Company Name:

_____

TARRANT COUNTY
PURCHASING DEPARTMENT

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VOLUME 2 – TECHNICAL SPECIFICATIONS

RFB NO. 2023-082

PROJECT MANUAL
FOR
SANITARY SEWER SYSTEM REPLACEMENT

RESOURCE CONNECTION
1100 CIRCLE DRIVE
FORT WORTH, TX 76119

BIDS DUE MARCH 9, 2023
2:00 P.M. CST

Technical Specifications Prepared by

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RFB NO. 2023-082

TARRANT COUNTY RESOURCE CONNECTION
SANITARY SEWER SYSTEM REPLACEMENT

SUMMARY OF WORK

SCOPE OF WORK: Awarded vendors are to provide all supervision, labor, equipment, and materials needed for the Sanitary Sewer System Replacement at the Tarrant County Resource Connection campus. The project consists of the construction of a new private, gravity flow sanitary sewer system, consisting of 4", 6", 8" and 10" PVC sanitary sewer piping, new manholes, cleanouts and connections to existing plumbing pipes exiting the buildings. The project includes connections to the City of Fort Worth public sanitary sewer system at existing public sanitary sewer manholes at two locations. Bidder is responsible for coordination with the City of Fort Worth for these two connections.

The project shall be constructed in such a manner that all existing buildings are to remain in operation during the entire construction period. Connections to the existing plumbing pipes exiting the buildings will have to be scheduled in advance and will probably have to be done after hours or weekends, when the buildings are not in use. Contractor is responsible for preparation of a Construction Schedule and working with local Facilities Personnel for all work. All work is to be performed during normal working hours, Monday through Friday – 8:00 AM to 5:00 PM. Tarrant County will accommodate awarded vendor if they would like to work outside these hours, per the General Notes on the plans. However, Tarrant County will NOT PAY FOR OVERTIME HOURS worked outside the normal working hours.

The construction consists of open cut trench construction and Pipe Bursting construction methods. The project also includes bypass pumping at selected locations, removal of all existing sanitary sewer manholes, backfilling and compaction, surface restoration for all disturbed areas, sidewalk and pavement replacement. The project includes all incidental work that is required for a complete and operable gravity flow sanitary sewer system.

Bidders should have experience in the construction of large sanitary sewer system projects. Traffic shall be maintained on Circle Drive (ring road) at all times to provide emergency access to the campus.

Bidder is responsible for preparation of a Storm Water Pollution Prevention Plan (SW3P) and controlling erosion during the entire construction period and until permanent ground stabilization is established. The SW3P shall be posted at the site and regular inspections shall be performed during the construction of the project.

Bidder shall be responsible for obtaining a Plumbing Permit from the City of Fort Worth and scheduling required inspections. Costs of obtaining Plumbing Permit is responsibility of the Bidder, no additional payment will be made for Permit and Inspections costs. All work shall be done in accordance with the standards of the City of Fort Worth.

Awarded vendors are to field verify existing conditions as shown on the Contract Documents. Report any discrepancies to the Engineer prior to execution of any construction affecting these areas. No changes shall be made without notifying the Engineer in advance. Any work undertaken prior to notification will be at the Contractor's sole expense and responsibility.

Table of Contents

Volume 2 -Technical Specifications

Section 02 41 00	Demolition
Section 31 23 33	Excavation, Trenching & Backfilling for Utilities
Section 31 50 00	Trench Safety
Section 32 12 16	Hot Mixed Asphalt Pavement
Section 32 13 13	Concrete Paving & Walks
Section 33 01 31	Closed Circuit Television (CCTV) Inspection – Sanitary Sewer
Section 33 03 10	Bypass Pumping of Existing Sewer Systems
Section 33 30 00	Sanitary Sewers
Section 33 31 15	HDPE Pipe for Sanitary Sewer
Section 33 31 12	Sanitary Sewer Pipe Enlargement
Section 33 31 50	Sanitary Sewer Service Connections & Service Line

SECTION 02 41 00
DEMOLITION

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies demolition and removal of paving, walks, fencing, utilities, other site improvements.

1.2 RELATED WORK

A. Safety Requirements: GENERAL CONDITIONS Article, ACCIDENT PREVENTION.

B. Disconnecting utility services prior to demolition: Section 01 00 00, GENERAL REQUIREMENTS.

1.3 PROTECTION

A. Perform demolition in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities; and to provide free passage to and from such adjacent areas of structures. Comply with requirements of GENERAL CONDITIONS Article, ACCIDENT PREVENTION.

B. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel during demolition and removal operations. Comply with requirements of Section 01 00 00, GENERAL REQUIREMENTS, Article 1.9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES AND IMPROVEMENTS.

