Paragraph 1.02A: Contractors requirement plus 4 sets.

2. Product Data as defined in Paragraph 1.02B: Contractors requirement plus 4 sets.

3. Samples: Submit the number stated in the respective Specification Sections, but no less than 1.

4. Test Reports, Certifications and Working Drawings: Contractor's requirement plus 4 sets.

D. Submittal shall contain:

1. The date of submission and the dates of any previous submissions.

2. The project title and number.

3. Contractor identification.

4. The names of:

a. Contractor
b. Supplier
c. Manufacturer

5. Identification of the product, with the Specification Section Number, page, and paragraph(s).

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the work or materials.

8. Applicable standards, such as ASTM or Federal Specification numbers.

9. Identification of deviations from Contract Documents and reason for said deviation.

10. Identification of revisions or re-submittals.

11. Each copy or set of each submittal shall include a blank space suitably sized for Contractor and Engineer stamps (min. of 5 ½ " x 8 ½ ").

1.05 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS, AND SAMPLES

A. The review of Shop Drawings, data, and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed:

1. As permitting any departure from the Contract requirements.

2. As relieving the Contractor of responsibility for any errors, including details, dimensions and materials.

3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.

B. The Contractor remains responsible for details and accuracy for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques or assembly, and for performing work in a safe manner.

C. If the Shop Drawings, data, or samples as submitted describe variations and show departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

D. Submittals will be returned to the Contractor marked with one or more of the following codes:

Code 1 "REVIEWED" is assigned when there are no notations or comments on the submittal. When returned under this code, the Contractor may release the equipment and/or material for manufacture.

Code 2 "FURNISH AS CORRECTED". This code is assigned when a confirmation of the notations and comments IS NOT required from the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.

Code 3 "REVISE AND RESUBMIT". This code is assigned when notations and comments are extensive enough to require a resubmittal of the package. The Contractor may release the equipment or materials for manufacture; however, all notations and comments must be incorporated into the final product. Installation and payment for equipment or materials will not be approved until resubmittal is received, reviewed, and approved. This resubmittal is to address all comments, omissions, and nonconforming items that were noted. Resubmittal is to be received by the Engineer within 21 calendar days of the date of the Engineer's transmittal requiring the resubmittal.

Code 4 "REJECTED" is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacture/vendor to meet the Contract Documents.

E. Re-submittals will be handled in the same manner as first submittals. On re-submittals, the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted Shop Drawings, by use of revision triangles or other similar methods, to revisions other than the correction requested by the Engineer, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of this type of revision that is not in accordance to the Contract Documents as may be required by the Engineer.

F. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor and will be considered "Not Approved" until resubmitted. The Engineer may at his/her option provide a list or make the submittal directing the Contractor to the areas that are incomplete.

G. Repetitive Review

1. Shop Drawings and other submittals will be reviewed no more than twice at the Owner's expense. All subsequent reviews will be performed at times convenient to the Engineer and at the Contractor's expense, based on the reviewing Engineer's current billing rate. The Contractor shall reimburse the Owner for all such fees invoiced to the Owner by the Engineer. Submittals are required until approved.

2. Any need for more than one resubmission, or any other delay in obtaining the Engineer's review of submittals, will not entitle Contractor to extension of the Contract Time.

H. If the Contractor considers any correction indicated on the Shop Drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least 14 working days prior to release for manufacture.

I. When the Shop Drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

1.06 DISTRIBUTION

A. Distribute reproductions of approved Shop Drawings and copies of approved product data and samples, where required, to the job site file and elsewhere as directed by the Engineer. Number of copies shall be directed by the Engineer but shall not exceed six.

1.07 PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

A. If specifically required in other sections of these Specifications, the Contractor shall submit a P.E. Certification for each item required, in the form attached to this Section, completely filled in and stamped.

1.08 GENERAL PROCEDURES FOR SUBMITTALS

A. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of product ordering and manufacturing and of performing the related work or other applicable activities, or within the time specified in the individual work sections of the Specifications, so that the installation will not be delayed by processing times, including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement and payment shall be made for this item, but it shall be included in the total price bid under this Contract.

END OF SECTION

P.E. CERTIFICATION FORM

The undersigned hereby certifies that he/she is a Professional Engineer registered in the State of Texas and that he/she has been employed by (Name of Contractor) _____ to design _____ in accordance with Specification Section _____for the County of El Paso. The undersigned further certifies that he/she has performed the design of the _____, that said design is in conformance with all applicable local, state, and federal codes, rules and regulations, and that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the Owner's representative within seven days following written request there of.

P.E. Name _____

Signature _____

Address _____

Contractor's Name _____

Signature _____

Title _____

Address _____

_____

_____

SECTION 01370 – SCHEDULE OF VALUES FOR LUMP SUM BID ITEMS

PART 1 GENERAL

1.01 REQUIREMENTS

A. Submit to the Engineer a Schedule of Values for Lump Sum bid items (a breakdown of the bid) allocated to the various portions of the Work bid as Lump Sum, in accordance with the General Conditions.

B. Upon request of the Engineer, support the values with data which will substantiate their correctness.

1.02 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Type schedule on an 8½-in by 11-in or 8½-in by 14-in white paper. Contractor's standard forms and automated printout will be considered for approval by the Engineer upon Contractor's request. Identify schedule with:

1. Title of Project and location.

2. Engineer and Project number.

3. Name and address of Contractor.

4. Contract designation.

5. Date of submission.

B. Schedule shall list the installed value of the component parts of the Lump Sum Work in sufficient detail to serve as a basis for computing values for progress payments during construction.

C. Identify each line item with the number and title of the respective major section of the specifications.

D. For each major line item, list sub-values of major products or operations under the item.

E. For the various portions of the Work:

1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.

2. For items on which progress will be requested for stored materials, prepare a sub-schedule as defined in Paragraph 1.03 below.

F. The sum of all values listed in the schedule shall equal the total Lump Sum bid for that portion of the work.

1.03 SUBSCHEDULE OF UNIT MATERIAL VALUES

A. Submit a sub-schedule of unit costs and quantities for:

1. Products on which payments will be requested for stored products.

B. The form of submittal shall parallel that of the Schedule of Values, with each item identified the same as the line item in the Schedule of Values.

C. The unit quantity for bulk materials shall include an allowance for normal waste.

D. The unit values for the materials shall be broken down into:

1. Cost of the material, delivered and unloaded at the site, with taxes paid.

2. Copies of the invoices for component material shall be included with the payment request in which the material first appears.

3. Paid invoices shall be provided with the second payment request in which the material appears or no payment shall be allowed and/or may be deleted from the request.

E. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION

SECTION 01410 – TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 TESTS

A. Where tests of materials or any portions of the Work are required by Law/Ordinance or public authority, the Contractor shall bear all costs of such tests, shall give timely notice of readiness therefore and shall furnish to the Engineer the required certification of testing or approval.

B. Tests specified in the Technical Specifications shall fall into four categories:

1. Those required for approval of materials prior to use, which serve the same purpose as shop drawings or samples;

2. Those required by law;

3. Those necessary for acceptance of equipment, or facilities; and,

4. Those made during the progress of the Work to check compliance with the requirements of the Contract Documents.

The Contractor shall bear all the costs of the tests in the first three categories.

C. Tests conducted in the fourth category shall be carried out at the discretion of the Engineer. The cost for testing materials in this category shall be paid for by the Owner, with the following exceptions:

1. The Contractor shall furnish the materials for any samples and shall fully cooperate with the Engineer or Testing Laboratory in securing such samples.

2. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the Work of the Contract.

3. At the option of the Engineer the source of supply of each of the materials shall be accepted by him before the delivery is started and before such material is used in the work. Representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer of all materials to be used in the work for testing or examination as desired by the Engineer.

4. The Owner/Construction Manager will be providing geotechnical services for Quality Assurance, the Contractor will be responsible for the retest of failures. Contractor may employ their own laboratory to ensure Quality Control at their own expense.

5. The Owner will pay all testing invoices which have met the specifications. The Contractor will pay for **ALL** test failures, any additional proctor tests other than required by the engineer, stand by time charges and erroneous job site visits. No time extension for delays will be considered by the Owner.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.

B. Respective Sections of Specifications: Certification of products.

C. Testing Laboratory inspection, sampling and testing is required for:

1. Section 02221: Excavating, Backfilling and Compacting for Utilities
2. Section 03300: Site Concrete Work

1.03 LABORATORY DUTIES

A. Cooperate with Engineer and Contractor; provide qualified personnel after due notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction:

1. Comply with specified standards.

2. Ascertain compliance of materials with requirements of Contract Documents.

C. Promptly notify Engineer and Contractor of observed irregularities or deficiencies of work or products.

D. Promptly submit five copies of written report of each test and inspection to Engineer. Each report shall include:

1. Date report issued.

2. Project title and number.

3. Testing laboratory name, address and telephone number.

4. Name and signature of laboratory inspector.

5. Date and time of sampling or inspection.

6. Record of temperature and weather conditions.

7. Date of laboratory test.

8. Identification of product and specification section.

9. Location of sample or test in the Project.

10. Type of inspection or test.

11. Results of tests and compliance with Contract Documents.

12. Interpretation of test results, when requested by Engineer.

E. Perform additional tests as required by Engineer or the Owner.

1.04 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of Contract Documents.

2. Approve or accept any portion of the Work.

3. Perform any duties of the Contractor.

1.05 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel, provide access to Work, and to Manufacturer's operations.

B. Provide to the Engineer the preliminary design mix proposed to be used for concrete, and other materials and mixes which require control by the testing laboratory.

C. Furnish copies of Products test reports.

D. Furnish incidental labor and facilities:

1. To provide access to Work to be tested.

2. To obtain and handle samples at the Project site or at the source of the product to be tested.

3. To facilitate inspections and tests.

4. For storage and curing of test samples.

E. Notify Engineer sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.

F. Make arrangements with Engineer and pay for additional inspections, sampling and testing required:

1. For the Contractor's convenience.

2. When initial tests indicate Work does not comply with Contract Documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT

A. No separate measurement and payment shall be made for this item, but it shall be included in the total bid under this Contract.

END OF SECTION

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SECTION 01500 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish, install and maintain all temporary facilities required for construction; remove on completion of Work.

B. Before starting the work, the Contractor shall make his own arrangements for storage of materials and equipment in locations on or off the construction site. For the allocated space, 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.

1.02 TEMPORARY BUILDINGS

A. The Contractor shall erect, or provide as approved, temporary storage buildings of the various sizes as required for the protection of mechanical equipment and materials as recommended by manufacturers of such equipment and materials. The buildings shall be provided with 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 adequately separated from other buildings.

1.03 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. Temporary gravel surfacing of the storage yards shall meet with the approval of the Engineer.

B. A temporary security fence with gates and locks shall be erected by the Contractor around the storage yard and located as approved by the Engineer.

1.04 FIRST AID FACILITIES

A. The Contractor shall maintain at his office or other well known place at the job site, all articles necessary for giving first aid to the injured, and shall make standing arrangements for the immediate removal to a hospital or a doctor’s care persons (including employees) who may be injured on the job site. In no case shall employees be permitted to work at a job site before the Contractor has made a standing arrangement for removal of injured persons to a hospital or a doctor’s care.

1.05 TEMPORARY ACCESS ROADS AND PARKING SPACE

A. The Contractor shall construct temporary construction access roads, parking areas and detours within the designated construction areas as are required to execute the Work. The roads, parking areas and detours shall meet the approval of the Engineer, and be maintained in good condition until no longer needed; at which time they 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 Subcontractor's employees, other employees and the Engineer.

1.06 CONTRACTOR'S FIELD OFFICE

A. The Contractor shall provide a temporary office on the job site where directed by the Engineer, adequately furnished, and maintained in a clean, orderly condition by the Contractor. The Contractor or his authorized representative shall be present in the field office or on the project at all times while the work is in progress. Instructions received there from the Engineer shall be considered as delivered to the Contractor. The office shall be furnished with lights, heating/refrigerated air conditioning, telephone, internet access (wifi), printer, scanner copier with require ink and paper, potable water, restroom and other appropriate facilities.

B. The Contractor, at his expense, shall make an office, facilities and all utilities (including telephone) available for the use and convenience of the Owner's inspector, the Engineer and other representatives as necessary during the course of the project.

C. Office space for the Owner/Engineer shall be separated by permanent full height walls from the rest of the structure. It shall have a lockable interior door for access to restrooms and other facilities and a lockable exterior door. As a minimum, it shall be furnished with these items: office desk and chair, four drawer legal size metal file cabinet, two guest chairs, six foot layout table (fold-up legs) with chair.

1.07 HOUSEKEEPING

A. All structures, storage areas, parking areas and the adjacent grounds shall be kept in a clean, slightly and sanitary condition at all times by the Contractor.

1.08 WATER FOR CONSTRUCTION

A. The Contractor shall make his own arrangement for a supply of potable drinking water for his employees and shall keep such supply available at all times.

B. The Contractor may, with the approval of the Engineer, make other arrangements and secure water for construction purposes from a source of his own choosing. Said water shall be clean and sanitary.

C. The Contractor may secure a construction meter from the Owner for construction water as per the Couny of El Paso Rules and Regulations or the El Paso Water Rules and Regulations. **Contractor shall pay EPWater and/or County of El Paso for all water used depending on the availability of a construction water meter.**

D. Contractor is encouraged to use groundwater from dewatering operation for construction purposes.

1.09 ELECTRIC POWER FOR CONSTRUCTION

A. The Contractor shall furnish and install, at his own expense, all temporary electrical facilities required for construction and safe operation. Separate electrical metering shall be provided and power used shall be paid for by the Contractor, regardless of the source of the power.

1.10 SANITARY FACILITIES

A. The Contractor shall provide adequate toilet facilities for use by his personnel and the Engineer and shall maintain such facilities in a clean and sanitary condition throughout the construction period. Such facilities shall be conveniently located for use by the personnel and the entire area shall be maintained in a clean and sanitary condition. After completion of the work, all temporary toilet facilities shall be removed from the site.

1.11 TRAFFIC PLAN

A. Traffic control and planning for the control of traffic in all areas of the project shall be the responsibility of the Contractor. Seven days prior to commencing any work on the project the Contractor shall prepare and submit for TXDOT review and approval, a Traffic Control plan for that particular work area. **Five (5) copies of the approved Traffic Control Plan shall be submitted to the Engineer.** The traffic control plans, devices, signage, and record keeping shall conform with the specifications and principles given in the "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", PART IV, latest edition issued by the Texas Department of Transportation and in accordance with the requirements of the City of El Paso. Work within any specific area must be phased so that the traffic controls for the work in that particular area do not conflict with traffic flows in any other control area.

1.12 DUST CONTROL

A. The Contractor shall furnish and maintain at all times equipment necessary to effect dust control over the entire working area.

B. The Contractor shall water the streets of the project a minimum of twice a day during working days and once during non-working days including weekends and holidays.

1.13 DRAINAGE CONTROL

A. The Contractor shall have the responsibility to comply with all the necessary requirements for the Federal Register dated, September 9, 1992, Volume 57, No. 175 - FINAL NPDES GENERAL PERMITS FOR STORM DISCHARGES FROM CONSTRUCTION SITES (or latest revision thereof). The Contractor shall file the Notice of Intent (NOI) as required, a minimum of 2 days prior to commencement of any construction. The required STORM WATER POLLUTION PREVENTION PLAN (SWPPP) shall be developed for the project by the Contractor as required in the above mentioned document. The SWPPP shall be kept at the work site and updated as work progresses.

B. The Contractor shall maintain adequate drainage within and through work areas. Earth dam drainage will not be permitted in paved areas. Temporary dams of sandbags, asphaltic concrete or other acceptable materials will be permitted when necessary to protect the work and/or the public, provided such use does not create a hazard or nuisance to the public. Such dams shall be removed from the site as soon as their use is no longer necessary.

1.14 CONSTRUCTION STAGING AREA

A. The OWNER will not provide a construction staging area. The Contractor shall be responsible for obtaining at his cost a construction staging area for equipment and materials storage, construction offices, etc., that the Contractor feels is necessary for the project.

1.15 OFFICE FACILITIES

A. Provide facilities for material storage yard and sheds adequate in size for Contractor's use. Contractor shall maintain a project office near the project site. The Contractor shall allow access for the Engineer's and Owner's personnel and use of the project office.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement and payment shall be made for this item, but it shall be included in the total price bid for the installation of sewer lines as indicated in the proposal.

END OF SECTION

SECTION 01600 – PROGRESS SCHEDULES

PART 1 GENERAL

1.01 REQUIREMENTS

A. The schedule of Work shall be based on the period of time within which this Contract is to be completed (Contract Completion Time).

B. Within 10 calendar days following Notice of Award, Contractor shall prepare and submit to Engineer his proposed Schedule of Work, as described in this Section, with sub-schedules of related activities which are essential to its progress. These include, but are not limited to: Submittals, fabrication, delivery, installation, testing and start-up schedules.

C. **An UPDATED construction schedule shall be included with each pay estimate as a condition precedent to approval of each pay application. Failure to provide an UPDATED schedule with each pay application will delay the approval of the pay application.**

D. Included with the Schedule of Work, Contractor shall submit a written Traffic Control Plan, which shall identify how heavy equipment shall be routed through the construction areas throughout the construction period, as required in these Specifications. The Traffic Control Plan shall specify timing of road and street closures as required performing the Work under this Contract.

E. Contractor shall submit updated Schedule of Work with application for payment monthly, or more frequently when required and acceptable to the Engineer.

F. All schedules and Traffic Control Plan shall be submitted to Engineer for acceptance and shall be subject to coordination with requirements of work performed under other projects which may be in progress.

G. Contractor's Schedule is to be considered and used as a working tool and will not become part of Contract or Contract Documents.

1.02 FORM OF SCHEDULES

A. The Schedule of Work shall utilize the Critical Path Method (CPM): Contractor shall prepare, maintain, and furnish current detailed progress and schedule charts using Critical Path Method (CPM) supporting Contract performance dates. Schedule shall identify Work in Contract in sufficient detail to ensure compliance with Contract dates, schedules, and sequences of construction.

B. CPM shall be maintained throughout life of Contract. Contractor shall designate an authorized representative within its firm who will be responsible for preparation of CPM network plan and schedule and for monitoring progress of project.

C. Contractor is deemed to have included in the Bid Price a sum of money sufficient to pay for all costs attendant to the scheduling requirements of this Section, throughout the Contract completion time. Owner shall have right to withhold progress payments due Contractor in the event that schedules are not maintained current or submitted as specified. Preparation, content, submittal, review and use of the network plan and schedule are as set forth below.

1. Schedule submittal: Within 15 calendar days following Award of Contract, Contractor shall submit to the Engineer complete CPM network plan. Size of network plan sheet or sheets shall be limited to 24-inch x 36-inch. A schedule of estimated monthly progress payments shall be developed by Contractor and submitted with CPM network plan. A schedule of Shop Drawing submittals and reviews shall also be included.

2. Within 7 calendar days after receipt of Schedule, Engineer will meet with Contractor for joint review, and any necessary correction or adjustment of proposed network plan. Within five calendar days after joint review, Contractor shall submit three copies of revised schedule to Engineer. Re-submittal will be reviewed by Engineer and if found to be as previously agreed upon, will be accepted. Accepted schedule shall constitute Project Schedule of Work until subsequently updated in accordance with requirements of this Section. The submission of schedules by Contractor, as required herein are not only required for the verification of progress payments, but also informing Owner and Engineer of the status of the Project in order that Owner and Engineer may evaluate project progress, Contractor change order requests, or other proposed changes to the Project.

3. Acceptance of Contractor's Schedule by Engineer will not relieve Contractor from compliance with all conditions of the Contract. Errors and omissions in accepted Contractor's Schedule will not be cause for future claims by Contractor for extra costs or increased Contract Time. Comments made by the Engineer on the Contractor's Construction Schedule during review will not relieve the Contractor from compliance with requirements of the Contract Documents. This review is only for general conformance with the schedule concept of the project and general compliance with the information given in the Contract Documents.

4. Network plan shall show sequence and interdependence of activities required for complete performance of all items of Work under this Contract. Contractor shall exercise sufficient care to produce a clear, legible, and accurate network plan. Network plan shall show the following for each work activity:

    a. Concise description of work represented by activity.

    b. Duration (in work days).

    c. Early and late start dates, and early and late finish dates.

    d. Percent complete.

5. Work activities in network plan shall be sufficiently detailed to identify all major items of Work included in this Contract, including procurement and delivery of materials, and including shutdowns and restarts.

6. Contractor shall also submit with network plan:

    a. Proposed number of working days per week.

    b. Holidays to be observed during duration of Contract (by day and month).

    c. Planned number of shifts per day.

    d. Number of hours per shift.

    e. Average manpower usage planned monthly by major trades. Trades shall include as a minimum: carpenters, laborers, operators, ironworkers, electricians, pipe fitters, masons, and painters.

7. Schedule is Contractor's schedule, prepared by him and he remains solely responsible for adherence thereto.

8. Project control: Once a month or more frequently if warranted, Contractor shall review progress of Work to that date. He shall collect information, with aid of field superintendents for all Subcontractors, on all jobs scheduled to be worked on during previous monthly period including Shop Drawings, material procurement, and Change Orders that may have been issued in this period. Information shall be evaluated and compared with original plan and schedule. Project problems will be reviewed and Contractor shall take necessary measures to keep Project on schedule. Any changes shall be incorporated into the schedule.

9. If latest completion time for any significant job does not come within time allowed by Contract, including all extensions, sequence of jobs, and performance of jobs shall be revised by Contractor through either concurrent operations, additional manpower, additional shifts, and significant Contract completion and occupancy times will be met. No additional cost will be allowed by Owner to Contractor or to any Subcontractor for overtime, additional manpower, equipment, or additional shifts if such expediting procedures are necessary.

10. Each month, Contractor shall update the Project Schedule of Work and shall submit to Engineer three copies of updated Schedule, for Engineer's review and acceptance. Update shall include all revisions required under item 9 above, percentage completion by work activity, as well as any revisions to Shop Drawing schedule and information included under item 6 above.

11. Changes to Schedule: Contractor may at any time make changes to his current plan and schedule upon notification to Engineer. Contractor shall submit changes to network plan and schedule for any of the following reasons:

    a. When delay in completion of any activity or group of activities indicates an extension of scheduled Project completion including delays which may be involved with change orders, unusual weather, etc.

    b. Delays in submittals or deliveries or work stoppages are encountered which make re-planning or rescheduling of Work necessary.

    c. Schedule does not represent actual prosecution and progress of Project.

12. Engineer's acceptance of changes to Schedule and all relevant data is contingent upon compliance with all other paragraphs of this Section and any other previous agreements or requirements by Engineer.

13. Contractor's cost of revisions to Schedule due to any cause shall be responsibility of Contractor.

14. Adjustment of Contract completion: Contract Time will be adjusted only by Change Order for causes specified in this Contract. In the event Contractor requests an extension of Contract Time, he shall furnish such justification, CPM data, and supporting evidence as follows for a determination as to whether or not Contractor is entitled to an extension of Time under provisions of Contract: all CPM logic revisions, durations changes, and cost changes for Work in question and its relationship to other activities on accepted, current network plan. Submission of proof based on network activity logic and durations is obligatory with any Contractor request for extension of time. Schedule must clearly display that Contractor has used, in full, all float time available for Work involved in this request. For other than critical path work, Contractor shall use available float times for Owner requested changes. Contractor shall not reserve float time for subsequent contracted requested changes. Engineer's determination as to total number of days of Contract extension shall be based upon current Schedule at time of alleged delay and all other relevant information and provisions of Contract. Schedule data shall be included in next monthly updating of Schedule. Actual delays in activities which according to network plan and schedule do not affect Contract Completion Date will not be basis for a change of Contract Completion Date. Engineer shall review facts within a reasonable time after receipt of Contractor request for extension of Time and supporting evidence and shall advise Contractor in writing thereof.

15. Contractor shall submit a brief narrative report as part of monthly update. Narrative report shall include a description of problem areas; current and anticipated delaying factors and their estimated impact on performance of other activities and completion dates; and an explanation of corrective action taken or proposed.

E. Contractor failure to comply with this Section shall be a material breach of this Contract.

F. The initial Contractor's payment request will be evaluated by the Engineer if the initial construction schedule submittal has been made. Subsequent payment requests made by the Contractor will not be evaluated by the Engineer until the revised Contractor's construction schedule (as defined in paragraph 1.01.C) has been accepted by the Engineer.

G. All "float time" i.e. the time indicated on the Contractor's Progress schedule between the early start time and late start time, and early finish time and late finish time is owned by the Owner.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement and payment shall be made for the work under this section, but it shall be included in the total price bid under this Contract.

END OF SECTION

SECTION 01700 – ARCHAEOLOGICAL INVESTIGATION AND MONITORING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The work covered by this Section includes steps that the Contractor must follow if buried cultural material is excavated during the installation of the pipelines of this project.

1.02 CULTURAL RESOURCE DISCOVERY

A. Upon the discovery of buried cultural materials during construction, the following steps shall be followed:

1. The construction Contractor or subcontractor shall cease work in the immediate area of the discovery;

2. The cultural materials shall be protected from further disturbance;

3. The Contractor making the discovery shall immediately notify the Engineer, who will notify the County of El Paso.

4. No activities that would further disturb the cultural materials shall be undertaken by the Contractor until authorized by the County of El Paso.

5. Contractor should be prepared to move operations to another area should significant cultural resources be encountered and mitigation be required at no cost to the Owner.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement and payment shall be made for this item, but it shall be included in the unit bid price for pipelines.

END OF SECTION

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SECTION 01710 – CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Additional closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 3, and in the General Conditions.

1.02 SUBSTANTIAL COMPLETION

A. Before requesting inspection for certification of Substantial Completion, complete the following:

1. Contractor shall submit an Acceptance of Work letter from all the jurisdictional agencies involved on the Project, prior to or at the time of requesting substantial completion of the project.

2. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the Work claimed as substantially complete.

a. Include supporting documentation for completion and an accounting of changes to the Contract Sum.

3. Advise the Owner of pending insurance changeover requirements, if any.

4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

5. Submit record drawings and specifications, maintenance manuals, final project photographs, damage to settlement surveys, property surveys and similar final record information.

6. Deliver tools, spare parts, extra stock and similar items.

7. Change over locks and transmit keys to the Owner.

8. Complete startup testing of systems and instructions of operation and maintenance personnel. Remove temporary facilities, mockups, construction tools and similar elements.

9. Complete final cleanup requirements, including touchup painting.

10. Touch up and repair and restore marred, exposed finishes.

1.03 INSPECTION PROCEDURES

A. On receipt of a request for inspection, the Engineer will proceed to advise the Contractor of unfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Engineer will repeat inspection when requested and assure that the Work is substantially complete.

2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.04 FINAL ACCEPTANCE

A. Before requesting inspection for certification of final acceptance and final payments, complete the following:

1. Final payment request with releases and supporting documentation. Include insurance certificates where required.

2. Submit a statement, accounting for changes to the Contact Sum.

3. Submit a copy of the final inspection list sating that each item has been completed or otherwise resolved for acceptance.

4. Submit final meter readings for utilities and similar data as of the date of Substantial Completion.

5. Submit consent of surety to final payment.

6. Submit a final settlement statement.

7. Submit evidence of continuing insurance coverage complying with insurance requirements.

8. Any other documentation required by Program Manager, Owner or funding agencies.

9. The release of retainage to contractor shall be authorized by the County of El Paso.

1.05 REINSPECTION PROCEDURE

A. The Engineer will re-inspect the Work upon receipt of notice that the Work has been completed, except for items whose completion is delayed under circumstances acceptable to the Engineer.

1. Upon completion of re-inspection, the Engineer will prepare a certificate of final acceptance. If the Work is incomplete, the Engineer will advise the Contractor of Work that is incomplete or obligations that have not been fulfilled but are required.

2. If necessary, reinspection will be repeated.

1.06 RECORD DOCUMENT SUBMITTALS

A. Do not use record documents for construction. Protect from loss in secure location. Provide access to record documents for the Engineer’s reference.

B. Upon completion of the Work, submit record Drawings (2 sets) and Specifications to the Engineer for the Owner’s records.

C. Refer to Section 01720.

1.07 MAINTENACE MANUALS

A. Organize operation and maintenance data into sets of manageable size. Bind in individual, heavy-duty, 2-in (51-mmA), 3-ring, binders, with pocket folders for folded sheet information. Mark identification on front and spine of each binder. Include as a minimum the following information:

1. Emergency instructions.

2. Spare parts lists.

3. Copies of warranties.

4. Wiring diagrams.

5. Shop Drawings and Product Data.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 REMOVAL OF PROTECTION

A. Remove temporary protection and facilities.

3.02 COMPLIANCE

A. Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Remove waste materials and dispose of lawfully.

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement and payment shall be made for this item but shall be included in the unit bid price for pipelines.

END OF SECTION

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SECTION 01720 – PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor shall maintain at Site for the Engineer and Owner:

1. One record copy of:

a. Specifications

b. Addenda

c. Change Orders and other Modifications to Agreement

d. Reviewed Shop Drawings and Samples

e. Field test records

2. Two copies of Record Drawings marked and updated each working day.

1.02 RELATED REQUIREMENTS

A. Section 01300: Submittals.

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Contractor shall store documents in Contractor's field office or other location as approved by the Owner apart from documents used for construction.

1. Provide files and racks for storage of Documents and Samples.

B. Contractor shall file Documents and Samples in accordance with Construction Specifications Institute (CSI) format.

C. Contractor shall maintain Documents in clean, dry, legible condition, and in good order. Do not use Record documents for construction purposes.

D. Contractor shall make Documents available at all times for reference by Engineer or Owner.

1.04 MARKING PENS

A. Contractor shall provide felt tip marking pens for recording information in color code designated by Engineer.

1.05 RECORD DRAWINGS

A. Contractor shall label each of the two sets of Record Drawings with "PROJECT RECORD" in neat large printed letters.

B. Contractor shall record information concurrently with construction progress. Do not cover any Work until required information is recorded.

C. Drawings shall be legibly marked by Contractor to record actual construction (As-Built).

D. During progress of Project, Contractor shall keep careful record at Site of all changes and corrections from layouts shown, on two separate sets of drawings. Contractor shall enter such changes and corrections on prints of Contract Drawings (marked "PROJECT RECORD") within a day of the times the changes are made. Record Drawings shall also indicate in addition to changes and corrections, actual location of all subsurface utility lines encountered. In order that location of these lines and appurtenances may be determined in the event of surface openings or indicators become covered over or obscured, Record Drawings shall show, by installation elevation and offset dimension to two permanently fixed surface features/structures, end of each run including each change in direction. All appurtenances shall be located by stationing along utility run from reference point and include northern and eastern location points to all gate vales and fire hydrants. At time of Substantial Completion of each facility involved under Contract, Contractor shall submit to Engineer, Record Drawings showing aforementioned data. Engineer will not recommend interim payment or final payments for Project until above requirements have been fulfilled by Contractor.

E. Specifications and Addenda shall be legibly marked by Contractor to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item or equipment actually installed.

2. Changes made by field order or by Change Order.

1.06 SUBMITTAL

A. At Agreement close-out, Contractor shall deliver Record Drawings to Engineer for Owner.

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

1. Date

2. Project title and number

3. Contractor’s name and address

4. Title and number of each Record Document

5. Signature of Contractor or his/her authorized representative

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement and payment shall be made for this item but shall be included in the total price bid under this Contract.

END OF SECTION

SECTION 01740 – GUARANTEES AND WARRANTIES

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

A. General – Section 01010: General

1.02 PROJECT MAINTENEACE AND GUARANTEE

A. The Contractor shall maintain and keep in good repair, the Work covered by these Contract Documents during the life of this Contract.

1. The Contractor shall indemnify the Owner against any repairs which may become necessary to any part of the Work performed and to items of equipment, and system procured for or furnished under this Contract, arising from defective workmanship or materials used therein, for a period as described in the General Conditions of the Specifications.

2. All equipment, spare parts, supplies, materials, special tools, and any other item installed or supplied by the Contractor shall be warranted by the Contractor for a period of 1 year from the date of acceptance (Official Substantial Completion Date) of the work by the Owner.

3. The Contractor shall, at his own expense, furnish all labor, materials, tools, and equipment required and shall make such repairs and removals or shall perform such work of reconstruction, as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship, or faulty materials, in any part of the Work performed by him. Such repair shall also include refilling of trenches, roadways, excavations, or embankments which show undue settlement or erosion after backfilling or placement.

4. Except as noted on the Drawings or as specified, all structures such as embankments, levees, fences, etc., shall be returned to their original condition prior to the completion of the Contract. Any and all damage to any facility, not designated for removal, resulting from the Contractor's operations shall be promptly repaired by the Contractor at no cost to the Owner.

5. The Contractor shall be responsible for all new improvements and reconstructed/repaired work included in the plans and specifications and for the reconstruction or repair of any road, sidewalks, street, and/or entrance damaged as a consequence of his operations, and or repairs and maintenance of same for a period of one (1) year from the date of such reconstruction. In the event the repairs and maintenance are not made immediately to the satisfaction of the Engineer, and it becomes necessary for the Owner to make such repairs, the Contractor shall reimburse the Owner for the cost of such repairs.

6. In the event the Contractor fails to proceed to remedy the defects of which he has been notified within 7 days of the date of such notice, The Owner reserves the right to cause the required materials to be procured and the work to be done, as described in the General Conditions and to hold the Contractor and his sureties liable for the cost and expense thereof.

7. All equipment warranties for periods of longer than one year shall be assigned to the Owner after the one-year warranty period specified herein and in the General Conditions.

1.03 PROCESS WARRANTIES

A. Certain items of construction are specified as to performance. Should these items fail to perform as specified, the Contractor shall make all required modifications or replacement necessary to achieve the specified results at no additional cost to the Owner.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement and payment shall be made for this item, but shall be included in the total price bid under this Contract.

END OF SECTION

DIVISION 2

SECTION 02100 – SITE PREPARATION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The work covered by this section of the specifications consists of preparing the jobsite for construction operations by the removal and disposal of all obstructions from the right-of-way and from designated easements, where removal of such obstructions is not otherwise provided for in the plans and specifications. Such obstructions shall include abandoned structures and utility lines, fences, trees, shrubs, vegetation, curbs, gutters, sidewalks, driveways, pavement, concrete and stone rubble, rubbish and all other miscellaneous debris.

B. The Contractor shall adhere to individual specific requirements concerning existing improvements as noted on the plans. These requirements include: removal, replacement and protection of existing improvements.

C. The Contractor shall furnish all materials, equipment, tools, labor, superintendence and incidentals required to perform the work as indicated on the drawings, as required by the Engineer, and as specified herein.

1.02 RELATED WORK

A. Section 02221 Excavating, Backfilling and Compacting for Utilities

B. Section 02222 Excavating, Backfilling and Compaction for Asphaltic Pavement

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 OBSTRUCTIONS OTHER THAN VEGETATION

A. All concrete, pavement, fences, rubble, trash and miscellaneous debris shall be removed to a depth of 1 foot below natural ground. All remaining holes shall be backfilled with material meeting the requirements for fill and backfill material as stipulated in Section 02222 and then tamped. The Contractor shall complete this operation by blading, bulldozing, or other approved methods so that the job site shall be free of holes, ditches, and other abrupt changes in elevation and irregularities of contour.

B. Abandoned storm sewers, culverts, sanitary sewers, conduits and water pipes over 3 inches in diameter, which lay in the path of construction shall be removed from the limits of construction and plugged with concrete to form a tight closure. All debris and/or rubble from removing any abandoned item from the path of construction will be immediately removed from the site at no cost to the Owner.

3.02 CLEARING AND GRUBBING

A. Clearing shall consist of removal and disposal of trees and other vegetation as well as down timber, snags, brush and rubbish within the working areas as shown in the drawings. Individual trees, groups of trees or other vegetation not required to be removed and occurring outside the earthwork area shall be protected against unnecessary cutting, breaking or skinning of roots, skinning and brushing of bark, or smothering of trees by stockpiling construction materials or excavated materials within drip lines.

B. Stumps, matted roots and roots larger than 2 inches in diameter shall be removed from within 6 inches of the surface of areas on which fills are to be constructed except in roadways. Materials as described above within 18 inches of finished subgrade of road ways in either cut or fill sections shall be removed. Areas disturbed by grubbing will be filled as specified in Section 02221 - Excavating, Backfilling and Compacting for Utilities.

3.03 DISPOSAL

A. The Contractor shall dispose of all materials removed from the job site in accordance with local law, rules and regulations.

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement and payment shall be made for this item, but it shall be in accordance with Section 01025 of these specifications.

END OF SECTION

SECTION 02221 – EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 GENERAL

1.01 STATUTORY REQUIREMENTS

A. All excavation, trenching and related sheeting, bracing, etc. shall comply with the requirements of OSHA excavation safety standards (29 CFR part 1926.650 Subpart P) and any State or local requirements. Where conflicts between OSHA, State, and local regulations exist, the most stringent requirements shall apply.

1.02 SCOPE OF WORK

A. Furnish all labor, materials, equipment, superintendence, tools and incidentals necessary to perform trenching for water lines and appurtenances, including drainage, filling, backfilling, disposal of surplus material, and restoration of trench surfaces and easements.

B. Excavation shall extend to the width and depth shown on the drawings or as specified and shall provide suitable room for placing shoring, pipe embedment and installing pipe, structures, and appurtenances.

C. Furnish and place all sheeting, bracing, and supports and remove from the excavation all materials which the Engineer may deem unsuitable for backfilling.

D. Whatever the requirement for any percentage of compaction is referred to herein shall mean "at least that percentage of maximum density as determined by ASTM D1557, Method D."

1.03 RELATED WORK

A. Environmental protection is included in Section 01110.

B. Dewatering is included in Section 02140.

C. Granular fill materials is included in Section 02235.

D. Asphaltic concrete paving is included in Section 02510.

E. Schedule of Pipe is included in Section 02600.

1.04 SUBMITTALS

A. Trench excavation support system designs shall be prepared by a licensed Professional Engineer, registered in the State of Texas, having a minimum of five years of professional experience in the design and construction of excavation support systems. Submit an original and a minimum of three copies of the licensed Professional Engineer’s certification, on the P.E. form included in Section 01300, stating that the excavation support systems designs have been prepared by the Professional Engineer and that the Professional Engineer will be responsible for their execution.

1.05 REFERENCE STANDARDS, QUALITY ASSURANCE, PROJECT/SITE REQUIREMENTS AND DEFINITIONS

A. American Society for Testing and Materials (ASTM)

1. ASTM D698 Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregates Mixtures Using 5.5 lbs (2.49 kg) Rammer and 12-inch (305 mm) Drop (also known as Standard Proctor Analysis)

2. ASTM D1557 Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54 kg) Rammer and 18-inch (457 mm) Drop (also known as Modified Proctor Analysis)

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.06 QUALITY ASSURANCE

A. Prior to and during the placement of backfill and fill, cooperate with the Engineer and soils testing laboratory in their performance of in-place soil density tests to verify that the backfill/fill material have been compacted in accordance with the compaction requirements specified herein. The Engineer may designate areas to be tested.

1.07 PROJECT/SITE REQUIREMENTS

A. Subsurface Conditions.

1.08 DEFINITIONS

A. Where the phrase "in-the-dry" is used in these specifications, it shall be defined to mean a soil condition such that the in-place moisture content of the soil at that time is no more than 2 percentage points above the optimum moisture content of that soil as determined by the laboratory test of the moisture-density relation appropriate to the specified level of compaction.

B. Where the phrase "at or near its optimum moisture content" is used in this Section, it shall be defined as being within plus or minus 2 percentage points of the optimum moisture content of that soil as determined by laboratory testing.

C. Where used in this Section, "modified proctor" refers to soil density testing in accordance with ASTM D1557.

PART 2 PRODUCTS

2.01 GENERAL

A. Timber used for excavation support systems shall be pressure treated with wood preservative for ground contact.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION SUPPORT

A. This item covers the requirements for the Contractor to provide the design and construction of trench safety for all trenches excavated. Refer to SUPPLEMENTARY CONDITIONS and Section 01010 - General, of these specifications for additional information regarding TRENCH EXCAVATION SAFETY SYSTEM.

B. The Contractor shall furnish, put in place, and maintain a trench safety system to support the sides of the excavations where required, to prevent movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect structures, pipelines, streets, drains, canals and utilities from damage due to lateral movement or settlement of ground.

C. The trench safety system shall be suitable for construction of pipelines, utilities, etc. that are installed below grade and shall be sufficient to fully protect public or private property including other existing utilities and structures below, or above grade. Trench safety systems include, but are not limited to, sloping of side excavation, sheeting, trench boxes or trench shields, sheet piling, cribbing, bracing, shoring, dewatering, or diversion of water to provide adequate drainage.

D. The Contractor shall be responsible for the design of systems, and procedures such as the use of sheet piling, shoring, or other means of temporary support to protect existing buildings, streets, highways, water conveying structures, and any other structures. In the case of existing utilities, the Contractor may elect to remove the utilities under the stipulated condition that the removal and subsequent replacement of these utilities shall meet with the approval of the Engineer, the Owner, the utility owner, and all agencies having jurisdiction of the structure or property. In all cases, the Contractor shall be fully responsible for the protection of any person or persons who, as a result of the Contractor's work, may be injured.

E. Trench safety systems shall be accomplished in accordance with the detailed specifications set out in the latest edition of the provisions of Excavations, Trenching, and Shoring, Federal Occupational Safety and Health Administration (OSHA) Standards. The OSHA Standards are incorporated into these specifications by reference with regard to trench safety systems, is hereby also incorporated, by reference, into these specifications.

F. The Contractor shall submit a safety program specifically for the construction of trench excavations together with the trench excavation plans for trench safety systems. The trench safety program shall be in accordance with OSHA Standards governing the presence and activities of individuals working in and around trench excavation.

1. Contractors shall have three generally accepted methods, or combinations thereof, to meet OSHA Standards for Trench Excavation:

    a. Minimum angle of Repose for sloping of the side of excavations.

    b. Utilization of Trench Box.

    c. Shoring, Sheeting, and Bracing Methods.

2. A Contractor electing to utilize the Minimum Angle of repose must submit:

    a. Soil Classification according to the unified Soil Classification System including water content and plasticity index, and minimum angle of the slope of excavation for the trench.

3. A Contractor electing to utilize a trench box must submit physical dimensions, materials, position in the trench, expected loads, and the strength of the box. No claims for delay will be permitted.

4. A Contractor electing to utilize shoring, sheeting, and bracing must submit dimensions and materials of all uprights, stringers, cross bracing, and spacing required to meet OSHA requirements. No claims for delay will be permitted.

G. Sheeting and Bracing

1. The Contractor shall furnish, put in place, and maintain such sheeting and bracing as may be required to protect personnel, to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures from undermining or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed and the cause of such voids investigated. Where soil cannot be properly compacted to fill void, and where acceptable to the Engineer, lean concrete shall be used to fill the void at no additional cost to the Owner.

2. The Contractor shall leave in place to be embedded in the backfill all sheeting the Engineer may direct him in writing to leave in place at any time during the progress of the work for the purpose of preventing injury to structures, utilities, or property. The Engineer may direct that timber used for sheeting and bracing be cut off at any specified elevation.

3. All sheeting and bracing not left in place shall be carefully removed in such manner as not to cause excessive loading on the installed piping, and to not endanger the construction or other structures, utilities, or property. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted for that purpose, or otherwise as may be directed.

4. The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such orders, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of failure on the part of Contractor to leave in place sufficient sheeting and bracing to prevent any caving in or moving of the ground.

5. No wood sheeting is to be completely withdrawn if driven below mid-diameter of any pipe, and under no circumstances shall any wood sheeting be cut off at a level lower than 1 foot above the top of any pipe.

6. When movable trench bracing such as trench boxes, moveable sheeting, shoring, or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding or backfill.

    a. When installing rigid pipe, any portion of the box extending below mid-diameter shall be raised above this point prior to moving the box ahead to install the next pipe. This is to prevent the separation of installed pipe joints due to movement of the box.

    b. When installing flexible pipe, trench boxes, moveable sheeting, shoring, or plates shall not be allowed to extend below mid-diameter of the pipe. As trench boxes, moveable sheeting, shoring or plates are moved, screened gravel shall be placed to fill any voids created and the screened gravel and backfill shall be re-compacted to provide uniform side support for the pipe.

H. The Contractor shall provide a qualified person to make daily inspections of the trench safety systems to ensure that the systems meet OSHA requirements. The contractor shall maintain a permanent record of these daily inspections.

If the evidence of possible cave-ins, or slides, is apparent, all work in the trench shall cease until the necessary precautions have been taken by the Contractor to safeguard personnel entering the trench. It is the sole duty, responsibility, and prerogative of the Contractor, not the Owner, the Owner's designated representative, or the Engineer to determine the specific applicability of the designed trench safety systems to each field condition encountered on the project.

I. In any emergency situation which may threaten or affect the safety or welfare of persons or property, the Contractor shall act at his discretion to prevent possible damage, injury, or loss. Any additional compensation or extension of time claimed for such action shall be considered in view of the cause of the emergency and in accordance with the general conditions.