C. Maintain fences, barricades, lights, and other similar items around exposed excavations until such excavations have been completely filled.

D. Prevent spread of flying particles and dust. Sprinkle rubbish and debris with water to keep dust to a minimum. Do not use water if it results in hazardous or objectionable condition such as, but not limited to; ice, flooding, or pollution.

E. In addition to previously listed fire and safety rules to be observed in performance of work, include following:

1. Wherever a cutting torch or other equipment that might cause a fire is used, provide and maintain fire extinguishers nearby ready for immediate use. Instruct all possible users in use of fire extinguishers.

2. Keep hydrants clear and accessible at all times. Prohibit debris from accumulating within a radius of 15 feet of fire hydrants.

F. Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The contractor shall take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the Client; any damaged items shall be repaired or replaced as approved by the Architect. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required.

1.4 UTILITY SERVICES

A. Demolish and remove outside utility service lines shown to be removed.

B. Remove abandoned outside utility lines that would interfere with installation of new utility lines and new construction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 DEMOLITION

A. Debris, including brick, concrete, stone, metals and similar materials shall become property of Contractor and shall be disposed of by him daily, to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Architect. Break up concrete slabs below grade that do not require removal from present location into pieces not exceeding 24 inches square to permit drainage. Contractor shall dispose debris in compliance with applicable federal, state or local permits, rules and/or regulations.

B. Remove and legally dispose of all materials, other than earth to remain as part of project work. Materials removed shall become property of contractor and shall be disposed of in compliance with applicable federal, state or local permits, rules and/or regulations.

C. Remove existing utilities as indicated or uncovered by work and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Architect. When Utility lines are encountered that are not indicated on the drawings, the Architect shall be notified prior to further work in that area.

3.2 CLEAN-UP

A. On completion of work of this section and after removal of all debris, leave site in clean condition satisfactory to Architect. Clean-up shall include off the property disposal of all items and materials not required to remain property, as well as all debris and rubbish resulting from demolition operations.

END OF SECTION 02 41 00

SECTION 31 23 33

EXCAVATION, TRENCHING, & BACKFILLING FOR UTILITIES

PART 1. - GENERAL

1.1. SUMMARY

A. Extent of excavation, backfilling and compacting for utilities work required by this section is indicated on drawings and by requirements of this section.

B. This section includes excavation, backfilling and compacting for buried building piping and site utility piping systems.

1.2. DEFINITIONS

A. Initial bedding material or granular cradle is clean gravel or crushed stone placed and compacted from at least 6" below bottom of pipe or conduit to centerline of pipe or conduit.

B. Final bedding material or selected granular backfill is clean gravel or crushed stone placed and compacted from centerline of pipe or conduit to at least 6" above top of pipe or conduit.

C. Structural areas are areas where any type of foundation slab, roadway, building, structure, or sidewalk is to be constructed.

D. Non-structural areas are landscaped areas with no structural area features.

1.3. REFERENCES

A. ASTM D698 - Tests for moisture-density relations for soils, using 5.5 lb. rammer and 12" drop.

1.4. PROJECT CONDITIONS

A. Notify utility companies for exact location of all utilities prior to excavating. Verify depths of utilities when possible conflicts may be present.

B. Protect all existing utilities serving the existing facilities. Do not interrupt service. Cooperate with the User and others having jurisdiction in keeping respective services and facilities in operation.

C. Barricade open excavations and post with warning lights. Operate warning lights during hours of darkness.

D. Protect all adjacent work, structures, and property. Damage to adjacent work, structures, or property shall be reimbursed in full. All benchmarks, monuments and other reference points shall be protected, maintained, and if disturbed or destroyed, must be replaced as directed by the Architect/Engineer.

PART 2. - PRODUCTS

2.1. MATERIALS

A. Bedding Material: Clean gravel or crushed stone conforming to the following gradation:

1. Initial and Final Pipe and Conduit Bedding Material

Pipe or Conduit	Percent Passing Maximum Size	Minimum Size	No. 200 U.S. Std. Size
4" and less	3/8”	1/8 “	0
5" thru 42"	¾”	1/8 “	0
48" and over	1”	1/8 “	0

B. Structures Bedding Material

Under 48" square or diameter	3/4"	1/8"	0
48" square or diameter and larger	1"	1/8"	0

C. Fill Material: Conform to the following:

1. Structural Areas: Well-graded sands and gravels; gravel sand mixtures; crushed, well-graded rock; little or no fines. Plasticity Index: Non-plastic. Gradation: Percent passing No. 200 5%.
2. Non-Structural Areas: Poorly graded gravels and sands; silty sands and gravels; little or no fines. Plasticity Index: Non-plastic to 12. Gradation: Percent passing NO. 200 12%.