3.02 TRENCH EXCAVATION PROCEDURES

A. Existing concrete and asphalt pavement, sidewalk, curb, or driveway removed in connection with construction shall be replaced to neatly sawed edges. Saw cuts shall be made to a minimum depth of 1½-inches or ¼ the thickness of the concrete, whichever is greater. Cuts shall be neat and to true straight lines with no shatter outside the removal area. If a saw cut would fall within 30-inches of a construction joint, cold joint, expansion joint, or edge, the concrete shall be removed and replaced to the joint or edge. Concrete sidewalk and/or driveway may be removed so that a minimum 30-inch square is replaced. If the saw cut would fall within 12 inches of score mark, the concrete shall be removed and replaced to the score mark. Existing bituminous pavement removed in connection with construction shall be cut with a saw, cutting wheel, or other similar and suitable tool. Care shall be taken to assure that the edge of the removed pavement does not vary from a straight line more than 2 inches from the mean. The Contractor shall furnish all material, labor, equipment, and supplies necessary to do the work required in removal of pavement and disposal of same where required. Saw cutting is required on all paving. The cutting shall be carried in a vertical plane through the pavement along a straight line marking the limits of the cut. Any unnecessarily irregular breakage or cracking caused by the Contractor shall be removed and replaced by the Contractor without added expense to the Owner. Paving cuts for manholes and valve boxes shall be SQUARE and at adequate distances from outside diameter to manholes and valve boxes to allow installation.

B. Strip and stockpile topsoil from farm areas crossed by trenches.

C. Trench digging machinery may be used to make trench excavation except in places where operation of same would cause damage to existing structures either above or below ground. In such instances, hand methods shall be employed. The Contractor shall locate all existing underground lines, whether or not they are shown on the drawings, sufficiently in advance of trenching operations to prevent any damage thereto. Extreme care shall be taken to prevent such damage and the Contractor shall be fully responsible for damage to any such lines. The Contractor shall locate the elevation of all major damage to any such lines. The Contractor shall locate the elevation of all major utility lines at least 1,000 feet ahead of pipeline placement operations and notify the Engineer in writing of any conflicts that are found or expected.

D. There will be no classification of excavated materials and all materials encountered shall be excavated as required. Adjacent structures shall be protected from damage by construction equipment. All excavated material shall be piled along the trench in a manner which will not endanger the work.

E. Excavation for manholes and other appurtenances shall be made as required to provide space for constructing the structure and trench safety system.

F. The use of explosives will not be permitted.

G. Trenches shall be excavated to the depth indicated on the drawings and in widths sufficient for laying and bedding the pipe, constructing concrete easement, bracing and for pumping and drainage facilities. The Engineer or Contractor may order testing by the soils testing laboratory to verify the suitability of the existing subgrade soils for the anticipated loadings. If the existing subgrade soils are determined to be unsuitable, direction will be provided by the Engineer regarding removal and replacement with suitable materials. The bottom of the excavations shall be firm and dry and in all respects acceptable to the Engineer.

H. Excavation shall be performed in-the-dry by methods which preserve the undisturbed state of subgrade soils. The trench may be excavated by machinery to, or just below the designated subgrade, provided that material remaining in the bottom of the trench is no more than slightly disturbed. Subgrade soils which become soft, loose, "quick," or otherwise unsatisfactory as a result of inadequate excavation, dewatering or other construction methods shall be removed and replaced by crushed stone fill as required by the Engineer at the Contractor's expense.

I. The Contractor shall not open up more trench in advance of pipe laying than is necessary to expedite the work, and in no event shall the length of a continuous open trench at the job site exceed 300 feet; however, trenching shall be done far enough in advance of pipe laying to allow the Engineer to make necessary grade changes without the use of extra fittings.

J. Any excavated areas shall be considered as "open trench" until all pavement replacements have been made, or until all trenches outside of pavement replacement areas have been backfilled and compacted in accordance with these Contract Documents. Trenches across streets shall be completely backfilled with temporary or permanent pavement in place within 24 hours after laying the pipe.

K. The Contractor shall provide substantial steel plates with adequate trench bracing which shall be used to bridge across trenches at street and alley crossings and at commercial driveways, where trench backfill and temporary patches have not been completed before the end of the Contractor's regular working hours. Safe and convenient passage for pedestrians shall be provided at all times. The Engineer may designate an enclosed or railed passage for the safe access of pedestrian traffic at any location adjacent to construction activities as he deems necessary. Access to fire stations, fire hydrants, schools, and hospitals shall be maintained at all times.

L. Trench widths from the bottom of the trench to a point 12 inches above the top of the pipe shall be kept to the practical minimum required for properly bedding, laying, aligning, grading, and jointing of the pipe. Trench widths shall follow EPWater Standards.

M. If the maximum recommended trench width must be exceeded or if the pipe is installed in a compacted embankment, then pipe embedment shall be compacted to a point of at least 2½ pipe diameters from the pipe on both sides of the pipe or to the trench walls.

N. Whenever the prescribed maximum trench width is exceeded, the Contractor shall use an embedment or encasement as required by the Engineer for the trench width as actually cut. For trench widths in excess of the prescribed maximum, excavated by the Contractor for his own convenience, the additional cost incurred will be borne by the Contractor.

O. In all cases, any accumulated water in the trench shall be removed before laying pipe, placing concrete, or backfilling.

P. If the Contractor excavates below grade through error or for the Contractor's own convenience, or through failure to properly dewater the trench, or disturbs the subgrade before dewatering is sufficiently complete, he may be directed by the Engineer to excavate below grade as set forth in the following paragraph, in which case the work of excavating below grade and furnishing and placing the refill shall be performed at the Contractor's expense.

If the material at the level of trench bottom consists of fine sand, sand and silt, or soft earth which may work into the pipe embedment material notwithstanding effective drainage, the subgrade material shall be removed to the extent directed by the Engineer and the excavation refilled with a 6-inch layer of coarse sand, or a mixture graded from coarse sand to fine peastone, as approved by the Engineer, to form a filter layer preserving the voids in the pipe embedment material. The composition and gradation of the filter layer shall be approved by the Engineer prior to placement. Pipe embedment material shall then be placed in 6-inch layers thoroughly compacted up to the normal grade of the pipe. If approved by the Engineer, bank-run gravel shall be used for refill of excavation below grade. Geotextile filter fabric may be substituted for filter layer if approved by the Engineer. Filter fabric shall be Mirafi 140N, Supac equivalent, or approved equal.

3.03 PIPE EMBEDMENT AND TRENCH BACKFILL PROCEDURES

A. After completion of the trench excavation in accordance with article 3.03 above, bedding material shall be placed on the trench bottom for support under the pipe. Bell holes and similar excavations for appurtenances shall be hand excavated. All pipe shall be installed in such manner as to insure full support of the pipe barrel over its entire length and under appurtenances.

B. Bedding, laying and joining of pipe shall be as specified for the individual type of pipe. After joining pipe it shall be adjusted to the line and grade indicated on the drawings.

C. As soon as practicable after pipe has been installed and joined, bedding material shall be placed and compacted, and either bedding or select fill as specified for the pipe shall be placed and compacted to at least 12 inches over the pipe. The bedding material shall be hand packed and tamped in 8-inch lifts paying particular attention to bell holes, sling holes, elimination of voids and to insure uniform support for the pipe. The Contractor may at his option use pipe embedment material in place of select fill to a height of 12 inches over the pipe.

D. In the event special pipe bedding is not required, the trench shall be excavated to an even grade so that the bottom of the pipe will rest on the bottom of the trench throughout the entire length of the pipe. In order to obtain a true even grade, the trench shall be fine graded and shaped to fit the bottom 90 degrees of the pipe. Any part of the trench excavated below grade shall be corrected by filling with approved materials and thoroughly compacted. If clay, rock or other unyielding material is encountered in the bottom of the trench, it shall be removed to a depth of six (6) inches below grade, refilled with selected materials, and thoroughly compacted to grade. Bell holes of ample dimensions shall be dug at each joint to permit the jointing of the pipe to be made properly.

E. Backfilling over pipes shall begin as soon as practicable after the pipe has been laid, jointed and inspected and the bedding material placed as specified, trenches shall not be left open overnight.

F. Allow three days before placing backfill over concrete encasement.

G. All backfilling shall be prosecuted expeditiously and as specified.

H. The remainder of the trench from a point 12 inches above the pipe, or above the concrete encasement, shall be backfilled to match and maintain existing grades and thoroughly compacted as herein specified. To prevent longitudinal movement of the pipe, dumping backfill material into the trench and then spreading will not be permitted until the bedding or select fill has been placed and compacted to a level 1 foot over the pipe.

I. If the bedding requirements do not require bedding zone material to the top or above the pipe, the first lift of backfill material shall be placed carefully under and around the pipe and thoroughly compacted by means of mechanical tamps to the spring line of the pipe. When the first lift above the top of the pipe has been compacted as specified, the backfilling of the remainder of the trench, shall be done in the following manner: The backfill material shall be placed in the trench in layers not to exceed 8 inches, moistened or aerated as necessary to obtain optimum moisture, and compacted with approved mechanical compaction equipment until the required density is obtained. Vibratory rollers may not be used in city streets. Density requirements shall be as follows:

1. For all backfill in areas to be paved, a density of no less than 95 percent per ASTM D1557 shall be obtained from bottom of subgrade to top of the embedment zone. Where conflicts exist between the project specifications and the plans, the most stringent requirement shall apply.

2. For all backfill not in paved areas, density of not less than 95 percent per ASTM D1557 shall be obtained from top of the embedment zone to ground surface. Where conflicts exist between the project specifications and the plans, the most stringent requirement shall apply.

3. The jetting method of water tamping, or the water ponding method will **NOT** be allowed.

J. Following the completion of backfilling, the Contractor will maintain the trench surface in a satisfactory manner until final completion and acceptance of the finished project. The maintenance shall include blading from time to time as necessary, filling depressions caused by settlement, and other work required to keep the areas and roads in satisfactory condition. Any settlement of the paved surface which occurs before and during the 1 year warranty period shall be repaired by the Contractor at his expense.

K. Backfill around structures shall be selected common fill material, and shall be compacted, especially over pipes connected to the structures.

L. When moveable trench bracing such as trench boxes, moveable sheeting, shoring, or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring, or plates shall not be allowed to extend below top of the pipe. As trench boxes, moveable sheeting, shoring, or plates are moved, pipe bedding shall be placed to fill any voids created and the backfill shall be recompacted as specified to provide uniform side support for the pipe access to the entire trench width.

M. Any new or relocated sewer, potable water, natural gas, buried telephone, reuse water line, or other utility shall be marked by installing the appropriate marking tape in the trench. Marking tape for water and sewer pipelines shall be metallic. All other marking tape shall consist of a minimum of 4.0 mil inert polyethylene plastic. The tape shall be imprinted continuously over its entire length in permanent black ink to identify the type of line. The tape shall be 6-inches in width and colored High Visibility Safety Yellow for gas pipelines, High Visibility Blue for potable water pipelines and High Visibility Brown for sanitary sewer pipelines.

   The pipelines shall be marked by concurrently installing the appropriate marking tape in the trench for detecting purposes. The marking tape shall be as manufactured by Alarm-Tapes, Inc. or approved equal. Installation in the trench shall be as recommended by the manufacturer and as shown on the Drawings.

N. Construction Tests

1. Tests of all the materials may be made during construction to determine conformity with the specifications. Such tests may include field densities on base coarse and grading analysis of material. The frequency and type of testing will be determined by the Engineer. The Contractor shall cooperate in securing samples and shall furnish materials required for sampling.

2. Should construction testing reveal that the item tested does not meet the requirements of the Construction Documents, retesting shall be required until the item does meet the requirements. All failing tests shall be at the Contractor's expense. The Contractor may obtain any additional tests which he may require for quality control, using his testing laboratory, at his expense.

3. Backfilling and Compaction will not be allowed prior to a proctor being available at the project site. “Blind densities will not be allowed. The Contractor shall plan accordingly as to avoid any delays.

3.04 RESTORING TRENCH SURFACE

A. Where the trench occurs adjacent to a paved street, in shoulders, or in sidewalks, thoroughly consolidate the backfill and maintain the surface as the work progresses. If settlement takes place, immediately deposit additional fill to restore the level of the ground.

B. In and adjacent to streets, the upper portion of trenches shall be backfilled with base material and pavement replaced.

C. In sections where the pipeline passes through grassed areas, and at the Contractor’s own expense, remove and replace the sod, or loam and seed the surface to the satisfaction of the Engineer.

3.05 EXCAVATION AND BACKFILLING FOR PIPES UNDER OR ADJACENT TO STRUCTURES

A. Excavation for all pipe lines beneath structures shall be carried out with the excavating equipment operating from the subgrade for the structure. The excavation shall be carried out "in-the-dry" and in a manner which will preserve the undisturbed state of the subgrade soils.

B. In order to minimize any differential settlement, all pipe within the excavation limits of structures shall be adequately supported on structural fill. The Contractor shall provide a suitable transition zone of this backfill under the pipelines or ducts from the structure wall to the beginning of the normal trench as shown on the drawings and as acceptable to the Engineer.

C. In locations where pipes pass through fill area, the Contractor shall take the following precautions to consolidate the refill up to an elevation of at least 1 foot above the bottom of the pipes:

1. Place and compact structural fill in such areas for a distance of not less that 3 feet either side of the centerline of the pipe in level layers not exceeding 8 inches in depth and extending from the structure wall to the end of fill.

2. Excavate for pipe trench and backfill as specified above.

3.06 DISPOSAL OF SURPLUS MATERIAL

A. Excavated material may be stacked without excessive surcharge on the trench bank. Excavated material shall be segregated for use in backfilling.

B. Unsuitable waste and surplus excavated material shall be removed and disposed of offsite in accordance with all applicable regulations. Materials may be temporarily stockpiled in an area within the limits of construction that does not disrupt neighborhood activities, construction activities, create any nuisances or safety hazards, or otherwise restrict access to the site of the work.

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement will made for this work item and payment for all work covered in this Section, will be included as part of the unit price for the installation of pipelines as shown in the Proposal. Such payment shall be complete compensation for the complete performance of the work in accordance with the drawings and Specifications.

END OF SECTION

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SECTION 02222 – EXCAVATING, BACKFILLING AND COMPACTION FOR ASPHALTIC PAVEMENT AND PAVEMENT REPLACEMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The work covered by this section of the Specifications consists of all earthwork required to prepare ground surfaces upon which asphaltic pavement and concrete items such as curbs, gutters, sidewalks and driveways are to be constructed or replaced. The work shall include removal and disposal of any unacceptable or excess materials and any necessary dewatering or rock excavation.

B. The Contractor shall furnish all materials, equipment, tools, labor, superintendence and incidentals required to perform the work as indicated on the drawings, as required by the Engineer, and as specified herein.

C. The work shall be performed to the dimensions, typical sections, and lines and grades indicated on the drawings or established by the Engineer and in accordance with these Specifications.

D. It shall be the responsibility of the Contractor to become familiar with job site conditions, and materials to be encountered prior to submitting his Proposal. The Contractor shall include in the proposal all costs of such preliminary investigations, as well as all costs for performing the work covered by this section, including any necessary dewatering or rock excavation.

E. The use of explosives in performing this work will not be permitted.

1.02 SUBMITTALS

A. Imported materials must have prior approval by the Engineer in the form of accepted certification from the material supplier that the proposed material meets all the requirements of this Section.

1.03 REFERENCE TO STANDARDS

A. Referenced within this section to the County of El Paso Standards.

B. Where conflicts exist between the project specifications and the Geotechnical Investigation Report, the most stringent requirement shall apply.

PART 2 PRODUCTS

2.01 IMPORTED MATERIAL

A. Imported backfill and subgrade materials shall conform to Section 02235 of these Specifications.

PART 3 EXECUTION

3.01 GRADING AND EXCAVATION

A. This work shall consist of removing all materials to the dimensions, typical sections, lines and grades shown on the drawings or established by the Engineer. The work shall include removal of all materials encountered, regardless of their nature, removal of materials which are unsuitable for use in subgrades, fills and backfills; stockpiling of suitable soils for use in fills or backfills; and the satisfactory disposal of unsuitable soil, vegetation, debris, or any other deleterious materials encountered within areas of excavation.

B. All areas involved in the construction shall be graded as shown on the drawings or as required by the Engineer. These areas shall be shaped to drain away from the construction area and shall be maintained free of trash and debris until final completion and acceptance of the work by the Owner.

C. If unsuitable soils such as clay, or silty sands or trash are exposed at the depths to which excavation is required by the Contract Drawings, these unacceptable soils or trash will be removed to a depth of 1 foot below the required excavation. The full cost of excavation required to remove unacceptable materials and to fill in these areas with acceptable material shall be borne by the Contractor. The Contractor may review the available boring logs, if any, and may perform additional soils investigations at Contractors expense to ascertain whether removal of such undesirable soils or trash will be required in any area of the construction.

D. Unauthorized excavation consists of removal of materials beyond indicated elevations or dimensions without specific written authorization of the Engineer. Unauthorized excavation, as well as remedial work performed outside of the contract limits, and not authorized by the Engineer, shall be corrected at the expense of the Contractor.

E. Excavation walls should be suitably sloped as per the approved Trench Safety System plan. The Contractor shall be responsible for maintaining, at all times, safe embankment slopes during the work.

F. Prior to placement of fill or backfill, all excavations and potential fill materials shall be inspected and approved by the Engineer. The excavation shall be underlain by natural non-expansive soils and not be undesirable soil materials or clay soils.

G. After excavation to the required elevation and/or prior to placement of fill, the upper 6 inches of the excavated area shall be scarified and compacted to the density required by this Section. Fill materials, if required, shall be incorporated into the scarified surface during the compaction operation.

3.02 BORROW MATERIAL

A. If sufficient suitable material is not available from the excavated areas at the job site, the Contractor shall provide additional suitable materials as required to complete backfills and to construct all fills to the typical sections, lines and grades shown on the drawings or established by the Engineer. The Contractor shall obtain the additional material from the owners of outside borrow areas. The Contractor shall be responsible for locating the sources of material and for obtaining the right to excavate and remove the material. All costs of providing the borrow material, including payment of royalties, developing the source of borrow, and excavating and hauling the material to the job site shall be paid by the Contractor at no cost to the Owner. Borrow material shall conform to Section 02235.

3.03 FILLING AND BACKFILLING

A. Filling and backfilling shall be performed as necessary to complete the preparation of ground surfaces to the typical sections and the lines and grades shown on the drawings or established by the Engineer.

B. Fill and backfill material shall be free of any organic or deleterious substances and shall not contain cobbles or lumps over four inches in greatest dimension. It shall contain no more than 12 percent by weight of material passing a No. 200 sieve. The fill material shall show low shrinkage or swelling when subjected to changes in moisture content, and its plasticity index shall not exceed 12.

C. Suitability of potential fill material shall be determined by grain size analysis and tests for liquid limit, plastic limit, and shrinkage performed in accordance with ASTM D522, D423, D424 and D427, respectively.

D. Soils at the site will be considered suitable for use as engineered fill, provided all of the above criteria are met. Under no circumstances shall rubble material, frozen soil, or deposits of clay be used to compromise any part of the engineered fill. Undesirable materials encountered during excavation shall be removed from the job site and disposed of at the Contractors expense. All excess excavation which cannot be reused as backfill shall be disposed of at the Contractors expense.

E. No frozen material shall be placed in fills or backfills, and no material shall be placed and compacted during periods when freshly placed material would become frozen.

3.04 INSTALLATION OF FILL AND BASE MATERIALS

A. The bottom of excavations shall be moistened and shall be compacted to a dry density which is not less than 95 percent of maximum as determined by ASTM D1556 or D2167. Fill material shall be placed in lifts not to exceed eight inches (loose measure) in depth and then compacted. The moisture content of the material shall be uniform and within, plus or minus, 2 percent of optimum, as determined by ASTM D1557. Water shall not be pooled or jetted onto the in-place fill, but shall be distributed uniformly over its surface.

B. Compaction of fill material shall be with approved types of pneumatic or tamping equipment. Self-propelled or heavy duty vibratory compaction equipment should not be used adjacent to previously completed buildings or structures. Each lift of fill material shall be compacted to a dry density as shown in the plans and as determined by ASTM D1557 of D2167.

C. Control of filling operations shall consist of field inspection and testing to determine that each lift of fill has been compacted to the required density. Should any lift or portion of a lift not conform to density requirements, it shall be scarified, wetted, if necessary, and then re-compacted until the required density is attained. If the Contractor is unable to attain the required compaction with the material in place, the material shall be removed, replaced with new material, and the site recompacted until the required density is attained.

D. When illustrated in the Drawings, Flowable Fill shall be used in lieu of base course as per the Contract Drawings or County of El Paso Standards.

3.05 SUBGRADE

A. After completion of excavation or filling and backfilling, the surfaces of the excavated or filled areas shall be prepared as subgrade for pavement base course, for the construction of concrete items or for the placement of the all-weather roadway finish course. The subgrade shall be the thicknesses shown on the drawings. Any clay encountered within two feet of the wearing course shall be removed and replaced with engineered fill.

B. The subgrade shall be scarified, plowed or otherwise loosened; shall be wetted, shaped and rolled with approved rollers. The rolling shall be continued until the required density shown in the plans is attained. Where conflicts exist between project specifications and project drawings, the most stringent requirement shall apply. The testing will be as outlined in ASTM D1557; method to be selected by the testing laboratory and approved by the Engineer.

C. When the required compaction is achieved the subgrade shall be finished to the lines and grades as shown on the plans or as required by the Engineer. The subgrade shall be kept in good condition as required and shall be safe for traffic until such time as the remaining courses are constructed. Periodic wetting of the subgrade may be required to maintain density and to control dust. Upon commencement of the base course, the Contractor will ensure that the subgrade continues to maintain the same density as the day it passed and remains finished to the lines and grades as shown on the plans and as required by the Engineer, and if not, all requirements will be re-established at no cost to the Owner. The above-mentioned requirements pertaining to the subgrade, shall also apply to the base course upon commencement of the Paving (HMAC) replacement.

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement and payment shall be made for this work item but shall be included in the unit price bid for pipeline as noted in the Proposal.

END OF SECTION

SECTION 02235 – GRANULAR FILL MATERIAL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals necessary to obtain materials for filling and backfilling, grading and miscellaneous site work, for the uses shown on the drawings and as specified herein.

1.02 RELATED WORK

A. Site Preparation is included in Section 02100.

B. Excavating, Backfilling, and Compacting for Utilities is included in Section 02221.

C. Asphaltic Concrete Paving is included in Section 02510.

D. Pipelines are included in Sections 02622.

E. Excavating, Backfill and Compaction for roadways and pavements is included in Section 02222.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300, Complete Product Data, for materials specified in this Section.

B. Test Results

1. Sieve analysis for fill and pipe embedment materials.

2. Plasticity index for material proposed for use as structural or common fill.

3. USCS Classification.

C. Samples

1. One 10 pound sample of each material specified herein delivered to the Owner's Testing Laboratory together with the submittals noted in A and B above. Samples shall be delivered in a plastic sack.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C33 Standard Specification for Concrete Aggregates

2. ASTM D75 Methods for Sampling Aggregates

3. ASTM C136 Method for Sieve Analyses for Fine and Course Aggregates

4. ASTM D4318 Liquid Limit, Plastic Limit and Plasticity Index of Soils

5. ASTM D698 Standard Test Method for Moisture-Density Relations for Soils and Soil-Aggregate Mixtures, Using 5.5-pound (2.49-kg) Rammer and 12-inches (305 mm) Drop.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. Laboratory Testing

1. At least 14 days prior to the placement of any backfill and fill materials, deliver a representative sample of the proposed materials weighing at least 50 pounds to the Owner's Testing Laboratory.

2. The soils testing laboratory will perform:

a. Grain-size analyses and soil classification of the samples to determine their suitability for use as backfill or fill material in conformance to the material requirements specified hereinafter.

b. The appropriate Proctor analyses to determine the moisture density relationship curve for the material submitted.

3. Backfilling and Compaction will not be allowed prior to a proctor being available at the project site. "Blind" densities will not be allowed. The Contractor shall plan accordingly as to avoid any delays.

4. Test results shall be delivered to the Engineer and to the Contractor no later than three days prior to the placement of backfill or fill materials.

5. The Contractor will pay for all tests to determine suitability of off-site or on-site excavation material proposed for use as backfill or fill.

1.06 DELIVERY, STOCKPILING, AND HANDLING

A. The Engineer shall be notified of all deliveries of granular material a minimum of 72 hours in advance of the scheduled delivery time.

B. Stockpile granular material within areas allowed for construction and at locations acceptable to the Engineer. The Contractor shall construct a pad of the stockpile material at the stockpile location(s) and shall utilize equipment capable of properly stacking each stockpile in a neat and regular shape. Contaminated or unsatisfactory stockpile material shall be replaced at no additional cost to the Owner. The Engineer shall be the sole authority determining the acceptability of stockpiled material.

C. Limit the handling of stockpiled material to prevent segregation and unnecessary material loss. Material to be stockpiled shall be covered with a waterproof tarp secured to the ground with weights or snaps, in the event of wet weather.

PART 2 PRODUCTS

2.01 MATERIALS

A. Select Fill and Backfill materials should be granular and free of clay lumps, deleterious materials, cobbles or boulders over 3-inches in nominal size. Fill materials should meet requirements of this section and/or the project plans and specifications, whichever is more stringent. Select Fill materials should have a liquid limit less than 35 and a plasticity index less than or equal to 12. The Select Fill shall also exhibit an optimum dry density of at least 115 pcf determined per ASTM D1557. Soils classified in the following list according to the USCS can be considered satisfactory for use as Select Fill and backfill above the pipe zone: SM, SC, SP-SM, SC-SM, GM, GC, GC-GM, GP-GM and GP-GC provided that these soils also meet the requirements above. Soils classified as CH, CL, MH, ML, OH, OL and PT or a combination of these under the USCS classification and soils that exhibit a plasticity index greater than 15 are **not** considered suitable for use as Select Fill and Backfill soil materials.

B. Select Fill materials should be placed in accordance with this report and/or the project plans, whichever is more stringent. Select Fill should also meet the minimum gradation requirements tabulated below.

Sieve Size (square opening)	% Passing by Weight
3-inch	100
3/4-inch	85 – 100
No. 4	35 – 100
No. 200	5 – 35

C. Class I, Class II, Class III and Class IV materials may be defined as follows:

1. **CLASS I** material may be manufactured angular, well-graded, crushed stone per ASTM D-2321 with a maximum particle size of 1½ inches. The following materials shall be acceptable under this class designation: ASTM D-448 – Stone Sizes 4, 46, 5, 56, 57, and 6. Pea Gravel and other uniformly graded material are **not** acceptable under this class. A gradation of Class I material shall be submitted by the Contractor to the Engineer for approval prior to use.

2. **CLASS II** material may be coarse sands and gravels per ASTM D-2487 with maximum particle size of 1½ inches, including variously graded sands and gravels, containing less than 12 percent fines (material passing the #200 sieve) generally granular and non-cohesive, either wet or dry. Soil types GW, GP, SW and SP are included in this class. (i.e., typically required within pipe zone). Proposed Class II material shall be submitted by the Contractor to the Engineer for evaluation and approval prior to use.

3. **CLASS III** material may be fine sands, clayey sand mixtures, clayey gravel and sand mixtures, suitable clean native sands and gravels. Class III materials shall also be free of clay lumps, deleterious materials, cobbles or boulders over 3-inches in nominal size. Class III materials should have a liquid limit less than 35 and a plasticity index less than or equal to 12 and exhibit an optimum dry density of at least 115 pcf. Soils classified in the following list according to the USCS and ASTM may be considered satisfactory for use as Class III backfill soil materials above the pipe zone as approved by the project engineer of record: SM, SW, SC, SPSM, SP-SC, SC-SM, GW, GP, GM, GC, GP-GM and GP-GC. Proposed Class III material shall be submitted by the Contractor to the Engineer for evaluation and approval prior to use.

4. **CLASS IV and V** material may be classified as CH, CL, MH, ML, OH, OL and PT under the USCS. These soils shall **not** be used as backfill materials, unless approved by the engineer of record.

D. Subgrade Material

1. Shall be Suitable Select Fill or Backfill materials. The existing soils should be cleared of all asphalt, vegetation, organic matter, topsoil, construction debris and/or any foreign matter. The cleared subgrade should be thoroughly proof rolled in order to densify any weak and compressible zones. The finished subgrade should be compacted to a minimum of 95 percent of maximum dry density per ASTM D-1557 at ±2 percent of optimum moisture.

E. Subsurface Conditions. A Geotechnical Report dated November 2, 2016, prepared by CQC Testing, El Paso, TX, entitled: “General Subsurface Soils Evaluation Report, El Paso Water – Montana East, 16-in Water Main Improvements Project, Homestead Meadows South – Vista del Este El Paso, El Paso County, Texas.” and copies of this report may be examined at the offices of EPWU (1154 Hawkins Blvd., El Paso, TX 79961-0511) during regular business hours. Nothing herein, relieves the Contractor of his obligations to thoroughly investigate the condition of the job site including all subsurface conditions.

PART 3 EXECUTION

NOT USED.

END OF SECTION

SECTION 02300 – BORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work covered by this section of the Specifications consists of all boring required to install casings; all installation of carrier pipes within the casings; and all installation of casing or carrier pipe accessories necessary to construct water line crossings under laterals, highways, or other pipelines. The work shall also include excavation of boring pits, removal and disposal of excess materials, and any necessary dewatering.

B. The Contractor shall furnish all materials, equipment, tools, labor, superintendence and incidentals, including all necessary field welding, to install the casings, carrier pipe and accessories as indicated on the drawings and as specified herein.

C. The Contractor shall be responsible for inspecting the location where the pipes are to be installed and to familiarize with the conditions under which the work will be performed.

D. The Contractor shall be prepared to work at night and on Saturday and Sunday, if required to complete this work. After the boring or tunneling operation has begun, the Contractor shall work continuously (24 hours a day) until the complete lengths of casing have been installed.

E. If any movement or settlement occurs which might cause damage to existing facilities or structures over or adjacent to the work, the Contractor shall immediately stop all work except that required to make the work secure and to prevent further damage. The Contractor shall resume boring or tunneling only after necessary precautions have been taken to prevent further movement, settlement or damage, and shall repair any damage, at his own cost.

F. Construction shall not interfere with the operation of the street or highway, nor weaken or damage any embankment or structure. Barricades and lights shall be furnished and maintained to safeguard traffic and pedestrians until such time as the backfill has been completed.

1.02 RELATED WORK

A. Excavating, Backfill and Compacting for Utilities, Section 02221.

1.03 SUBMITTALS

A. Plans and details of the equipment, materials and the method of construction to complete the work shall be submitted by the Contractor and must be approved by the Engineer. Submittal shall include plans of pits, details of shields and the intended method to maintain proper grade and/or restrict movement of the pipe within the casing.

PART 2 PRODUCTS

2.01 MATERIALS

A. Casing material shall be HDPE Black Pipe.

B. Carrier pipe shall be as specified in Section 02600 as applicable. All joints of carrier pipe within casing shall be restrained type.

C. Casing End Enclosures shall be Model "C" pull-on type seal with stainless steel bands and clamps as manufactured by Pipeline Seal and Insulator, Inc. or approved equal. The annular space between the carrier pipe and the casing shall be sealed at each end of the casing using casing end enclosures. Casing end enclosures must be installed in accordance with the manufacturer's instructions.

D. Mortar grout shall consist of one part cement, 1/4 part lime, and two parts sand. Sand for mortar grout shall comply with ASTM C-144; lime shall comply with ASTM C-207, Type S; cement shall comply with ASTM C-150, Type II.

E. Casing Insulators shall be Model A8G-1 as manufactured by Pipeline Seal and Insulator, Inc. or approved equal. The runners shall be made of glass-reinforced plastic and be firmly attached to the carrier pipe according to the recommendations of the insulator manufacturer prior to installing the carrier pipe in the casing. The insulators shall be spaced so that any insulator is located a maximum of twelve (12) inches from each pipe joint, so that there is a maximum spacing of eight (8) feet between insulators, and so that one full insulator is located within six (6) inches of each end of the casing. Casing Insulators must be installed in accordance with the manufacturer's instructions.

PART 3 EXECUTION

3.01 BORING PITS

A. Boring shall be to the limits, lines and grades shown on the Drawings and the Contractor's approved submittal, and shall utilize methods which include due regard for the safety or workmen, adjacent structures, utilities and the public. The location of boring pits shall be approved by the Engineer.

B. The Contractor is advised of the proximity of buildings, structures, roads, drains, canals and utilities to the work as shown on the Drawings. The work of excavating, lining, grouting and construction of the casing shall be so executed that ground settlement is minimized. Precautions shall include the use of construction methods and equipment to minimize the loss of earth materials at the casing face and settlement of earth around the casing. The completed casing will have full bearing against earth and no voids or pockets will be left in any portion of work.

C. The Contractor shall be required to furnish, install and remove shoring, sheeting, thrust blocks or other provisions required in driving the casings and pipe forward.

D. All boring pits shall be fenced or barricaded to prohibit public access to the work site.

E. Prior to any construction of this work item, and prior to any submittals for this work item, the Contractor shall verify the horizontal and vertical locations of all utility lines that may exist within the path of boring or within the shafts. Any conflict found to exist shall be brought to the Engineer's attention immediately, so that a course of further action can be devised.

F. Upon completion of casing and pipe installation, Contractor shall backfill pits per Section 02221 of the specifications.

G. For additional boring requirements within TXDOT Right-of-Way, the Contractor shall refer to the Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges, 2004, when conflicts arise.

3.02 BORING OPERATIONS

A. The holes are to be bored mechanically, using a pilot hole as a guide. A two inch pilot hole shall be bored the entire length of the crossing and shall be checked for line and grade on the opposite end of the bore from the work pit. This pilot hole shall serve as the centerline of the large diameter hole to be bored. The use of water or other fluids in connection with the boring operation will be permitted only to the extent necessary to lubricate cuttings. Water jetting will not be permitted.

B. In unconsolidated soil formations, a gel-forming colloidal drilling fluid consisting of at least 10 percent 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 casing.

C. Overcutting in excess of one inch shall be remedied by pressure grouting the entire length of the bore, with 7-sack mix, immediately after bore is completed.

D. Refer to Geotechnical Report for additional boring requirements.

3.03 INSTALLING CARRIER PIPE

A. After the casing has been installed, the Contractor shall thoroughly clean the interior, then install the carrier pipe within the casing using insulated spacers. Method of installation of carrier pipe shall be in accordance with pipe manufacturer recommendations.

B. After pipe is installed within the casing the Contractor shall conduct the required pressure and leakage test on the carrier pipe. Any leaks discovered during the testing phase shall be repaired to the satisfaction of the Engineer.

C. The carrier pipe shall be installed to the line and grade required within the casing.

D. Rubber end seals shall be installed at each end of the casing after the pipe has been installed and tested.

PART 4 MEASUREMENT AND PAYMENT

4.01 Measurement and payment for this work item shall be in accordance with Section 01025 of these Specifications.

END OF SECTION

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SECTION 02331 – CRUSHED STONE BASE COURSE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Crushed Stone Base Course.

1.2 REFERENCES

A. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

B. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

C. ASTM D3017 - Test Methods for Moisture Content of Soil & Soil-Aggregate Mixtures.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Crushed Stone Base Course: Conforming to Type A, Grade 3, Item 247 of the latest version of the Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate has been inspected, gradients and elevations are correct, and are dry.

3.2 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place fill on soft, muddy, or frozen surfaces.

C. To protect the underlying course and to insure proper drainage, the spreading of the base shall begin along the centerline of the pavement on, a crowned section, or on the high side of the pavement with a one-way slope.

3.3 AGGREGATE PLACEMENT

A. Spread aggregate over prepared substrate to a total compacted thickness as indicated on the Drawings.

B. The aggregate, as spread, shall be of uniform gradation with no segregation or pockets of fine or coarse materials. The aggregate shall not be spread more than 2,000 square yards or 500 linear feet in advance of the rolling.

C. Place aggregate in maximum 8-inch loose layers and compact to 100% maximum dry density and a moisture content within plus or minus 2%, in accordance with ASTM D1557. If more than one layer is required, the construction procedure described herein shall apply similarly to each layer.

D. Level and contour surfaces to elevations and gradients indicated.

E. Add small quantities of fine aggregate to coarse aggregate to assist compaction.

F. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

G. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 FINISHING AND COMPACTING

A. After spreading, the crushed aggregate shall be thoroughly compacted by rolling. The rolling shall progress gradually from the sides to the center of the lane under construction, or from one side toward previously placed material by lapping uniformly each preceding rear wheel track by one half the width of such track.

B. Rolling shall continue until the rear wheels have rolled the entire area of the course. The rolling shall continue until the stone is thoroughly set, the interstices of the material reduced to a minimum, and until creeping of the stone ahead of the roller is no longer visible.

C. The Crushed Stone Base Course shall be moisture conditioned and compacted to a minimum of 100 percent of maximum dry density as determined by ASTM D1557, unless other wise indicated on drawings.

D. The Crushed Stone Base Course for the full depth shall be within plus or minus 2 percent of optimum moisture content as determined by ASTM D1557.

3.5 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 16 foot straight edge when applied to the surface parallel with, and at right angles to, the centerline.

B. Scheduled Compacted Thickness: Within 1/4 inch.

3.6 FIELD QUALITY CONTROL

A. As per Section 02222 – Earthworks.

END OF SECTION

SECTION 02510 – HOT MIX ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Asphaltic concrete paving, wearing binder or Base Course.

B. Surface sealer.

C. Aggregate base course.

1.2 RELATED SECTIONS

A. Section 02331 - Crushed Stone Base Course.

1.3 PERFORMANCE REQUIREMENTS

A. Paving: Designed for parking lot improvements.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with Texas Department of Transportation (TXDOT) Standard Specifications for Construction of Highways, latest version.

B. Mixing Plant: Conform to above TXDOT Standard.

C. Obtain materials from same source throughout.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code for paving work on public property.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

B. Place bitumen mixture when temperature is not more than 15 F degrees below bitumen supplier's bill of lading and not more than maximum specified temperature.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hot Mix Asphalt Concrete: In accordance with Item 340, Type C, of the above TXDOT Standard.

B. The HMAC surface course shall have a minimum of 1500 pounds of Marshall Stability when compacted at 75 blows in accordance with ASTM D-1559, and a flow between 8 and 16.

C. Densification of the material shall be 98% of the maximum theoretical specific gravity of the mix (rice).

D. The mix design criteria shall be within the in-place air void requirements ranging between 2 and 3 percent.

E. Aggregate for Wearing Course Mix: Item 340 of the above TXDOT Standard.

F. Fine Aggregate: Item 340 of the above TXDOT Standard.

G. Mineral Filler: In accordance with Item 340 of the above TXDOT Standard.

H. Primer: Cut-back petroleum asphalt.

I. Tack Coat: Emulsified asphalt.

2.2 ASPHALT PAVING MIX

A. Use dry material to avoid foaming. Mix uniformly.

B. In accordance with Item 340, Type C of the above TXDOT Standard.

2.3 SOURCE QUALITY CONTROL AND TESTS

A. Provide mix design for asphalt.

B. Submit proposed mix design of each class of mix for review prior to beginning of work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify base conditions.

B. Verify that compacted subgrade and sub-base is dry and ready to support paving and imposed loads.

C. Verify gradients and elevations of base are correct.

3.2 SUB-BASE

A. Section 02331 - Crushed Stone Base Course forms the base construction for work of this section.

3.3 PREPARATION – PRIMER

A. Prior to placement of the asphaltic-concrete layer, the base course shall be cleaned and tack coat of diluted emulsified asphalt (TXDOT Standard) shall be applied at the rate of 0.05 to 0.10 gal. per square yard.

B. Apply primer to contact surfaces of curbs, gutters, and site structures.

C. Use clean sand to blot excess primer.

3.4 PLACING ASPHALT PAVEMENT - SINGLE COURSE

A. Install Work in accordance with above TXDOT Standard.

B. Place asphalt within 24 hours of applying primer.

C. Asphalt pavement must be placed within 15 calendar days after all testing of water mains has been passed.

D. Place to compacted thickness as indicted on the Drawings.

E. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

F. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.5 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation from True Elevation: Within 1/2 inch.

3.6 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 7 days.

END OF SECTION

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SECTION 02600 – SCHEDULE OF PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, tools, superintendence and incidentals required to install, test, and perform any other specified or drawn work required to construct and install the pipeline systems under this Contract.

B. Only approved pipe shall be used for the construction of all pipelines and connections under this Contract. The only type of pipe that will be considered for use, and for the uses specified, are those listed in Part 2 of this Section. All pipe shall be the same type, class and manufacturer.

1.02 SUBMITTALS

A. Before beginning fabrication of the pipe, the Contractor shall submit to the Engineer, in accordance with Section 01300, manufacturer's certification and supporting calculations that the pipe materials and thickness specified herein are adequate for the depths shown on the Drawings, and for the intended use.

PART 2 PRODUCTS

2.01 SCHEDULE OF PIPE

A. Potable Water Main, 6- and 8-inch Diameter.

1. PVC, AWWA C-900, DR 18 (Blue)

B. Water Service Connections
1. As Specified.

C. Water Service Yard Lines
1. Schedule 40 PVC

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.01 Measurement and payment for pipelines shall be in accordance with Section 01025 of these Specifications.

END OF SECTION

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SECTION 02603 – CONNECTIONS TO AND WORK ON EXISTING SYSTEMS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, and equipment required to maintain flow in existing pipelines, construct and maintain all temporary connections and bypasses, and construct the permanent connections to the new system as shown on the drawings as directed by the Engineer.

B. Furnish all labor, materials, and equipment required to plug existing pipelines, all work on existing manholes (including all work and materials required to reshape existing manhole inverts with mortar or concrete, and connecting new pipes to existing manholes), and all additional work required.

C. Should damage of any kind occur to any existing system, the Contractor, at the Contractor's own expense, and as part of the work under this Item, shall make repairs to the satisfaction of the Engineer.

D. Notify the Engineer immediately of any discrepancies in elevations of existing facilities between those shown on the drawings and those established during construction in order that the Engineer can make the necessary modifications.

E. All new pipe for connection shall conform to the pipe specifications for this project.

1.02 RELATED WORK

A. Coordination requirements are included in Section 01040

B. Excavating, Backfilling, and Compaction for Utilities is included in Section 02221.

C. Concrete manholes are specified in Section 02605.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 REMOVING INFILTRATION

A. Furnish all labor, equipment, and materials necessary to remove water from infiltration, including all pumping that may be required. Remove all offensive matter at Contractor's own Expense.

PART 4 MEASUREMENT AND PAYMENT

4.01 No separate measurement or payment shall be made for this work item, but it shall be included in the unit price bid for the pipeline work as noted in the proposal.

END OF SECTION

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SECTION 02635 – FIRE HYDRANTS

Part 1 GENERAL

1.1 SCOPE

A. Furnish labor, materials, equipment and incidentals to furnish and install fire hydrants as indicated on the drawings, in accordance with County of EL Paso and EPWater requirements and according to typical fire hydrant installation.

1.2 SUBMITTALS

A. Submittals shall include certified drawing showing dimensions and construction details and certification from manufacturers that the products comply with appropriate AWWA Standards and these Specifications. Catalog data illustrating equipment to be furnished and a schedule of parts and materials shall be submitted.

B. Friction loss shall be guaranteed by the manufacturer to meet the requirements of AWWA C-502.

1.3 STANDARDS

A. Fire hydrants shall comply with requirements of AWWA C-502, Dry-Barrel Fire Hydrants, and AWWA C-550, Protective Epoxy Interior Coatings for Valves and Hydrants.

PART 2 PRODUCTS

2.1 GENERAL

A. Fire hydrants shall be dry-barrel compression type, with the main valve opening against the pressure, in accordance with AWWA C-502. The hydrant shall be designed for a minimum working pressure of 150 psi and tested at 30 psi hydrostatic pressure.

B. Hydrant shall have permanent markings identifying name of manufacturer, size of main valve opening and year of manufacture. Markings shall be easily located and legible after the hydrant has been installed.

C. Hydrants shall be constructed so that the standpipe may be rotated to 8 different positions.

D. Center of the lowest nozzle shall have a minimum ground clearance of 15 inches. Hydrants shall be supplied with extension sections in multiples of 6-inches with rod and coupling as required to increase barrel length.

E. The fire hydrant manufacturer shall provide local representation and support services, through an established vendor, within the County of El Paso. Acceptable manufacturers and models shall be:

American Flow Control	B84B
Clow	Medallion
Kennedy	Guardian K81A
M&H	Style 129
Mueller	Super Centurion

F. Size. Minimum inside barrel diameter shall be 7-inches. Minimum diameter of the main valve opening shall be 5-inches.

G. Traffic Type. The barrel and operating mechanism shall be so designed that in the event of an accident, damage, or breaking of the hydrant above or near the grade level, the main valve will remain closed and reasonably tight against leakage.

H. Manufacturer shall guarantee that the hydrant valve stem will not be bent when the hydrant is damaged or broken at or near ground level. A safety breaking flange or thimble shall be provided. Provisions shall be made in the design of the stem to disconnect the stem from the hydrant parts above the standpipe break point in the event of a traffic accident.

I. If breakable couplings are used, the design shall be such that the barrel safety flange and stem safety collar will break before any other hydrant part in the event of an accident. Design of coupling shall be such that no part of the coupling will drop into the hydrant barrel in the event of an accident.

J. Drain Outlet. Upper valve plate, seat ring and drain ring or shoe bushing shall be bronze, to form an all bronze drain way. The drain valve shall be provided to drain the hydrant properly by opening as soon as the main valve is closed.

K. Inlet Connections. Shall be mechanical joint, with accessories, gland, bolts, gaskets, and a 6-inch diameter inlet connection. Main valve facing against seats shall be synthetic rubber. Top of the stem or bonnet shall be equipped with O-ring seal. Hydrant shall be oil or grease lubricated.

L. Outlet and Pumper Nozzles. There shall be two hose outlets with two 1/2-inch with National Standard hose coupling screw threads. The outlet nozzles shall be of the caulked type or mechanically connected into the barrel with an O- seal and a non-corrosive locking pin to lock the nozzle to the barrel.

M. Pumper Nozzle shall have an inner diameter of 4-inches with threads conforming to County of El Paso and EPWater Standards.