D. For all utilities dedicated to the City of Fort Worth, the bedding and backfill requirements of the City shall apply to that utility work.

PART 3. - EXECUTION

3.1. PREPARATION

A. Establish line, grade and cuts to attain invert elevations shown on the drawings.

B. Establish the location and identify all existing utility lines, drainage and sewer lines at point of connection and all interference.

C. Examine the areas and conditions under which trenching, backfilling, and compaction will be performed and notify the Architect/Engineer in writing of conditions detrimental to the proper and timely completion of the work and request resolution.

3.2. EXCAVATING

A. Perform excavating in a manner that will provide the depth for installation at pipe or conduit plus allowance for the bedding material. Excavated trenches shall be cut wide enough to provide adequate working space to align and install pipe or conduit, make up and inspect joints and allow placing and compaction of bedding material.

B. Where trenches are excavated through existing paved areas the paving shall be saw-cut to a depth of 1-1/2 inches minimum on all sides of the excavation and the paving shall be removed along the saw-cut lines. When sawing would occur less than three feet from an existing pavement joint the paving shall be removed back to the existing pavement joint. Pavement shall be sawed and removed so that the opening is at least 12 inches wider than the top of the trench on each side to prevent undermining of pavement.

C. Over excavation shall be brought back to proper grade with bedding material compacted as specified herein for backfill.

D. When unsuitable soils are encountered during excavation that will not provide satisfactory

supportive strength, such soil shall be removed as directed by Architect/Engineer and placed in an off-site disposal area furnished by Contractor. This unsuitable soil shall be replaced with suitable soil and compacted to meet the density requirements hereinafter specified under "Backfilling".

E. Trench excavation shall include the removal of all earth, rock, concrete rubble or other materials encountered in performing the work.

F. Where bell and spigot pipe is used, bell holes shall be excavated to ensure uniform bedding under the pipe.

G. Excavating in Rock:

1. Rock is a natural solid mineral matter occurring in masses of one-half cubic yard or more that cannot be excavated and removed by the use of standard earth moving equipment.
2. Trenching in rock shall include the removal of all rock to attain the specified lines and grades. A tolerance of plus 0.1 feet and minus 0.5 feet will be allowed for new rock grades.
3. When rock excavations are carried below the specified elevations, or to a depth greater than directed by Architect/Engineer, the excavation shall be maintained and filled to meet the desired elevations. In trench excavations, the over excavation shall be filled with bedding material compacted as specified herein.
4. Explosives shall not be used in rock excavation.
5. All rock excavation shall be placed in an off-site disposal area furnished by Contractor.

H. Sheeting, Shoring and Bracing:

1. Provide sheeting, shoring, and bracing necessary to support earth banks, adjacent structures, services and utilities. Trenches shall be maintained in a safe condition at all times for the protection of all persons having access to the work. Sheeting shall not be withdrawn until the excavation is sufficient to prevent caving or damage to adjacent structures.

I. Dewatering:

1. Labor and equipment to maintain all excavations free from water during the progress of the work shall be provided until backfill is completed. Water shall be disposed of in a manner that will not cause ponding in the work area or hamper or damage in any way the work of other crafts. Do not contaminate existing sewer system with sediment or debris from Contractor's pumping operations. Clean all such deposits from sewer system upon completion of the work.

3.3. BEDDING

A. Bedding shall be accurately graded to provide uniform bearing and support for each section of pipe or conduit at every point along its length except where it is necessary to excavate for bells and the proper sealing of joints. Such bell holes and depressions shall be dug after the bedding has been placed and graded.
B. Unstable soil encountered at the bottom of pipe trenches shall be removed and replaced in accordance with this specification.
C. Initial pipe bedding shall be placed and compacted from at least 6" below bottom of pipe to the centerline of the pipe. Final pipe bedding shall be placed and compacted from centerline of pipe to at least 6" above top of pipe.

3.4. BACKFILLING

A. All excavations shall be filled or backfilled with suitable soil specified as rapidly as conditions will permit except that backfill or fill shall not be placed until work to be covered has been inspected and approved by Architect/ Engineer. Backfill or fill shall not be placed against frozen soils.

B. Backfill or fill placed against freestanding concrete or masonry walls shall not be placed until concrete or mortar has attained adequate strength or until adequate bracing has been installed to resist loads imposed by backfilling.

C. Suitable material that has been excavated from the trench or footing excavation may be used as backfill provided the compaction requirements are met. No large rock or stone larger than 1", or frozen material or trash or rubble of any kind shall be used in the backfill.