N. Nozzle caps shall have one 1-inch square nut, gaskets and non-kinking chains. The operating nut and nozzle cap nuts shall be one 1-inch square at the base and to 7/8-inch square at the end and not less than 1-inch deep. Nozzle caps to be provided with rubber gaskets.

O. Hydrant Operator. Shall be 1-inch square at the base and tapered to 7/8-inch at end and not less than 1-inch deep. Attachment of the operator nut shall not, in way, hinder operating the hydrant with the wrench. The hydrant operator shall open by turning left (counterclockwise).

P. Hydrants shall be designed with O-ring seals to prevent water from damaging the threads.

Q. Tamper Proof Cover. The hydrant shall be equipped with a tamper proof cover, drainage holes, that deters unauthorized operation of the hydrant. The tamper proof cover shall provide adequate wrench clearance and shall have a minimum inside diameter of 2-1/4". The height of the cover shall range from 2-1/4" to 2-1/2", from the base at the bonnet to the top of the collar.

R. Painting. Barrels above ground shall be prime coated and painted with two coats paint, color shall be "aluminum" as approved by the Water Utility.

S. Protective Coating. All interior ferrous surfaces of shoe exposed to flow shall be coated to a minimum dry thickness of 4 mils. Epoxy coating shall be factory by an electrostatic or thermosetting process in accordance with printed instructions. Epoxy materials shall be 100 percent powder epoxy or liquid epoxy conforming to AWWA C-550 and to the current requirements of the Food and Drug Administration and the EPA for potable water.

PART 3 EXECUTION

A. Hydrants shall be installed in locations as shown on the Drawings or in standard locations approved by the Water Utility. Installation shall conform to typical details of the Water Utility. Paint damaged during installation shall be touched up. Hydrants shall be disinfected with the connecting pipe in accordance with Article IX "Cleaning, Disinfection

and Testing of Water System" in these Specifications. All hydrants shall be furnished and left in good working order with control valve open.

PART 4 MEASUREMENT AND PAYMENT

4.1 Measurement and payment shall be made for this work item at the unit price bid as noted in the proposal.

END OF SECTION

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SECTION 02640 – POLYVINYL CHLORIDE (PVC) PRESSURE PIPE AND FITTINGS FOR WATERLINES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Scope of Work.

B. Submittals.

C. Reference Standards.

D. Quality Assurance.

E. System Description.

F. Delivery, Storage and Handling.

G. Polyvinyl Chloride (PVC) Pipe and Fittings.

H. Installation of PVC Pipe and Fittings.

I. Jointing PVC Pipe.

J. Testing (Pressure Pipeline).

1.2 SCOPE OF WORK

A. These specifications cover the requirements for polyvinyl chloride (PVC) pressure plastic pipe materials and installation for potable water use. These specifications shall apply to PVC pipe in sizes 4-inch through 16-inch diameters.

A. Furnish all labor, materials, equipment and incidentals required and install and test polyvinyl chloride PVC pressure pipe and fittings, complete as shown on the Drawings and as specified herein.

B. Pipe or piping refers to all pipe, fittings, material, and appurtenances required to construct PVC waterlines complete, in place.

1.3 SUBMITTALS

A. The contractor shall be responsible for furnishing all necessary shop drawings, certificates, etc. for review and acceptance to the Engineer. A certification from the manufacturer shall be furnished to the Engineer attesting compliance with appropriate ASTM Standards and ANSI/NSF Standard 61. Such compliance shall be evidenced by an affidavit from the manufacturer or vendor. If the pipe does not presently conform to this standard, information from the manufacturer regarding action being taken to comply with this standard must be submitted. Failure to provide this information may result in rejection of pipeline material.

B. Submit documentation on pipe products, fittings, and related materials as may be required by the Contract Documents or the Engineer. Review all submittals prior to submission. Submit it in a timely manner so as not to delay the project. Allow sufficient time for Engineer's review and resubmission, if necessary. Include certifications from manufacturer that the product complies with appropriate ASTM standards.

C. No later than 10 calendar days after the Effective Date of the Agreement, submit the name of the pipe and fitting manufacturers and a list of materials to be furnished by each manufacturer. Also, include information on local representative for each manufacturer, if product is sold through a distributor.

D. Shop drawings including piping layouts and schedules shall include dimensioning, fittings, types and locations of valves and appurtenances, joint details, restraint joints/fittings, gasket material, grade of material, and all other pertinent technical information for all items to be furnished.

E. Prior to shipment of pipe, certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM and AWWA Standards specified herein shall be submitted.

1.4 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D-1784 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

2. ASTM F-477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

3. ASTM D-3139 Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

4. ASTM D-2837 Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials

5. ASTM D-2774 Recommended Practice for Underground Installation of Thermoplastic Pressure Piping

6. ASTM D-2241 Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR-Series)

B. American Water Works Association (AWWA)

1. AWWA C-110 Ductile-Iron and Gray-Iron Fittings, 3-inches through 48-inches for Water and Other Liquids.

2. AWWA C-111 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

3. AWWA C-605 Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.

4. AWWA C-905 Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 in. through 36 in.

5. AWWA C-905 Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 4 in. through 12 in, for water distribution.

6. AWWA C-900 Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4-Inch through 60-Inch, for Water Distribution

7. AWWA M-23 Manual: PVC Pipe - Design and Installation

C. Texas Commission on Environmental Quality (TCEQ)

1. Chapter §290 Rules and Regulations for Public Water Systems (Rules)

D. American National Standards Institute/National Sanitation Foundation (ANSI/NSF)

1. Standard No. 14 - Plastic Piping Components and Related Materials.

2. Standard No. 61 - Drinking Water System Components

E. Uni-Bell PVC Pipe Association

1. UNI-BELL-3 Polyvinyl Chloride (PVC) Pressure Pipe (Complying with AWWA Standard C-900-16)

2. UNI-BELL-11 Polyvinyl Chloride (PVC) Water Transmission Pipe Nominal Diameters 14-36 Inch.

E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.5 QUALITY ASSURANCE

A. All PVC pipe and fittings shall be from a single manufacturer. The supplier shall be responsible for the provisions of all test requirements specified in AWWA C900-16 and NSF Standard No. 14, as applicable. In addition, all PVC pipe to be installed under this Contract may be inspected at the plant for compliance with the requirements specified herein by an independent testing laboratory. The Contractor shall require the manufacturer's cooperation in these inspections.

B. Inspections of the pipe may also be made by the Engineer or other representatives of the Owner after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though pipe may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the job at once.

C. All newly installed pipes and related products must conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61 and must be certified by an organization accredited by ANSI.

D. All PVC pipe shall be coded to provide positive identification and prevent accidental damage to or interruption of the water facilities. Pipe shall conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61 “Drinking Water System Components - Health Effects” and be certified by and organization accredited by ANSI. Such compliance shall be evidenced by an affidavit from the manufacturer or vendor. If the pipe does not presently conform to this standard, information from the manufacturer regarding action being taken to comply with this standard must be submitted.

E. Only pipe manufactured in the United States of America will be accepted.

F. Pipe shall be suitable for use in the conveyance of water for human consumption. Each piece of pipe shall be marked with two seals of the testing agency that certified the pipe material as being suitable for potable water use

G. All C900 polyvinyl chloride pipe (PVC) and fittings shall be from a single manufacturer. Each length of PVC pipe supplied for the project shall be hydrostatically tested at the point of manufacturer to four times its rating class for a duration of 5 seconds in accordance with AWWA C900. Testing may be performed prior to machining bell and spigot. Failure of polyvinyl chloride (PVC) pipe shall be defined as any rupture or bulging of the pipe wall. Certified test results shall be furnished in triplicate to the Engineer prior to time of shipment.

1.6 SYSTEM DESCRIPTION

A. The equipment and materials specified herein are intended to be of standard types suitable for use in transporting potable water.

B. Note information given on the drawings and in this section, especially concerning pressure, minimum thickness, etc. In case of a conflict, information given in the Specification shall govern.

C. Contractor is responsible for compatibility between pipe materials, fittings and appurtenances.

D. Unless otherwise noted, PVC pipe for the waterlines shall be designed for the following condition(s).

1. Class: AWWA C900-16 DR-18 (Blue)
   Pressure
   Operating: 235 psi
   Testing: 500 psi

1.7 DELIVERY, STORAGE AND HANDLING

A. All items shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the Engineer. Pipe, fittings and accessories shall be inspected upon delivery and during progress of the work. Any material found defective will be rejected by the Engineer and shall be promptly removed from the site.

B. PVC items deteriorate in sunlight and are slightly brittle, especially at lower temperatures, so care shall be taken in loading, transporting, and unloading items to prevent injury to the items. All items shall be examined before installation and no piece shall be installed which is found to be defective. Handling and installation of pipe and fittings shall be in accordance with the manufacturer's instructions, referenced standards, and as specified herein. PVC pipe shall not be stored outside exposed to prolonged periods of sunlight. Any discoloration of pipe due to such exposure is an indication of reduced pipe impact strength and will be sufficient cause for rejection of the pipe. Any pipe rejected shall be removed from the job site.

C. Any pipe or fitting showing a crack, or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once form the work. All pipe, fittings, and other accessories shall, unless otherwise directed, be unloaded at point of delivery, hauled to and distributed at the site of the work by the Contractor. In loading and unloading, materials shall be lifted by hoists or rolled on skidways so as to avoid shock or damage. Under no circumstances shall materials which have been dropped be incorporated in the work. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.

D. While stored, pipe shall be adequately supported from below at not more that 3-ft intervals to prevent deformation. The pipe shall be stored in stacks no higher than 2 rows.

E. Pipe and fittings shall be stored in a manner, which will keep them at ambient outdoor temperatures and out of the sunlight. Temporary shading as required to meet this requirement shall be the responsibility of the Contractor. Covering of the pipe and fittings that allows direct or indirect sunlight will not be permitted.

F. If any defective item is discovered after it has been installed, it shall be removed and replaced with an exact approved replacement item in a satisfactory manner by the Contractor, at the Contractor's own expense. All pipe and fittings shall be thoroughly cleaned before installation and the interior shall be kept clean until testing. At the end of the workday, the end of the last pipe installed shall be covered to avoid dust/solids from entering the pipe.

G. In handling the items, use special devices and methods as required to achieve the results specified herein. No un-cushioned devices shall be used in handling the item.

PART 2 PRODUCTS

2.1 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

A. Pipe shall meet the requirements of AWWA C-900-16 for 4-inch through 60-inch sizes, and AWWA C-905 for 14-inch through 36-inch pipe. Pipe shall be Underwriters Laboratories (UL) approved. All PVC pressure pipe shall be furnished in cast iron pipe equivalent outside diameters and a standard laying length of 20 feet. Minimum pressure class shall be 235 (DR 18) for 4-inch through 12-inch diameters, and 235 psi (DR 25) for 14-inch through 16-inch pipe.

B. PVC pipe shall have bell and spigot push-on joints. The bell shall consist of an integral wall section with a solid cross-section elastomeric gasket securely locked in place to prevent displacement during assembly. Installation of elastomeric gasketed joints and performance of the joint shall conform to ASTM F477 and ASTM D3139.

C. All pipes and fittings shall contain no more than 8.0% lead conforming to Section §290.44(a) (2) of TCEQ Rules and Regulations for Public Water Systems.

D. All fittings shall be cast or ductile iron conforming to AWWA C110 for mechanical joints. All adaptors, fittings and transition gaskets necessary to connect cast or ductile iron fittings to PVC shall be furnished.

E. Mechanically restrained joints shall be used at all changes in direction and as per manufacturer's recommendations. The Contractor shall submit adequate calculations substantiating their effectiveness to withstand the anticipated test pressure.

PART 3 EXECUTION

3.1 INSTALLATION OF PVC PIPE AND FITTINGS

A. No single piece of pipe shall be laid unless it is straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than $^{1}/_{16}$-in per foot of length. If a piece of pipe fails to meet this requirement check for straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.

B. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound approved pipe in a satisfactory manner at no additional cost to the Owner. No couplings will be allowed at any time. All pipe and fittings shall be thoroughly cleaned before installation, shall be kept clean until they are used in the work and when laid, shall conform to the lines and grades required. PVC pipe and fittings shall be installed in accordance with requirements of the manufacturer, AWWA C605-13 or as otherwise provided herein.

C. As soon as the excavation is complete to normal grade of the bottom of the trench, screened gravel bedding shall be placed, compacted and graded to provide firm, uniform and continuous support for the pipe. Bell holes shall be excavated so that only the barrel of the pipe bears upon the bedding. The pipe shall be laid accurately to the lines and grades indicated on the drawings. Blocking under the pipe will not be permitted. Screened gravel shall be placed evenly on each side of the pipe to mid-diameter and hand tools shall be used to force the screened gravel under the haunches of the pipe and into the bell holes to give firm continuous support for the pipe. Screened gravel shall then be placed to 12-in above the top of the pipe. The initial 3-ft of backfill above the screened gravel backfill shall be placed in 1-ft layers and carefully compacted. Generally, the compaction shall be done evenly on each side of the pipe and compaction equipment shall not be operated directly over the pipe until sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe. Equipment used in compacting the initial 3-ft of backfill shall be approved by the pipe manufacturer's representative prior to use.

D. All pipe shall be sound and clean before installation. Good alignment shall be preserved during installation. Maximum ring deflection of installed PVC pressure pipe shall be 5 percent. Joint deflection shall not exceed manufacturer's recommendations for the particular size pipe. Fittings, in addition to those shown on the plans, shall be provided, if required, in crossing utilities, which may be encountered upon opening the trench.

E. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a bell shall be beveled to conform to the manufactured spigot end.

F. The Engineer may examine each bell and spigot end to determine whether any preformed joint has been damaged prior to installation. Any pipe having defective joint surfaces shall be rejected, marked as such, and immediately removed from the job site.

G. Each length of the pipe shall have the assembly mark aligned with the pipe previously laid and held securely until enough backfill has been placed to hold the pipe in place. Joints shall not be "pulled" or "cramped".

H. Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

I. Precautions shall be taken to prevent flotation of the pipe in the trench.

J. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the screened gravel backfill. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below the top of the pipe. As trench boxes, moveable sheeting, shoring or plates are moved, screened gravel shall be placed to fill any voids created and the screened gravel and backfill shall be recompacted to provide uniform side support for the pipe.

K. Restrained joints shall be employed a specified herein.

L. Pipe fittings shall be ductile iron, cement lined, in accordance with AWWA C-110 and SECTION 5.0 of these Specifications, Valves and Fittings. Pipe fittings shall be mechanical joint (MJ) unless otherwise specified.

M. Provisions for Thrust: For 16-inch diameter water mains and larger, thrust restraint devices must be installed at all fittings and valves per manufacturer's specifications and as shown on design plans. Concrete thrust blocks and mechanically restrained joints (i.e. "mega-lugs") shall be used at all fittings, valves and changes in direction (vertical and/or horizontal) as per manufacturer's recommendations. The Contractor shall submit adequate calculations substantiating their effectiveness to withstand the anticipated test pressure as required by the Owner.

N. Acceptable thrust restraint devices include EBAA Iron, Ford Uni-Flange, or approved equal. NOTE: At connection of new water line to existing main, both concrete thrust blocking (per SECTION 3.1 of these Specifications) and thrust restraint devices must be used, regardless of main size.

O. Thrust restraint devices shall be used for a sufficient distance from each bend, tee, plug, or other fitting to resist thrust which will be developed at the design pressure of the pipe. For the purposes of thrust restraint, design pressure shall be 1.5 times the design working pressure class indicated. Length of pipe with restrained joints to resist thrust forces shall be determined by pipe manufacturer.

3.2 JOINTING PVC PIPE (Push-on type)

A. Joints shall be made in strict accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe and the joint surfaces cleaned and lubricated. The plain end of the pipe to be entered shall then be inserted in alignment with the bell of the pipe to which it is to be joined and pushed home with a come-along or by other means. Check that the reference mark on the spigot end is flush with the end of the bell.

B. The bell shall be an integral part of the pipe length and have the same strength and DR as the pipe. The spigot pipe end shall be beveled and include a synthetic elastomeric gasket. The gasket shall meet the requirements of ASTM F-477.

C. All push-on joint PVC pipe shall be marked with dual indicator lines at the spigot end indicating proper penetration when the joint is assembled. The sockets and/or spigot configurations for the fittings and couplings shall be compatible to the pipe. Socket configuration shall prevent improper installation of gasket and shall ensure that the gasket remains in place during joining operations.

D. Cartridge-style restrained joint PVC pipe shall be joined using a non-metallic coupling to form an integral system. Coupling shall be designed for use at or above the pressure class of the pipe with which they are utilized and shall incorporate twin elastomeric sealing gaskets meeting ASTM F-477. High strength, flexible thermoplastic splines shall be inserted mating, machined grooves in the pipe and coupling to provide full 360 degree restraint

E. Restrained joint pipe systems shall have a restrained joint that in and of itself prevents over belling of the pipe during assembly of the joint and every joint already assembled in that string of pipe. Restrained joint system shall allow the installer to both push and pull the pipe during installation without the risk of over belling of any of the pipe joints in the string. Joint shall not require electrical power or other additional equipment (other than hand tools) to assemble.

3.3 TESTING (PRESSURE PIPELINE)

A. Testing: Disinfect and test the piping system as detailed in AWWA C-651 and in accordance with the SECTION 6.6 of these Specifications.

3.4 PIPE TRENCHING, INSTALLATION AND BACKFILL

A. Except as noted, Pipe Trenching, Installation and Backfill for PVC Pressure Pipe shall be in accordance with AWWA M-23, C-900-16 and SECTION 4.0 of this specifications.

1. Trench Width: The minimum clear width of the trench should be 1 foot greater than the outside diameter of the pipe. The maximum clear width of the trench at a point 1 foot above the top of the pipe is equal to the pipe outside diameter plus 2 feet. If the maximum recommended trench width is exceeded or if the pipe is installed in a compacted embankment, then pipe embedment shall be compacted to a minimum point of 2-1/2 pipe diameters from the side of the pipe or to the trench walls.

2. Pipe Zone Embedment: Unless otherwise specified, PVC pressure pipe shall be embedded in Class II material as defined in SECTION 4.1. Native material or imported material meeting or exceeding Class II requirements may be used.

3. Installation: Plastic pressure pipe shall be installed in accordance with AWWA M 23 and C-900 and/or manufacturer's printed recommendations, whichever is applicable. Where a conflict arises with this specification, this specification shall control.

4. For push-on joints care shall be taken to insert the pipe spigot to the reference mark to prevent buckling or separation of the pipe joint. The reference mark shall be showing and not be further than 1/2-inch from the leading edge of the pipe bell. The contractor shall verify that the manufacturer's reference mark is correct per manufacturer's literature.

5. Pipe and couplings for a restrained joint pipe system shall be homogenous throughout and free from voids, cracks, inclusions and other defects, and shall be as uniform as commercially practicable in color, density, and other physical characteristics. Assembly shall not require that the pipe be allowed to rest after a joint is assembled prior to it being pulled in or connections being made. Pipe and restrained joint system shall enable the installer to pull the pipe while joint assembly takes place.

6. Under no circumstances should the pipe or accessories be dropped into the trench. When pipe laying is not in progress, open ends of installed pipe should be closed to prevent entrance of trench water, dirt and foreign matter into the line.

7. Marking Tape: PVC pressure water pipe shall be marked by concurrently installing the appropriate marking tape for detection purposes. The detectable tape shall consist of a 5.0 mil inert polyethylene plastic material. It shall be high visibility blue with the standard warning and identification for potable water imprinted on the tape. The minimum width of detectable tape shall be 6-inches for all potable water lines. The burial depth shall be 36-inches, measured from finished grade. Detecting tape shall be manufactured by Empire, Lineguard, or approved equal.

8. Corrosion Protection: As a precaution against corrosion, all flanges, bolts, nuts and other exposed metal surfaces underground shall be coated with Texaco, Koppers, or approved equal rustproof compound.

PART 4 MEASUREMENT AND PAYMENT

4.1 No separate measurement or payment shall be made for this work item, but it shall be included in the unit price bid for the pipeline work as noted in the proposal.

END OF SECTION

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SECTION 02641 – REMOVAL AND DISPOSAL OF BURIED ASBESTOS CEMENT PIPE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The removal and disposal of buried asbestos cement pipe.

1.02 GENERAL

A. Description. This item shall govern the uncovering, dislodging, handling, removing, transporting, and disposing of asbestos cement (AC) pipe and other asbestos containing materials (ACM). AC pipe is also known as transite pipe. AC pipe typically contains from 15% to 20% chrysotile and crocidolite asbestos and is considered to be an asbestos- containing material. The disturbance and/or removal of this material is governed by the National Emissions Standards for Hazardous Air Pollutants (NESHAP) 40 Code of Federal Regulations (CFR) 61; by the Occupational Safety and Health Administration (OSHA) 29 CFR 1926.1101; the State of Texas Occupation Code, Chapter 1954 and Health and Safety Code Chapters 361 and 363; and the Texas Administrative Code (TAC), 25 TAC Chapter 295 and 30 TAC Chapter 330.3 and 330.171. The material is classified by definition under 40 CFR 61, Subpart M, Section 61.141 as Category II, non-friable ACM, unless, when dry, it can be crumbled, pulverized, or reduced to powder by hand pressure.

1.03 SCOPE OF WORK

A. Contractor shall cut and remove existing asbestos cement water lines within the construction limits. It is the intent of this specification to define procedures that maintain the AC pipe in an intact state. Contractors shall not use procedures that subject the AC pipe to forces that will crumble, pulverize, or reduce to powder the AC pipe. By using procedures that have a low to no probability of fiber release, the pipe retains its classification as Category II, non-friable ACM. These procedures will protect workers from the health risk associated with airborne asbestos.

1.04 GOVERNING DOCUMENTS

A. U.S. Environmental Protection Agency (EPA), 40 Code of Federal Regulations (CFR) Part 61, Subpart M – National Emission Standards for Asbestos.

B. Occupational Safety and Health Administration (OSHA), 29 CFR 1926.1101, Asbestos.

C. The State of Texas Statue, Health and Safety Code, Chapter 363.

D. Texas Administrative Code (TAC) 30 TAC Chapter 330.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 DESCRIPTION OF WORK

A. Prior to commencing removal of cementitious asbestos-containing piping material, a plan shall be submitted containing the following:

1. The scope of work to be accomplished shall be described in detail. Be specific as to the involvement with the existing AC pipe. For example: abandoning/removing X feet of AC pipe; tying into one or more joint(s)/section(s) of an existing water main and replacing one or more joints/sections (X feet) of pipe to make the connection; removing X feet of buried AC pipe encased in concrete crossing a drainage way not accessible by road; or connecting to an existing joint/section of AC pipe by tapping into the AC pipe.

2. Detailed procedures that describe the methods/techniques to be employed to uncover, dislodge, handle, remove, secure, transport, and dispose of the AC pipe and any generated ACM waste.

3. The removal team must show the following steps will be performed:

a. Make proper arrangements for disposal of waste at an acceptable site. The EPWater will not accept any portion of the asbestos cement pipe at its facilities.
b. Isolate the area from the rest of the facilities that are to remain in use.
c. Locate tools, equipment, and material waste receptors near the work area.
d. Make proper security arrangements.
e. Obtain all permits and post all applicable notices.
f. Location of disposal site.

3.02 PREPARATION OF WORK AREAS

A. Work area shall be isolated with barrier tape or other means.

B. Impermeable plastic sheeting shall be used to cover the area underneath removal site in order to catch pieces if they fall onto ground and to catch water used to wet material.

3.03 REMOVAL OF CEMENTITIOUS (TRANSITE) PIPING MATERIAL

A. Work shall be supervised all the time by a NESHAP competent person with accredited training.

B. The pipe cutting area shall be applied with sufficient foam, shaving cream or any other similar material in order to minimize fiber release as the pipe is being cut.

C. A pipe cutting tool shall be used to remove sections of pipe in lengths appropriate to facilitate their removal.

D. Pipeline must be maintained adequately wet during and after removal.

E. 6-mil thickness asbestos disposal bags shall be used to dispose of all pipeline pieces. These bags shall be labeled and leak tight.

F. The pieces shall be handled carefully in order to avoid any unnecessary breakage.

3.04 CLEANUP

A. All visible accumulations of pipe transite material and debris shall be removed.

B. Debris shall be deposited inside waste disposal bags.

C. The plastic layers underneath the pipeline shall be removed and disposed as asbestos contaminated wasted.

3.05 DISPOSAL

A. Asbestos containing materials and asbestos contaminated waste shall be disposed, as needed, in order to prevent exceeding the on-site storage capacity.

B. All documentation regarding disposal shall be submitted to Owner.

C. Non-contaminated waste resulting from demolition or replacement operations shall be removed from the site in accordance with all applicable codes.

PART 4 MEASUREMENT AND PAYMENT

A. Measurement and payment shall be made at the stated Unit Price shown on the Bid Form.

END OF SECTION

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SECTION 02645 – VALVES AND FITTINGS

PART 1 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall furnish all valves and fittings where indicated on the Plans, as called for in these Specifications, or as required for proper operation of the equipment in general. Unless otherwise indicated on the Plans or specified in other sections of these Specifications, valves and fittings shall conform to the requirements as specified herein.
B. Where proper operation and utilization of equipment and facilities require installation of valves not indicated or specified, the CONTRACTOR shall provide and install, upon acceptance by the ENGINEER, valves similar and comparable to valves specified for similar and comparable duty in other parts of the project.

1.02 QUALITY ASSURANCE

A. Valves shall conform to American National Standards Institute / National Sanitation Foundation (ANSI/NSF) Standard 61 "Drinking Water system Components - Health Effects" and be certified by an organization accredited by ANSI. Such compliance shall be evidenced by an affidavit from the manufacturer or vendor. If the pipe does not presently conform to this standard, information from the manufacturer regarding action being taken to comply with this standard must be submitted. All valves installed in a given line shall be designed to withstand the test pressure for that particular line and shall be fabricated with ends to fit the piping.

PART 2 PRODUCTS

2.01 MATERIALS

A. All materials shall conform to the pertinent material requirements of the following Items. Complete shop drawings and specifications shall be furnished prior to acceptance and approval of the bid proposal. If requested, the valve manufacturer shall also submit a list of similar installations that have been in satisfactory operation for at least three years.
B. The manufacturer shall furnish a complete set of installation, operation, and maintenance instructions for each type of valve furnished. Instructions shall be bound in a cover.

C. Blow-Off Valves: All blow-off valves larger than 2-inch shall be iron-body, bronze mounted, resilient seat type with non-rising stem and designed for 250 psi working pressure. NRS gate valves shall comply with AWWA C-509 "Resilient-Seated Gate Valves for Water and Sewer Systems" and AWWA C-550 Standard for Protective Coatings for Valves and Hydrants, latest revision. The valve design shall not have any recesses or insets in the bottom of the waterway which would promote build-up or collection of residue and debris.

NRS resilient-Seated Blow-Off Valves shall preferably conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61, "Drinking Water System Components - Heath Effects", and be certified by an organization accredited by ANSI. Such compliance shall be evidenced by an affidavit from the manufacture or vendor.

With the valve open, the valve shall provide an unobstructed waterway that has a diameter not less than the full nominal diameter of the valve. The minimum number of turns to open the valve shall be three times the valve diameter in inches. Valves shall be flanged or mechanical joint as shown on the drawings. All valves shall open when turned to the left.

1. Submittals: Complete shop drawings and specifications shall be furnished prior to acceptance and approval of the proposed valve. If requested, the Valve Manufacture shall also submit a list of similar installations which have been in satisfactory operation for at least three years.

The manufacture shall furnish a complete set of installation, operation and maintenance instructions for each type of valve furnished. Instructions shall be bound in a cover.

The manufacture shall provide approved certified test data or an affidavit stating that the valve complies with AWWA C-509 Section 6.1 and the following, in accordance with Section 6.2.

Hydrostatic Test: The manufacture shall pressure test each valve of each size and class with 400 psi applied to one side and zero to the other. The test shall be made in each direction across the closed valve.

Torque Test: The manufacture shall over-torque a valve of each size to demonstrate that no distortion of the valve stem occurs. The applied torque shall be 250 ft-lb for a 4" valve and 350 ft-lb for the larger valve sizes in both the open and closed position.

Leakage Test: The manufacture shall select two valves of each size to be fully opened and closed for 500 complete cycles with 200 psi deferential pressure across the gate. The valve shall be drip tight upon completion of the test.

Pressure Test: One valve of each size shall be tested, with the gate fully open, to a pressure of 500 psi. There shall be no evidence of rupture or cracking of the valve body, bonnet or seal.

3. Markings: Markings shall be cast on the bonnet or body of each valve. Markings shall include the manufacture's name or mark, the year the valve casting was made, size of the valves, and the designated working pressure.

4. Valve Ends: Valve ends shall be mechanical joint or flanged with drilling in compliance with ANSI B61.1. Valve ends and size shall be as shown in the drawings and listed in the Scope of Work.

5. Valve Bonnet and Body: Shall be cast iron conforming to ASTM A-126 Class B, or ductile iron conforming to ASTM A-395 or ASTM A-536.

6. Bolts: All bonnet and seal plate bolts shall be factory installed and made from stainless steel ASTM A-276 with either regular square or hexagonal heads with dimensions conforming to ASTM B18.2.1.

7. Wedge: The wedge shall be cast iron or ductile iron fully encapsulated with resilient rubber material bonded to the disc. The method for bonding the resilient material shall be confirmed by ASTM D-429 as required by AWWA C-509.

8. Valve Stem: Shall be constructed of low zinc bronze CDA Copper Alloy no. C99500 with a minimum yield strength of 40,000 psi and a minimum elongation in 2-inches of 10%.

9. Stem Seals: Shall consist of two O-rings such that the seal above the stem collar can be replaced with the valve under pressure in the fully open position. O-rings shall meet the requirements of ASTM D-2000 and have physical properties suitable for the application.

10. Valve Operator: Valves installed in pipe trench shall be provided with a cast iron, ASTM A-126 Class B, wrench nut. The nut shall have a 2" square base and shall tapper to a 1-15/16" square at the top, be 1-3/4" high, and shall open counterclockwise (left). The wrench nut shall be painted black and an arrow indicating the direction of opening shall be cast on the nut, according to AWWA C-509. Valves exposed inside of vaults shall be provided with wheels of the appropriate diameter for the valve size.

11. Protective Coating: An epoxy coating shall be applied to all exterior and stationary interior ferrous surfaces including all interior openings in the valve body. The coating shall not be applied to gasket surfaces of the end flanges.

    Coatings shall be applied in accordance with AWWA C-550 and the manufacturer's instructions. The epoxy coating shall have a minimum of 8 mils. After the coating is completely cured, the coated surfaces shall be tested for porosity, holidays, and pinholes using a holiday detector. All holidays or irregularities shall be repaired and the coating again tested.

D. Butterfly Valves.

1. Butterfly Valves. Shall be of the tight-closing, rubber-seated type for Class 150B service. Butterfly valves shall comply with the requirements of AWWA C-504, "Standard for Rubber-Seated Butterfly Valves". Butterfly valves shall be provided for the size specified.

   Acceptable manufacturers and models shall be:

American Darling	Class 150B Flanged or Mechanical Joint
M&H	450, 4500, 1450
Kennedy	30A, 30C
Mueller	Lineseal II
Pratt	Groundhog, Flanged or Mechanical Joint

2. Submittals. Submittals shall be provided for approval. Also, the Manufacturer shall provide approved certified test data or an affidavit stating that the valve complies with the performance tests, leakage tests, hydrostatic test and proof-of-design tests as described in Section 5.2 of AWWA C-504.

3. Valve Ends. Shall be short body flanged, mechanical joint or as otherwise specified.

4. Valve Bodies. Shall be constructed of cast iron ASTM A-126, Class B, or ASTM A-48, Class 40 or Ductile Iron, ASTM A-536, Grade 65/45/12.

5. Valve Discs. Shall be cast iron conforming to ASTM A-126, Class B or Ductile Iron conforming to ASTM A-536, Grade 65/45/12. Valve disc shall seat in a position of 90 degrees to the pipe axis and shall rotate 90 degrees between full open and tight closed position. Dimensions of clearance for valve discs are required.

6. Valve Shafts.

   a. Valve shafts, keys, dowel pins, or taper pins used for attaching valve shaft to the valve disc shall be Type 304 or 316 Stainless Steel, conforming to ASTM A-276, or equivalent corrosion resistant material. All portions of shaft bearings shall be stainless steel or bronze.

   b. Valve shafts may consist of a one-piece unit extending completely through the valve disc, or may be of the "stub shaft" type as defined in AWWA C-504.

   c. Butterfly valves shall be provided with an extended bonnet, unless otherwise specified.

7. Shaft Seals. Shall be a Split-V or O-ring type. Replacement shall be possible without removing the valve shaft.

8. Valve Seats. Shall be new natural or synthetic rubber resilient seats to provide tight shut off at the specified pressure. Seats shall be attached to either the disc or the body. Seats shall be clamped, mechanically secured, bonded or vulcanized to either the disc or body. Seat rings shall be stainless steel and fastened by stainless steel cap screws.

9. Mating Seat Surface. Shall be ASTM A-276, stainless steel 18-8, Type 304, or have a 95% pure nickel overlay.

10. Valve Bearings. Shall be sleeve type. Bearings shall be manufactured from corrosion resistant, and "self lubricated" materials that will not damage natural or synthetic rubber.

11. Valve Operators. Shall be manual with a 2-inch square operating-nut and turn left (counterclockwise) to open. Operators shall have all gearing totally enclosed and shall be pre-lubricated or grease packed. Operators shall be of the worm gear or traveling nut and link type with field adjustable stops capable of withstanding 300 ft. lbs. input torque, as required by AWWA C-504.

12. Protective Coating.

    a. Except as otherwise specified, all interior steel or cast iron surfaces shall be shop coated in accordance with the requirements of AWWA Standard C-504. All external surfaces for buried valves shall be continuously painted with permanent purple paint.

    b. A standard epoxy interior coating shall be applied in accordance with AWWA Standard C-550, "Standard for Protective Interior Coatings for Valves and Hydrants".

E. Air Release, Air/Vacuum, and Combination Air Valves.

1. Air-Release, Air/Vacuum and Combination Air Valves shall comply with AWWA C-512 and the following specifications. These specifications shall apply to valve sizes 6 inch and smaller.

2. Air Release Valves (AR) shall be designed to automatically release accumulated air pockets within the pipeline while in operation and under pressure. Air release valves shall be APCO Model 200, Val-Matic Model 38, or Crispin Model P.

3. Air/Vacuum Valves (AV) shall be designed to allow large volumes of air to escape through the valve orifice when filling a pipeline and to close watertight once the air has been expelled. Air and vacuum valves shall also permit large volumes of air to enter through the valve orifice when the pipeline is being drained to break the vacuum. Air and vacuum valves shall be APCO Series 140, Val-Matic Series 100, or Crispin Model AL.

4. Combination Air Valves (CAV) shall be heavy-duty air and vacuum valves with air release. Combination Air Valves shall be designed to release accumulations of air at high points within a pipeline by exhausting large volumes of air as the pipeline is being filled and by releasing accumulated pockets of air while the pipeline is in operation and under pressure. Combination air valves shall also be designed to permit large volumes of air to enter the pipeline during pipeline drainage. Combination Air Valves shall be APCO, Val-Matic Series 200, or Crispin Model C.

5. Submittals. The manufacturer shall provide an affidavit stating that the valve and all materials used in its construction conform to the applicable requirements of AWWA C-512 and these specifications. When required, the manufacturer shall provide and affidavit stating that the valve has been tested and is in compliance with the requirements specified in Section 5.1 of AWWA C-512.

6. Markings. Manufacturer's name or trademark, size of valve, and the designated maximum working pressure rating shall be cast in the body or marked on a corrosion-resistant name plate.

7. Body and Cover. Each air valve shall have a cast or ductile iron body and cover. Cast iron shall comply with ASTM A-126 Class B, or ASTM A-48 Class 35. Ductile iron shall comply with the requirements of ASTM A-536, Grade 65-45-12. Bolting material shall meet or exceed the strength requirements of ASTM A-307. All internal trim shall be of stainless steel.

8. Float. Shall be stainless steel. Float shall be baffled to prevent air from blowing valve closed until air is exhausted. Valve body, float, etc., shall be designed for a working pressure equal to that of the system in which it is installed. Floats for valves with inlet sizes less than 100 mm (4 inch) shall be capable of withstanding a collapse gauge pressure of 1,000 psig. For larger inlet sizes, floats shall be capable of withstanding a collapse gauge pressure of 750 psig.

9. Valve Outlet. Shall be fitted to attach discharge pipe as indicated. Valve inlet shall be N.P.T. for 2-inch and smaller valves. Valve inlet shall be ANSI flange for 3-inch and larger valves. Flange rating shall equal or exceed the maximum working pressure of the system in which it is installed.

10. Installation. Air release and air/vacuum valves shall be installed within valve vaults, or manhole, in accordance with Utility Standard Details 263-1, 263-2, 263-3, 263-4 and plans.

11. Protective Coatings. Interior surface coatings shall not be required unless otherwise specified. External surfaces shall be coated with the manufacturer's standard primer.

F. Non-Rising Stem (Nrs) Resilient-Seated Gate Valves:

1. Non-Rising Stem Gate Valves are to be resilient seat, non-rising stem and shall have a minimum rated working pressure of 200 psig and shall comply with AWWA C-509 "Resilient-Seated Gate Valves for Water and Sewage Systems" and AWWA C-550 "Standard for Protective Coatings for Valves and Hydrants". The valves design shall not have any recesses, insets in the bottom of the waterway which would promote build-up or collection of residue and debris. Resilient Seated Gate Valves shall be provided for the size specified.

2. With the valve open, the valve shall provide an unobstructed waterway that has a diameter not less than the full nominal diameter of the valve. The minimum number of turns to open the valve shall be three times the valve diameter.

3. Acceptable manufacturers and models shall be:

AMERICAN FLOW CONTROL	Series 500, Series 2500
CLOW	2640 (Figure F-6100)
KENNEDY	8571 KS - FW
M&H	3067
US PIPE	Metroseal 250
MUELLER	A-2360
J&S	Series 6800, Series 6900

4. Submittals: Submittals shall be provided in accordance with Article 5.3 of this Section. Also, the manufacturer shall provide approved certified test data or an affidavit stating that the valve complies with AWWA C-509 Section 6.1 and the following, in accordance with Section 6.2:

5. Hydrostatic Test: The manufacturer shall pressure test one valve of each size and class with 400 psi applied to one side and zero to the other. The test shall be made in each direction across the closed gate.

6. Torque Test: The manufacturer shall over-torque a valve of each size to demonstrate that no distortion of the valve stem occurs. The applied torque shall be 250 ft-lb for a 4-inch valve and 350 ft-lb for the larger valves in both the open and closed position.

7. Leakage Test: The manufacturer shall select two valves of each size to be fully opened and closed for 500 complete cycles with a 200 psi differential pressure across the gate. The valve shall be drip tight upon completion of the test.

8. Pressure Test: One valve of each size shall be tested, with the gate fully open, to a pressure of 500 psi. There shall be no evidence of rupture or cracking of valve body, bonnet or seal plated.

9. Markings: Shall be cast on the bonnet or body of each valve. Markings shall include the manufacture's name or mark, the year the valve casting was made, the size of the valves, and the designated working pressure.

10. Valve Ends: Shall be mechanical joint or flanged ends as specified.

11. Valve Body and Bonnet: Shall be cast iron conforming to ASTM A-126, or ductile iron conforming to ASTM A-536 or A-395.

12. Bolts: All bonnet and seal plate bolts shall be factory installed and made from stainless steel ASTM A-276 with either regular square or hexagonal heads with dimensions conforming to ANSI B18.2.1.

13. Wedge: The wedge shall be cast iron or ductile iron fully encapsulated with resilient rubber material bonded to the disc. The method for bonding the resilient material shall be confirmed by ASTM D-429 as required by AWWA C-509.

14. Valve Stem: Shall be constructed of low zinc bronze CDA Copper Alloy no. C99500 with a minimum yield strength of 40,000 psi and minimum elongation in 2-inches of 10%.

15. Stem Seals: Shall consist of two O-rings such that the seal above the stem collar can be replaced with the valve under pressure in the fully open position. O-rings shall meet the requirements of ASTM D-2000 and have physical properties suitable for the application.

16. Valve Operator: Shall be a cast iron, ASTM A-126 Class B, wrench nut. The nut shall have a 2-inch square base and shall be 1-15/16-inch square at the top and be 1-3/4-inch high and shall open counterclockwise (left). The wrench nut shall be painted black and an arrow indicating direction of opening shall be cast on the nut, according to AWWA C-509.

17. Protective Coating: An epoxy coating shall be applied to all exterior and all stationary interior ferrous surfaces including all interior openings in the valves body. The coating shall not be applied to the gasket surfaces of the end flanges.

18. The coating shall be applied in accordance with AWWA C-550 and the manufacturer's instructions. The epoxy coating shall have a minimum dry film thickness of 8 mils. After the coating is completely cured, the coated surface shall be tested for porosity, holidays, and pinholes using a holiday detector. All holidays or irregularities shall be repaired and the coating again tested.

G. Fittings.

1. Fittings as specified herein shall be ductile iron (DI) for use with ductile iron and polyvinyl chloride (PVC) water pressure or transmission pipe.

2. All fittings shall be smooth cement lined in accordance with AWWA C-104 and shall be outside asphaltic coated per AWWA C-110. The size, body type, type of joint ends, and applicable reference standard, shall be as shown on engineering drawings or as specified.

3. Standards. Fittings shall comply with applicable requirements of the following:

4. ANSI B16.1 "Cast Iron Pipe Flanges and Fittings", AWWA C-104 "American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water", AWWA C-105 "Standard for Polyethylene Encasement for Ductile Iron Pipe and Fittings", AWWA C-110 "American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In., for Water and Other Liquids", AWWA C-111 "Rubber-Gasket Joints", AWWA C-153 "American National Standard for Ductile-Iron Compact Fittings, 3 In. Through 16 In., for Water and Other Liquids"

5. Minimum Requirements. The following minimum requirements of TABLE A and TABLE B shall apply to the specified fittings.

6. All joint accessories such as gaskets, glands, bolts, and nuts shall be furnished with mechanical joints, and gaskets and lubricant shall be furnished with push-on joints in sufficient quantity for assembly of each joint.

7. Push-on joint fittings shall be marked with the proprietary name or trademark of the joint.

8. Fittings shall be marked on the outside with their applicable AWWA Standard and information called for by the Standard.

9. Fittings shall be polyethylene wrapped in accordance with AWWA C-105.

TABLE A – STANDARD SHORT-BODY FITTINGS PER AWWA C-110

TYPE OF JOINT	DIAMETER	RATED WORKING PRESSURE	MATERIAL
Mechanical (Rubber Gasket/C-111)	4 - 24 inches	350 psi	DI
Flanged	4 - 24 inches	250 psi	DI
All types	30 - 80 inches	250 psi	DI
Push-On (Rubber Gasket/C-111)	4 - 24 inches	250 psi	DI

TABLE B - COMPACT SHORT-BODY FITTINGS PER AWWA C-153

TYPE OF JOINT	DIAMETER	RATED WORKING PRESSURE	MATERIAL
Mechanical or Push-On (Rubber Gasket/C-111)	4 - 24 inches	350 psi	DI

PART 3 EXECUTION

3.01 VALVE INSTALLATION

A. Carefully handle and install valves horizontally in such a manner as to prevent damage to any parts of the valves. Installation shall be in accordance with manufacturer's instruction. Valves delivered closed to the site shall be opened by the CONTRACTOR prior to installation. The CONTRACTOR shall record the number of turns required to open the valve. This information shall be submitted to the Utility on the standard valve report.

B. Valves shall be polyethylene-wrapped in accordance with AWWA C-105, unless otherwise specified. Thrust blocking shall be provided as specified.

3.02 VALVE TESTING

A. Upon completion of installation of the valves, an acceptance test shall be conducted to verify the satisfactory operation of the valves. The unit shall be checked for operation and leakage. The valves must perform in a manner acceptable to the ENGINEER before the Owner makes final acceptance.

END OF SECTION

SECTION 02650 – DUCTILE IRON PIPE AND FITTINGS FOR POTABLE WATER

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, tools, superintendence and incidentals required to install, test, clean and disinfect ductile iron pipe and fittings, shown on the drawings and as specified herein.

B. Piping shall be located substantially as shown on the drawings. The Engineer reserves the right to make such modifications as may be found desirable to avoid interference between pipes or for other reasons. Pipe fitting notation is for the Contractor's convenience and does not relieve him/her from installing and jointing different or additional items where required to achieve a complete piping system.

C. Vertical bends shown on the plans may be modified or eliminated by deflection to accomplish the intended profile. Deflection will not eliminate the requirement for joint restraint if so noted on the plans.

D. Where the word "pipe" is used it shall refer to pipe, fittings and appurtenances unless noted otherwise.

1.02 RELATED WORK

A. Excavating, Backfilling and Compacting for Utilities is included in Section 02221.

B. Granular Fill Material is included in Section 02235.

C. Valves and Fittings are included in Section 02645.

D. Schedule of Pipe is included in Section 02600.

1.03 SUBMITTALS

A. Shop drawings, product data and all specified calculations shall be submitted in accordance with Section 01300 and this Specification.

B. Submit copies of design calculations in accordance with this Section.

C. Submit a tabulated laying schedule which references stations and invert elevations as shown on the drawings as well as all fittings, bends, outlets, valves of all types, restrained joints, tees, special deflection bells, adapters, solid sleeves, and specials, along with the manufacturer's drawings and specifications indicating complete details of all items. The laying schedule shall show pipe class, class coding, station limits, and method of joint restraint. The above shall be submitted to the Engineer for approval before manufacture and shipment. The location of all pipes shall conform to the locations indicated on the drawings.

D. Submit anticipated production and delivery schedule.

E. Prior to shipment of pipe, submit a certified affidavit of compliance from the manufacturer stating that the pipe, fittings, gaskets, interior linings, and exterior coatings for this project have been manufactured and tested in accordance with ANSI/AWWA and ASTM Standards and requirements specified herein.

F. Submit calculations, prepared by the manufacturer, for all required lengths of joint restraint in general conforming to the locations shown on the drawings. Approval by the Engineer is required prior to the manufacture and shipment of the pipe.

G. Submit detailed methods of bonding the pipe for cathodic protection.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM A307 - Low Carbon Steel Bolting Materials, Grade A.

2. ASTM C150 - Portland Cement

B. American National Standards Institute (ANSI)/American Water Works Association (AWWA)

1.	ANSI/AWWA C104/A21.4	American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
2.	ANSI/AWWA C105/A21.5	American National Standard for Polyethylene Encasement for Ductile-Iron Piping for Water
3.	ANSI/AWWA C110/A21.10	American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-In through 48-In (75 mm through 1200 mm) for Water and Other Liquids
4.	ANSI/AWWA C111/A21.11	American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
5.	ANSI/AWWA C116/A21.16	Fusion Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile Iron and Gray Iron Fittings for Water Supply Service
6.	ANSI/AWWA C150/A21.50	American National Standard for the Thickness Design of Ductile-Iron Pipe
7.	ANSI/AWWA C151/A21.51	American National Standard for Ductile-Iron Pipe, Centrifugally Cast for Water
8.	ANSI/AWWA C153/A21.53	American National Standard for Ductile Iron Compact Fittings for Water Service

C. American Water Works Association (AWWA)

1.	AWWA C600	AWWA Standard Installation of Ductile-Iron Water Mains and Their Appurtenances
2.	AWWA C651	AWWA Standard for Disinfecting Water Mains

D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. All ductile iron pipe and fittings shall be from a single manufacturer. Each length of ductile iron pipe supplied for the project shall be hydrostatically tested at the point of manufacture to 500 psi for a duration of 10 seconds of AWWA C151. Testing may be performed prior to machining bell and spigot. Failure of ductile iron pipe shall be defined as any rupture of the pipe wall. A certification from the manufacturer that testing was accomplished in accordance with this standard shall be furnished in triplicate to the Engineer prior to time of shipment.

B. All ductile-iron pipe and fittings to be installed under this project shall be inspected and tested at the foundry as required by the Standard Specifications to which the material is manufactured.

C. Inspection of the pipe and fittings will also be made by the Engineer or representative of the Owner after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the job.

D. All pipe and fittings shall be permanently marked with the following information:

1. Manufacturer, date.

2. Size, type, and class.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe, its lining and coating. Under no circumstances shall the pipe be dropped or skidded against each other. Slings, hooks, or pipe tongs shall be used in pipe handling.

B. Materials, if stored, shall be kept safe from damage. The interior of all pipe, fittings, and other appurtenances shall be kept free from dirt or foreign matter at all times.

C. Pipe shall not be stacked higher than the limits recommended by its manufacturer. The bottom tier shall be kept off the ground on timbers, rails, or concrete. Stacking shall conform to manufacturer's recommendations.

D. Gaskets for mechanical and push-on joints to be stored shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pipe

1. All ductile iron pipe (DIP) shall conform to AWWA C151. Pipe shall be supplied in standard nominal lengths of 18 or 20 feet.

2. Thickness design shall be in accordance with AWWA C150. Ductile iron pipe installed within casing pipe shall be a minimum of thickness class 51, and all joints shall be restrained.

3. Ductile iron pipe shall be a minimum of pressure class 200 for 24-inch pipe with nominal thickness as follows: 24"I.D.=0.33".

4. Ductile iron pipe shall be as manufactured by U.S. Pipe and Foundry Company, Inc., American Cast Iron Pipe Company, or approved equal.

5. All ductile iron pipe and fittings shall have a bituminous outside coating in accordance with AWWA C151 and shall be lined and seal coated in accordance with AWWA C104 or may be lined and coated in conformance with ANSI/AWWA C116/A21.16-Fusion Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile Iron and Gray Iron Fittings for Reclaimed Water Supply Service.

6. All DIP shall be poly-wrapped for protection. The purple polyethylene wrap shall be applied in accordance with AWWA C-105/A21.5.

B. Joints

1. Joint Type:

a. Liquid services in buried locations shall be mechanical or push-on joint.

b. Liquid service in locations other than buried shall be flanged, grooved end joint, or restraint mechanical coupling.

c. As shown on Drawings or as specified in system Specification if different than specified above for services and locations.

2. Mechanical and Push-on Joints:

a. AWWA C111.

b. Gasket material:

1) Suitable for service and maximum operating temperature of piping system as specified in piping system specification section.

2) Selected by pipe manufacturer.

3. Restrained Joints:

a. Manufacturers:

1) American Cast Iron Pipe Company, Flex-Ring, and Lok-Ring.

2) U.S. Pipe and Foundry Company, TR-Flex, FIELD LOK 350®, and MJ FIELD LOK®.

b. Provide restrained joints for buried piping systems specifically identified to have restrained joints and for buried piping systems where use of concrete thrust blocks is not practical.

c. Mechanical locking type to provide positive restraint from joint separation without use of restraining rods, straps, clamps, or setscrew retainer glands.

d. Minimum pressure rating: 250 psi.

4. Flanged Joints:

a. Flanged pipe for liquid service shall be in accordance with AWWA C115.

b. Fabrication of flanged pipe, including assembly of flange on pipe shall be performed by pipe manufacturer in accordance with AWWA C115. Assembly of flange on pipe outside of manufacturer's shop is unacceptable.

c. Flange material for flanged pipe shall be ductile iron. Flanged pipe with gray iron flanges is not acceptable.

d. Gasket material shall be suitable for service and maximum operating temperature of piping system as specified in piping system specification section. Torque requirement of gaskets shall be less than torque rating of flange, bolt, and nuts.

e. Gaskets shall be ring or full face, 1/8 in. thick, and conform to dimensions shown in Appendices to AWWA C110 and AWWA C115.

f. Bolts:

1) Size, length, and number as shown in AWWA C110 and AWWA C115.

2). Material: Carbon steel, ASTM A307, Grade A.

3). Dimensions: ANSI B18.2.1, heavy hex.

g. Nuts:

1). Size, length, and number as shown in AWWA C110 and AWWA C115.

2). Material: Carbon steel, ASTM A307, Grade A.

3). Dimensions: ANSI B18.2.2, heavy hex.

5. Grooved Joints:

a. AWWA C606.

b. Rigid joint. Pipe ends radius cut grooved to rigid groove specifications.

c. Grooved couplings shall be Victaulic Style 31, or equal.

d. Grooved joint adapter flanges shall be Victaulic Styles 341 or 342, or equal.

e. Gasket material:

1). Suitable for service and maximum operating temperature of piping system as specified in piping system specification section.

2). Selected by grooved coupling manufacturer.

3). Coatings for grooved couplings and adapter flanges shall be same product as coatings for pipe.

C. FITTINGS

1. Pressure rating shall be 350 psi, minimum.

2. Standard fittings for liquid and air service:

a. Mechanical and push-on joint fittings:

1). Ductile iron.

2). AWWA C110 or AWWA C153.

3. Flanged joint fittings:

    a. Ductile iron.

    b. AWWA C110.

    c. Flange dimensions in accordance with AWWA C115.

4. Grooved joint fittings:

    a. Ductile iron.

    b. AWWA C110 except end preparation and wall thickness.

    c. End preparation in accordance with AWWA C606, rigid radius groove.

    d. Minimum wall thickness in accordance with AWWA C153.

5. Special fittings for liquid service, not included in AWWA standards, shall be manufacturer's standard, based on AWWA design principles, and in compliance with applicable requirements of AWWA standards.

6. Miscellaneous Fittings:

    a. Provide miscellaneous fittings, such as cutting in sleeves, tapping sleeves, caps, plugs, and other fittings, as required for complete system.

    b. Manufacturer of miscellaneous fittings shall be same manufacturer as pipe.

D. OUTSIDE COATING

1. Provide buried piping with asphaltic coating in accordance with applicable AWWA and ANSI standards.

2. Surface preparation, priming, and finish coating of non-buried piping shall be compatible and in accordance with NAPF 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special Exterior Coatings and/or Special Interior Linings.

3. Finish color for interior and exterior piping shall be as specified in piping system Specification section.

4. Coating for piping embedded in concrete is not required.

E. POLYETHYLENE ENCASEMENT

1. Provide PURPLE polyethylene encasement for buried piping in accordance with AWWA C105.

F. DUCTILE IRON TAPPING SLEEVES

1. Manufacturers:

    a. U.S. Pipe T-28 Dual Compression Seal Tapping Sleeve or approved equal.

PART 3 EXECUTION

3.01 GENERAL

A. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe, lining or coatings. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying and no piece shall be installed which is found to be defective. Any damage to the pipe linings or coatings shall be repaired as directed by the Engineer. Handling and laying of pipe and fittings shall be in accordance with the manufacturer's instruction and as specified herein.

3.02 INSTALLING PIPE AND FITTINGS

A. All pipe and fittings shall be thoroughly cleaned and dried before laying, shall be kept clean and dry until they are used in the work, and when laid, shall conform to the lines and grades required. Ductile iron pipe and fittings shall be installed in accordance with requirements of AWWA C600 except as otherwise provided herein. A firm, even bearing throughout the length of the pipe shall be constructed by tamping the bedding material at the sides of the pipe up to 1 foot over the top of the pipe. Blocking will not be permitted. If any defective pipe is discovered after it has been laid, it shall be removed and replaced with a sound pipe in a satisfactory manner by the Contractor, at his/her own expense.

B. All pipe shall be sound and clean before laying. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plugs or other approved means. Good alignment shall be preserved in laying. The deflection at joints shall not exceed that recommended by manufacturer. Fittings, in addition to those shown on the Drawings, shall be provided, if required, for crossing utilities, which may be encountered upon opening the trench. Solid sleeve closures shall be installed at locations approved by the Engineer.

C. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a bell shall be beveled to conform to the manufactured spigot end. Cement lining shall be undamaged. Field cut ends shall be sealed with Protecto 401 (or for potable water, approved epoxy) in accordance with manufacturer's instructions. Cutting of restrained joint pipe will not be allowed, unless approved at specific joints in conjunction with the use of restrainer glands by EBAA Iron or field adaptable restrained joints.

D. All drain valves, outlets, control valves, fittings and other appurtenances required shall be set and jointed as indicated on the drawings in accordance with the manufacturer's instructions.

3.03 PUSH-ON JOINTS

A. Push-on joints shall be made in accordance with the manufacturer's instructions. Pipe shall be laid with bell facing the direction in which the work is progressing. Whenever possible, a metal feeler shall be used on assembled joints to verify that the gasket was not dislodged before proceeding with the next assembly.

3.04 MECHANICAL JOINTS

A. Mechanical joints shall be assembled in accordance with AWWA C600, AWWA C111 and the manufacturer's instructions. Thoroughly clean and lubricate the joint surfaces and rubber gasket with soapy water before assembly. Bolts shall be tightened to specified torques. Under no conditions shall extension wrenches or pipe over handle of ordinary ratchet wrench be used to secure greater leverage.

B. Bolts in mechanical joints shall be tightened alternately and evenly.

3.05 CONNECTIONS TO STRUCTURES

A. Wherever a pipe passes from concrete to earth horizontally, two flexible joints spaced 4-feet apart shall be installed, within 2-feet of the exterior face of the wall, whether or not shown on the drawings.

B. Wall pipes shall have a thrust collar located at mid-depth of wall.

C. Piping underneath structures shall be concrete encased.

END OF SECTION

SECTION 02675 – DISINFECTION AND TESTING OF WATER LINES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Scope of Work.

B. References.

C. Submittals.

D. Scheduling.

E. Quality Assurance.

F. Equipment.

G. Performance Requirements.

1.2 SCOPE OF WORK

A. After completion of all pipe line section, the following procedure will be used to clean, sterilize and pressure test the pipeline. The pipeline shall be filled and flushed until all evidence of dirt or debris has been washed from the pipeline. The line shall then be refilled if necessary, introducing the chlorinating material. Each valved section shall then be brought up to test pressure and the leakage test performed. After all sections have been accepted, all valves shall be cleaned and the line left full of sterilizing water.

B. All domestic water lines installed in this Contract, including waterlines, which are installed between or connected to existing water lines, shall be tested in accordance with LVWD requirements.

C. Work shall include furnishing all pumps, meters, gauges, and other appurtenances, including taps to expel air, required for conducting tests. The Contractor shall furnish equipment, piping and appurtenances required to transport water used in testing from source to test location.

D. 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 a piping system and during testing.

1.3 REFERENCES

A. American Water Works Association (AWWA).

AWWA B-300	Standard for Hypochlorites
AWWA B-301	Standard for Liquid Chlorine
AWWA C-605	Underground Installation of Polyvinyl Chloride (PVC)
AWWA C-651	Standard for Disinfecting Water Mains

B. Texas Commission on Environmental Quality (TCEQ) - Rules and Regulations for Public Water Systems.

1.4 SUBMITTALS

A. Test Reports Shall Include:

1. Date of test.

2. Identification of piping tested.

3. Test fluid.

4. Test pressure.

5. Remarks, to include such items as:

a. Leaks (type, location).

b. Repairs made on leaks.

6. Contractor's signature certifying the results.

B. Submit under provisions of Section 01300.

1.5 SCHEDULING

A. Time and sequence of testing shall be scheduled by the Contractor, subject to review and approval by the Engineer, County of El Paso and Owner. Submit testing plan to Engineer at least 10 days before starting testing operations.

B. Notify Engineer 24 hours in advance of testing.

1.6 QUALITY ASSURANCE

A. Conduct tests on buried piping that is to be hydrostatically tested after the trench has been completely backfilled. The Contractor may, if field conditions permit and if approved by the Engineer, partially backfill the trench and leave the joints open for inspection and conduct an initial service leak test. The acceptance test shall not, however, be conducted until all backfilling has been completed.

B. Conduct testing on exposed piping after the piping has been completely installed, including all supports, hangers, and anchors, but prior to insulation.

C. Testing of pipe with concrete thrust blocking shall not be performed until the concrete has cured at least five days.

D. If any pipe fails to meet the specified pressure/leakage requirements the piping shall be repaired at the expense of the Contractor, including retesting.

E. 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.

F. The Contractor shall certify that all required tests have been successfully completed before the piping is accepted.

G. All pressure and leakage tests shall be observed by the Engineer's Representative.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. Portable Pressure Pump System: Including pump, motor, 2 isolation valves, quick connect/disconnect fittings at pump intake and discharge and 250 pound per square inch (psi) oil damped pressure gage (reading in 5 psi increments) mounted downstream of discharge side isolation valve.

B. Supply water tank with meter or gauge to measure water quantities used during test.

C. Water required for filling, flushing and testing the line will be furnished at the Contractor's expense, at such points along the pipe line as water is available from the existing distribution or supply systems. Wasting of water will not be condoned and such actions may require the Owner to make appropriate charges for such water.

D. The Contractor shall make provisions to provide the water, by tank truck or other means, to the points necessary to produce specified test pressure.

E. The Contractor shall use either liquid chlorine conforming to AWWA B-301, latest version or hypochlorite conforming to AWWA B-300, latest version.

PART 3 EXECUTION

3.1 GENERAL

A. After completion of all pipe line section, the following procedure will be used to clean, sterilize and pressure test the pipeline. The pipeline shall be filled and flushed until all evidence of dirt or debris has been washed from the pipeline. The line shall then be refilled if necessary, introducing the chlorinating material. Each valve section shall then be brought up to test pressure and the leakage test performed. After all sections have been accepted, all valves shall be cleaned and the line left full of sterilizing water.

Water for disinfection and testing of water mains will be provided at the CONTRACTOR's expense, as described in "Water for Construction".

B. Quality Assurance. The CONTRACTOR shall take special care to keep the interior of the pipe clean during storing, handling, and laying operations in order to reduce the need for flushing to an absolute minimum. In addition, all open ends shall be tightly covered whenever unattended to prevent small animals and dirt from entering the pipeline after it is in place. Testing firm shall be a company specializing in testing and examining potable water systems and be approved by the State of Texas. Submit bacteriologist's signature and authority associated with testing

C. Sterilization/Disinfection. Before acceptance for operation, each unit of completed water system shall be sterilized as specified below or as prescribed by Chapter 290 of TCEQ Rules and Regulations for Public Water Systems and AWWA C-651, latest version. New mains shall be thoroughly disinfected and then flushed and sampled before being placed in service. As per AWWA C-651, latest version, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected for microbiological analysis to check the effectiveness of the disinfection procedure. Sampling shall be repeated if contamination persists. A minimum of one sample for each 1,000 feet of completed waterline will be required. The unit to be sterilized shall be thoroughly flushed with water until all entrained dirt and mud have been removed before introducing the chlorinating material. The CONTRACTOR shall provide all chlorination material for sterilization at his cost. The chlorinating material shall provide a dosage of not less than 50 parts per million and shall be introduce into the water line in an approved manner. The treated water shall be retained in the pipe long enough to destroy all nonspore-forming bacteria. Except where a shorter period is approved, the retention time shall be at least 25 hours and shall produce no less than 10 ppm of chlorine at the extreme end of the line at the end of the retention period. Chlorine solution with a higher residual may remain in the line, without flushing, if approved by the Engineer.

All valves on the lines being sterilized shall be opened and closed several times during the contact period.

Procedure. During installation, the interior of all pipe, fittings and other accessories shall be kept as free as possible from dirt and foreign matter at all times. If, in the opinion of the Owner or Engineer, the pipe contains dirt or foreign matter that could not be removed during the flushing operation, the interior of the pipe shall be cleaned and swabbed with a bactericidal solution. When pipe laying is not in progress, the open ends of pipe shall be sealed with watertight plugs. If water has accumulated in the trench, the seal shall remain in place until the trench water has been removed to such an extent that it will not enter the pipe.

After the completion of hydrostatic pressure tests and prior to disinfection, the pipeline shall be flushed, as thoroughly as possible with the water pressure and outlets available. If feasible, flushing rate should develop a velocity in the pipeline of at least 2.5 fps. The minimum quantity of water used for flushing shall be in excess of the storage capacity of the pipeline, to ensure that clean water has traversed the entire length of the line.

After flushing has been completed to the point that all apparent dirt and foreign matter have been removed from the pipeline, calcium hypochlorite solution shall be injected into the pipeline as provided in AWWA Standard C-651, latest version.

Following chlorination, all treated water shall be flushed from the newly laid pipeline at its extremities until the replacement water throughout its length is proved by test to be: a) comparable in quality to the potable water served from the existing water supply system, or b) as approved by the public health authority having jurisdiction. Should the initial treatment fail to achieve the satisfactory quality described above, the original chlorination procedure shall be repeated until satisfactory results are obtained.

Contractor shall not discharge water used for disinfection purposes to any waterway or water course known to support fish or wildlife, if the water contains more than 4 ppm of chlorine. Dechlorination by methods acceptable to the Owner and Engineer must be used if Contractor proposes discharge to waterways or water courses known to support fish or wildlife. Discharge to holding ponds so that evaporation or infiltration will occur or use in obtaining optimum moisture content in trench backfill or embankments, or other approved discharge methods may be used in lieu of dechlorination.

Bacteriological report shall include, at minimum, the following information:

1. Date issued, project name, and testing laboratory name, address, and telephone number.
2. Time and date of water sample collection.
3. Name of person collecting samples.
4. Test locations.
5. Initial and 24-hour disinfectant residuals in ppm for each outlet tested.
6. Coliform bacteria test results for each outlet tested.

D. Hydrostatic Pressure and Leakage Testing. All valves and hydrants shall be checked for proper operation and pressure the pipe system shall be subjected to a hydrostatic pressure and leakage test. After completion of each valved section and following the filling and disinfection of the section, the system shall be subjected to this test. The meter, pressure gauges, pump, small piping and hose connections, and all labor necessary for conducting the test, shall be furnished by the CONTRACTOR.

After the section of pipeline has been filled, Contractor shall test new water line for leakage per latest version the AWWA Standards.

After all sections of the pipeline have been tested, as described above, all valves shall be closed and the line left filled with the water to be used for disinfection and testing. Under no circumstances will the Contractor be allowed to open/close existing valves on the existing potable water system.

PART 4 MEASUREMENT AND PAYMENT

4.1 No separate measurement or payment shall be made for this work item, but it shall be included in the unit price bid for the pipeline work as noted in the proposal.

END OF SECTION

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SECTION 02700 – WATER SERVICE CONNECTIONS

PART 1 GENERAL

1.1 DESCRIPTION

A. This Item shall govern for the construction of water service connections and fire lines. Contractor shall furnish labor, materials, equipment and incidentals necessary to install water service connections and fire lines complete for potable water supply. New water meters will be purchased from EPWater by the Contractor but will be furnished and installed by the EPWater personnel. All other materials required, including meter boxes, shall be furnished and installed by the CONTRACTOR. Contractor shall be responsible for all coordination between Contractor, EPWater, County of El Paso, and property owner. Contractor shall furnish labor, materials, equipment, and incidentals to fabricate, furnish, and install pre-cast concrete meter boxes, outside structures and vaults in accordance with County of El Paso and EPWater Requirements.

PART 2 PRODUCTS

2.1 GENERAL

A. Submittals. Submittals shall include certifications from manufacturers that the products comply with appropriate ASTM, AWWA and Utility Standards. Submit shop drawings on meter boxes and associated hardware to the ENGINEER for approval prior to fabrication.

B. Materials.

1. Water Service Connections.

Water Meters: As per EPWater Standards. Shall be purchased from EPWater by the Contractor but will be furnished and installed by the EPWater personnel.

Castings and Washer Nuts. Shall be of certified cast bronze composition, 85-5-5-5 percent per ASTM B-62, fully formed, tapped threads meeting requirements of AWWA C-800 for underground service. (Not in contact with potable water).

Gaskets. Shall be self-sealing, 100 percent neoprene or Buna-N rubber, formulated for water service.

Straps. Shall be silicon bronze, approximate tensile strength of 70,000 psi chamfered for easy nut starting and flattened to provide wide bearing surface.

Valves. Shall be in accordance with Utility acceptable standards and requirements for Gate Valves. Valves for copper pipe shall be bronze with minimum 85 percent copper content casting. Valves for PVC pipe shall be cast-iron and conform to requirements for Gate Valves (see Section 5.0).

Corporation stops shall be ball-valve style and conform to the requirements of AWWA c800. Acceptable manufacturers are Ford Meter Box Co., A.Y. McDonald Model 4701, Muller or approved equal.

Angle ball meter stop with padlock wings with copper compression inlet by meter coupling, such as James Jones Company, McDonald, Ford, or approved equal, shall be used for 3/4-inch through 1-inch meters; except that valves for 2-inch meters shall be compression/flanged ends in lieu of outlet coupling nut.

Angle ball valves with padlock wings shall be copper flared inlet and female iron pipe thread outlet such as James Jones Company Model J-1965W, McDonald MFG Model 74606B, or approved equal. Outlet meter coupling nut shall be used for 3/4-inch and 1-inch meters. Valves for 1-1/2-inch and 2-inch meters shall be inlet female iron pipe by outlet oval flange ends

Service Pipe. Shall be copper Type "K" for sizes up to and including 2-inch, meeting ASTM B-88. Pipe for 3-inch services shall be 4-inch PVC per AWWA C-900, with reducers at meters. Pipe for 4-inch services and larger shall be PVC pipe per AWWA C-900. Fittings for copper pipe shall be bronze. Fittings for PVC pipe shall be ductile iron.

2. Meter Boxes. Concrete meter boxes shall meet the following standards:

ASTM A-27	Specifications for Steel Castings, Carbon, for General Application
ASTM A-36	Specification for Structural Steel
ASTM A-48	Specification for Gray Iron Castings
ASTM C-33	Specification for Concrete Aggregates
ASTM C-150	Specification for Portland Cement
ASTM C-309	Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C-615	Specification for Granite Building Stone

Cement shall be Portland cement conforming to ASTM C-150, Type I or Type III. Concrete shall have a minimum 28-day compressive strength of 4,500 psi; a water cement ratio of 0.5 or less by weight; and a maximum 5.5 gallons water per sack cement.

All concrete shall be handled from the mixer or transport vehicle to the place of final deposit in a continuous manner, as rapidly as practicable, and without segregation or loss of ingredients, until the operation is completed. Concrete shall be placed in layers not over 2-feet deep. Each layer shall be compacted by mechanical internal or external vibrating equipment. Duration of the vibration cycle shall be limited to the time necessary to produce satisfactory consolidation without causing objectionable segregation.

Aggregates, other than lightweight aggregates, shall conform to specifications outlined by ASTM C-33. Aggregates shall be free of deleterious substances and graded in a manner as to produce a homogeneous concrete mix. All materials are to be accurately weighed at a central batching facility for mixture.

Curing for the purposes of early re-use of forms, the concrete may be heated in the mold, after initial seat has taken place. The temperature shall not exceed 71.11^0C (160 degrees Fahrenheit) and the temperature shall be raised from normal ambient temperatures at a rate not to exceed 4.44^0C (40 degrees Fahrenheit) per hour. The cured unit shall not be removed from the forms until sufficient strength is obtained for the unit to withstand any structural strain that may be subjected during the form stripping operation. After the stripping of forms further curing by means of water spraying or a membrane curing compound may be used and shall be of a clear or white type, conforming to ASTM C-309.

Steel Reinforcing shall comply with ASTM A-615 Grade 60 steel, F_Y= 60,000 psi. Minimum concrete cove on re-bar top slab shall be 1.25" and 1.5" on re-bar for walls. Bar bending and placement to comply with latest ACI Standards. All reinforcing steel, including welded wire mesh, shall be of the size and in location as shown on the plans. All reinforcing shall be sufficiently tied to withstand displacement during the pouring operation. Lifters shall be designed to handle the imposed weights and shall be placed as specified on the drawings or manufacturer's requirements.

Steel Frames and Covers shall conform to ASTM A-27, Grade 70-36. Structural welded steel shall conform to the requirements of ASTM A-36 with dimensions as specified on the drawings.

Cast Iron Ring and Covers shall conform to the requirements of ASTM 48, Class 30. All castings shall be of uniform quality, free from blowholes, shrinkage, distortion or other defects. They shall be smoothed and well cleaned by shot-blasting.

All castings shall be manufactured true to pattern. Component parts shall fit together in a satisfactory manner. Round frames and covers shall have continuously machined bearing surfaces to prevent rocking and rattling.

Tolerances shall not exceed 1/16-inch per foot. Deviation in weight shall not exceed 5 percent.

3. Tapping Sleeves and Pipe Couplings. The Contractor shall furnish labor, materials, equipment and incidentals necessary to install tapping sleeves and pipe couplings as specified. All tapping sleeves and pipe couplings furnished for incorporation in the work shall be suitable for operation at pressures as specified for the pipelines in which they will be installed, including test pressures and surge allowances.

   Submittals. The Contractor shall furnish all necessary shop drawings as required.

   Cast Tapping Sleeves. Tapping sleeves shall be of suitable construction and reinforced to provide resistance to line pressures. They shall be designed for the pipe size and material on which they will be used. Tapping sleeves shall be built in halves for assembly around the main to be tapped. The branch outlet shall have a flanged face for bolting to the tapping valve. The inside diameter of outlet branch shall be sufficiently larger than the nominal size to provide clearance for the full-size cutters of the tapping machine.

   Acceptable manufacturers shall be:

   Mueller Company

   Kennedy Valve Square seal

   M&H

   Type 1: Cast tapping sleeve allows water to circulate between the sleeve and the outside surface of the pipe. Gaskets of suitable material, designed for use on potable water shall form watertight joints along the entire length of the sleeve. Circumferential joints at the ends of the run of the sleeves shall be sealed by mechanical joints, conforming to AWWA C-111 as to dimensions, clearances, and materials, except that gaskets and glands form mechanical joints shall be totally confined or compressed between ridges or grooves extending continuously for the full length of both halves of the sleeve casting. Bolts shall be located close to the outside of the gaskets and spaced so as to exert sufficient pressure to form a watertight joint and withstand stresses imposed by the intended use.

   Type 2: Water is confined to the immediate area of the tap opening. The outlet half of each sleeve shall be fitted with a continuous gasket of approximately circular cross section, permanently cemented into a groove surrounding the outlet opening. The back half of each sleeve shall be fitted with elastomeric pads, a metal shoe, or other device for developing adequate pressure on the gasket to prevent leakage at any pressure within the design capacity of the pipe.

   Protective Coating: All surfaces exposed to flow shall be coated in accordance with AWWA C-550.

Fabricated Tapping Sleeves. Fabricated tapping sleeves shall be rated for a working pressure of 150 psi. All tapping sleeves shall meet the following requirements:

Acceptable manufacturers of fabricated tapping sleeves shall be:

Ford	FTSC
JCM	412
Romac	FTS 420
Power Seal	3490

Markings: Each tapping sleeve shall be permanently marked to identify the outer diameter size range.

Test Plug: Shall be a 3/4" NPT with standard square head.

Nuts and Bolts: Shall be high strength, corrosion resistant 18-8 Type 304 Stainless Steel.

4" - 12": Tapping sleeve body and flange shall be 18-8 Type 304 Stainless Steel or AWWA C111 Carbon Steel with fusion epoxy coating. The body, lug, and gasket armor plate shall be in compliance with ASTM A-240. All metal surfaces shall be passivated, in accordance with ASTM A-380, after fabrication.

Gasket: Shall provide a watertight sealing surface around the full circumference of the pipe. Gaskets shall be formed of natural or synthetic rubber.

Lugs: Shall be welded to the shell and prevent alignment problems by allowing the bolts to pass through. Bolts shall not be welded to the sleeve.

16" and Larger: Tapping sleeves shall have a heavy welded steel body in compliance with ASTM A-36 or ASTM A-285, Grade C.

Gasket: Shall be natural or synthetic rubber compounded for water use and shall provide a watertight sealing surface.

Flange: Shall be in constructed in accordance with AWWA C-207 Class D and shall be properly recessed for aligning the sleeve and tapping valves.

Protective Coating: Steel tapping sleeves shall be coated with epoxy. Minimum thickness shall be 8 mils.

Flexible Couplings. Shall be furnished and installed where shown on the drawings, specified, or in locations, as approved by the Engineer. Flexible couplings installed underground shall be ductile iron and Type 316 Stainless Steel nuts and bolts shall be used. When flexible couplings are used as expansion joints, the pipe ends shall be separated to allow for expansion. Where indicated on the drawings or required by field conditions, flexible couplings shall be suitable for connecting pipes having different outside diameters. Flanged coupling adapters shall be restrained with tie rods.

Protective Coating: Entire coupling assembly shall be given a 20-mil coating of T.C. Mastic as manufactured by Tape Coat Company, Bitumastic No. 50 as manufactured by Koppers Company, or approved equal.

Ductile Iron Pipe: Flexible Joint Couplings shall be Dresser Style 38, Rockwell Style 411, or equal. Flanged coupling adapters for ductile iron pipe shall be Dresser Type 127, Rockwell International 112, Baker Series 600, or equal.

Steel Pipe: Flexible couplings shall be Dresser Style 38, Rockwell International 411, or equal, except where other styles are required for special conditions.

Gaskets: Shall be neoprene rubber or equal.

Installation. Tapping sleeves shall be installed in accordance with the manufacturer's recommendations. Tapping valves shall meet the requirements of SECTION 5.0, Gate Valves. Disc and seat ring shall be so constructed that the inside diameter of the ring is at least 3/16-inch larger than nominal size of valve. Tapping sleeve and valve assembly shall be blocked as indicated.

PART 3 EXECUTION

3.1 GENERAL

A. Service taps for 3/4-inch to 2-inch services shall be made with service saddle to be furnished and installed by the CONTRACTOR. No direct taps, i.e. without the saddle, shall be made. Taps for 3-inch and 4-inch services shall be made using 4-inch tapping sleeve and valve. Copper service pipe attached to metallic water mains shall be insulated at the corporation stop with a dielectric insulator. Installation shall comply with Utility Standards for Excavating, Backfilling and Compacting.

Multiple tapping, two or more taps on a length of pipe, shall not be on a common line parallel to the longitudinal axis of the pipe and shall be no closer than 18-inch on the longitudinal axis of the pipe.

No splices shall be allowed in any portion of the service pipe run between the main line connection and the meter assembly. No dry or direct taps are authorized.

When specified, meter installations larger than 1-inch shall be made with a bypass meter connection according to the following schedule:

1-1/2 inch and 2-inch meters = 1-inch bypass

3-inch and 4-inch meters = 2-inch bypass

6-inch and 8-inch meters = 3-inch bypass

B. Existing Services. Where existing water services are indicated on the Drawings to be replaced, relocated, or reconnected to new water lines, the CONTRACTOR shall make prior arrangements with each water customer as to the time and length of shutdown necessary. The customer shall be notified 24 hours before any connections are made. A maximum shut-off time of four (4) hours will be allowed for making connections, after which time the CONTRACTOR shall supply the customer with potable water from an approved source, at no additional cost to the Owner.

C. Metallic Tracer Tape. For 3-inch services and larger (i.e. PVC), width shall be a minimum of 6-inch or twice the line diameter. The burial depth shall not exceed 36-inches below final grade nor be at an elevation of less than 12-inches above the utility line. Recommended burial depth shall be according to the tape manufacturer. Color of tape shall conform to American Public Works Association (APWA) color code. Acceptable manufacturer shall be THOR Enterprises, Inc., “Magnatec” or equivalent as approved.

D. Meter Box Installation. Meter boxes shall be installed in accordance with these specifications and Utility Standard Details. Install to grade matching top of curb. Meter boxes shall not be installed under sidewalks, driveways, or proposed above-ground structures. Where no curbing exists, install boxes in accessible locations beyond limits of street surfacing, walks, and driveways.

The following standard meter boxes shall be installed for their respective meter size, unless otherwise determined and approved by the Utility.

STANDARD METER BOXES			
METER SIZE	BOX TYPE	CONSTRUCTION	DIMENSIONS W x H
3/4-inch	Type A	Single Unit	19.25 in. O.D. x 17 in.
1 inch	Type B	Single Unit	26 in. O.D. x 17 in.
1-1/2 in. to 2 in.	Type C	Single Unit	50 in. SQ x 24 in.
3 in. and larger	Type D	Modular	7 ft.-8 in. SQ x 4 ft.-6 in.

Where it is necessary to install Type A or B boxes for 3/4-inch or 1-inch meters under roadways or traffic bearing surfaces, boxes shall be encased in 12-inches concrete 3,000 psi minimum.

E. Testing and Flushing Procedures. All services shall be pressure tested for leakage by opening the corporation or service valve at the main service connection point, maintaining the meter angle valve closed, and visually observing all connections and piping for leaks. If no leaks are observed, the service line shall then be flushed as follows. The angle valve is opened to “full” and then the corporation valve is slowly opened to full capacity. Water is allowed to flow until piping has been thoroughly flushed. Then the angle valve is slowly closed to prevent water hammer or shock pressure, which might rupture the main or adjacent water service connections. If no customer piping is currently connected to the meter outlet connection, a fitted plug shall be used at the end of this connection to prevent the entrance of dirt or muddy water.

PART 4 MEASUREMENT AND PAYMENT

4.1 Measurement and payment shall be made for this work item at the unit price bid for as noted in the proposal for this item.

END OF SECTION

DIVISION 3

SECTION 03200 – CEMENT STABILIZED BACKFILL

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. This Section includes the following:

1. Flowable Fill.

2. "2-Sac" Cement Stabilized Backfill.

1.03 SUBMITTALS

A. Material Certificates: Provide copies of materials certificates signed by material producer and Contractor certifying that each material item complies with or exceed specified requirements.

1.04 QUALITY ASSURANCE

A. Codes and Standards: Comply with the Texas Department of Transportation and County Department standard specifications, latest edition, and with local governing regulations if more stringent than herein specified.

PART 2 PRODUCTS

2.01 MATERIALS

A. Flowable Fill:

1. Shall consist of cement, graded limestone aggregate, water, and an air entraining admixture.

2. Must be of such consistency after it has cured, that it can be excavated with standard excavation power and/or hand equipment.

3. Not more than 125 lbs. or less than 75 lbs. of cement per cubic yard of flowable fill.

4. Twenty eight day compressive strength of test sample made in standard 6 x 12 concrete cylinder mold to be no more than 150 psi or less than 100 psi.

5. Ph shall be greater than 8.

6. No fly ash will be permitted.

7. Stable air content of 20 to 35 percent, admixture for maintaining stable air content shall be designed specifically for cement slurry.

8. Aggregate shall be graded screenings with 3/8" maximum size aggregate.

9. Slump shall be 8 inches.

10. Water cement ratio shall not exceed 2.5.

11. Field test must be submitted and approved by Engineer showing the designed mix meets the required properties.

12. Test excavations as directed by the Engineer shall be made to confirm that material can be excavated as described in 2 above. Material that does not comply shall be removed at no cost to the Owner.

B. "2-Sac" Cement Stabilized Backfill

1. Shall comply with Item 400.6 of the Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridge, latest version, and County of El Paso.

2. Shall consist of cement, graded limestone aggregate, water, and an air entraining admixture.

3. Must be of such consistency after it has cured, that it can be excavated with standard excavation power and/or hand equipment.

4. Shall consist of 188 lbs. of cement per cubic yard of cement stabilized backfill.

5. Twenty-eight-day compressive strength of test sample made in standard 6 x 12 concrete cylinder mold to be 400 psi.

6. Ph shall be greater than 8.

7. No fly ash will be permitted.

8. Stable air content of 20 to 35 percent, admixture for maintaining stable air content shall be designed specifically for cement slurry.

9. Aggregate shall be graded screenings with 3/8'' maximum size aggregate.

10. Slump shall be 8 inches.

11. Water cement ratio shall not exceed 2.5.

12. Field test must be submitted and approved by Engineer showing the designed mix meets the required properties.

13. Test excavations as directed by the Engineer shall be made to confirm that material can be excavated as described in 2 above. Material that does not comply shall be removed at no cost to the owner.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Flowable fill shall be allowed to cure sufficiently to prevent displacement prior to placing fill or base course over the cement slurry. Flowable Fill must be of consistency during placement such that mix is highly flowable with no signs of segregation.

B. "2-Sac" Cement Stabilized Backfill shall be placed in accordance with Item 400.6 of the Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges, latest version, and County of El Paso.

C. Equipment: All equipment necessary for the proper construction of this work shall be on the project, in first class working condition, and approved by the Engineer before construction is permitted to start.

END OF SECTION

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SECTION 03300 – SITE CONCRETE WORK

PART 1 GENERAL

1.01 SCOPE

A. This section of the specifications covers all of the work required for constructing concrete structures, curbs, headers, sidewalks, driveways, manhole bases, cast-in-place manholes, and other miscellaneous work.

B. Concrete for this project shall conform to the requirements of this section. The Contractor shall furnish all materials, equipment, tools, labor, superintendence, and incidentals necessary to perform the work in accordance with the drawings and these specifications.

1.02 RELATED SECTIONS

A. N/A

1.03 REFERENCES

A.	ACI 301	Specifications for Structural Concrete for Buildings
B.	ACI 304	Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete
C.	ASTM A185	Welded Steel Wire Fabric for Concrete Reinforcement
D.	ASTM A497	Welded Deformed Steel Wire Fabric for Concrete Reinforcement
E.	ASTM A615	Deformed and Plain Billet-Steel for Concrete Reinforcement
F.	ASTM C33	Concrete Aggregates
G.	ASTM C94	Ready Mix Concrete
H.	ASTM C150	Portland Cement
I.	ASTM C260	Air-Entraining Admixtures for Concrete
J.	ASTM C309	Liquid Membrane-Forming Compounds for Curing Concrete
K.	ASTM C494	Chemical Admixtures for Concrete
L.	ASTM D1751	Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide data on joint filler, admixtures and curing compounds.

C. Provide test reports and materials' certification as required in referenced sections for concrete.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301.

B. Obtain cementitious materials from same source throughout.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable standards for paving work on public property.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.01 FORM MATERIALS

A. Form Materials:

1. Steel or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

2. Use flexible spring steel forms or laminated boards to form radius bends as required.

3. Coat forms with a non-staining form release agent that will not discolor or deface of concrete.

2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A615; 60 ksi yield grade; deformed billet steel bars; unfinished finish.

B. Welded Steel Wire Fabric: Plain type, ASTM A185; in coiled rolls finish.

C. Dowels: ASTM A615; 60 ksi yield grade, plain steel, unfinished finish.

2.03 CONCRETE MATERIALS

A. Concrete Materials: As specified herein.

2.04 ACCESSORIES

A. Curing Compound: ASTM C309, Type 1, Class A.

B. Joint Materials: AASHTO M-33, ½" bituminous type preformed joint filler.

2.05 CONCRETE MIX - BY PERFORMANCE CRITERIA

A. Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94.

B. Select proportions for normal weight concrete in accordance with ACI 301 Method 3.

C. Provide Type I/II concrete to the following criteria:

1. Compressive Strength: 3,000 psi @ 28 days.

2. Slump: 4 inches (± 1).

3. Minimum Water/Cement Ratio: 0.45.

4. Air Entrained: 4%, ± 1.5% percent.

D. Provide Type I/II Concrete to the following criteria:

1. Compressive Strength: 4,000 psi @ 28 days.

2. Slump: 4 inches (± 1).

3. Minimum Water/Cement Ratio: 0.45.

5. Air Entrained: 4%, ± 1.5% percent.

E. Use accelerating admixtures in cold weather only when approved by Engineer. Use of admixtures will not relax cold weather placement requirements.

F. Use calcium chloride only when approved by Engineer.

G. Use set retarding admixtures during hot weather only when approved by Engineer.

2.06 SOURCE QUALITY CONTROL AND TESTS

A. Provide mix design for concrete to the Engineer for approval prior to placing any concrete.

B. Submit proposed mix design to the Engineer for review and approval prior to commencement of work.

C. Tests on cement and aggregates will be performed to ensure conformance with specified requirements.

D. Test samples in accordance with ACI 301.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

B. Notify Engineer minimum 24 hours prior to commencement of concreting operations.

3.03 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

D. Clean forms after each use and coat with form releasing agent as required to ensure separation from concrete without damage.

3.04 REINFORCEMENT

A. Interrupt reinforcement at expansion joints.

B. Place dowels and reinforcement to achieve pavement and curb alignment as detailed.

C. Provide doweled joints 12 inch oc at transverse joints and interruptions of concrete.

3.05 PLACING CONCRETE

A. Place concrete by methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels and joint devices.

B. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

D. Place concrete continuously over the full width of the panel and between predetermined construction joints.

E. Deposit and spread concrete in a continuous operation between transverse joints as far as possible. If interrupted for more than ½ hour, place a construction joint.

F. Curb and Gutter: Automatic machines may be used for curb and gutter placement at the Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results that meet or exceed the minimums specified. Machine placement must produce curbs and gutters to required cross sections, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, the Contractor will be required to remove and replace with formed concrete, as specified, at the Contractor's expense.

3.06 JOINTS

A. Expansion Joints

1. Place expansion joints at 20 foot intervals. Align curb, gutter, and sidewalk joints.

2. Place joint filler between paving components and building or other appurtenances. Recess top of filler 1/4 inch for sealant placement.

3. Provide scored joints at 5 feet intervals between sidewalks.

4. Provide keyed joints as indicated.

5. Provide pre-molded joint filler for expansion joints abutting concrete curbs, structures, walks and other fixed objects, unless otherwise indicated.

6. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. When more than one length is required or clip joint filler sections together.

7. Protect top edge of joint filler during concrete placement with a metal cap or other temporary materials.

8. Remove protection after concrete has been placed on both sides of joint.

B. Construction Joints

1. Place construction joints at and of placements and at locations where placement operations are stopped for more than ½ hour.

2. Where load transfer-slip dowel devices are used, install so that one end of each dowel bar is free to move.

C. Fillers and Sealants

1. Where joints in concrete construction are shown to be sealed, the joint sealing compound shall be a cold-applied two-component poly-sulfide sealant.

2. The handling, mixing, and placing of the material and preparation of the joint prior to sealing shall be in strict accordance with the recommendations of the manufacturer.

3. A two component epoxy primer compatible with the sealer shall be used in all joints.

4. Provide joint sealers and other related materials that are compatible with one another and with joint substrates.

3.07 FINISHING

A. Area Paving: Rake finish or as required by TXDOT standards.

B. Sidewalk Paving: Light broom, radius to 1/2 inch radius, and trowel joint edges.

C. Curbs and Gutters: Light broom.

D. Direction of Texturing: Transverse to pavement direction.

E. Inclined Vehicular Ramps: Broomed perpendicular to slope.

F. Place white curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.08 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Cure floor surfaces in accordance with ACI 308.

D. Ponding: Maintain 100 percent coverage of water over slab areas continuously for 4 days.

E. Spraying: Spray water over floor slab areas and maintain wet for 7 days.

3.09 TOLERANCES

A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
B. Maximum Variation From True Position: 1/4 inch.

3.10 PATCHING

A. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.

C. Patch imperfections as directed.

3.11 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

3.12 FIELD QUALITY CONTROL

A. Three concrete test cylinders will be taken for every 50 or less cubic yards of concrete placed each day.

B. One additional test cylinder will be taken during cold weather and cured on site under same conditions as concrete it represents.

C. One slump test will be taken for each set of test cylinders taken.

D. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.13 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian and vehicular traffic over pavement until 75 percent design strength of concrete has been achieved.

END OF SECTION