D. Contractor for his convenience may use imported material for fill as specified, the material not used from the excavation should be disposed of as directed by the Architect/Engineer.

E. Excavations in cohesive soils shall be backfilled with at least 12 inches of cohesive soil, placed so that the top of the cohesive soil backfill is (1) at the same elevation as the proposed grade for top of soil or (2) at the top of cohesive soil encountered in the excavation, whichever is lower.

F. When excavated material that is normally suitable for backfill absorbs excessive moisture, dry it to reduce the moisture content to acceptable limits or replace it with suitable material compacted as specified herein.

G. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and which are carried below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing. Concrete shall be in accordance with Section 03300.

H. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Architect/Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.

3.5. COMPACTION

A. All bedding, fill and backfill material shall be placed in layers not exceeding a compacted thickness of 6 inches and compacted as follows:

1. In non-structural areas materials shall be compacted to a minimum density of 90 percent of maximum compaction as determined by ASTM D-698.
2. In structural areas materials shall be compacted to a minimum density of 98 percent of maximum compaction as determined by ASTM D-698.

B. All compaction of bedding fill, and backfill in structural areas shall be done by hand or with mechanical tamping machines. Running the tires or treads of heavy equipment down the trench is not allowed.

C. Jetting or water soaking, as a method of backfill compaction, will not be allowed.

3.6 TESTING OF COMPACTION

A. Provide one test per 100 linear feet of trench per lift. Test locations shall be as directed by the Architect/Engineer. If test results in a failure to comply with compaction requirements Contractor shall re-compact entire lift the length of the excavation and provide additional tests per lift not to exceed five (5) as directed by the Architect/Engineer.

3.7 GRADING AND RESTORATION

A. Backfilled trenches shall be finish graded to the specified elevation or match existing elevations and restored to the condition satisfactory to Architect/Engineer.

END OF SECTION 31 23 33

SECTION 31 50 00
TRENCH SAFETY

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the basic requirements which the Contractor must comply with in order to assure the safety and health of workers in a trench.

B. The trench safety system shall be used for all trench excavation deeper than five (5) feet.

1.2 REGULATORY REQUIREMENTS

A. The Excavating and Trenching Operation Manual of the Occupational Safety and Health Administration, U.S. Department of Labor; Subpart P shall be the minimum governing requirement of this item and is hereby made a part of this specification.

1.3 SUBMITTALS

A. Submit shop drawings and calculations to the Owner's Representative for approval of the following methods of trench safety systems.

1. Deviation from the allowable angle of repose resulting in a steeper slope.
2. Trench shield method.
3. Deviation from the allowable trench shoring, sheeting, and bracing method.

PART 2 – NOT APPLICABLE

PART 3 -EXECUTION

3.1 METHODS

A. There are three acceptable methods of trench safety system.

1. Angle of Repose Method: If the wall or face of the excavation is sloped to preclude collapse, slope shall not be steeper than 1-foot vertical to 2-feet horizontal. Any deviation from this angle of repose ($26^{o}34'$) resulting in a steeper slope must be designed by a registered Professional Engineer and submitted to the Owner's Representative for approval. The angle of repose method of trench safety system will not be permitted in the following situations.
   a. Within an existing paved street.
   b. Adjacent to/or crossing existing structures, utilities, others.
2. Trench Shield Method: Where trench boxes or shields are used they shall be designed and certified by a Registered Professional Engineer and submitted to the Owner's Representative for approval. They shall be constructed and maintained in a manner which will provide protection equal to or greater than the sheeting or shorting required for the trench. In all cases if the top of the trench box is below the existing grade, that portion above the trench box is below the existing grade, that portion above the trench box shall be sloped back to the angle of repose of 1-foot vertical to 2-feet horizontal unless as specified in Part A above.
3. Trench Shoring, Sheeting, and Bracing Method: For depths greater than 5 feet all members shall be sized and spaced in accordance with the 15 to 20 feet deep all kinds or conditions of earth category in Table P-2 of OSHA Excavating and Trenching Operations Manual. Any deviation shall be designed by a registered Professional Engineer and furnished to the Owner for approval. All materials shall be of structural or construction grade.

END OF SECTION 31 50 00

SECTION 32 12 16

HOT MIXED ASPHALT PAVING

PART 1 - GENERAL

1.1 DESCRIPTION:

This work shall cover the composition, mixing, construction upon the prepared subgrade, and the protection of hot asphalt concrete pavement. The hot asphalt concrete pavement shall consist of an aggregate or asphalt base course and asphalt surface course constructed in conformity with the lines, grades, thickness, and cross sections as shown. Each course shall be constructed to the depth, section, or elevation required by the drawings and shall be rolled, finished, and approved before the placement of the next course.

1.2 RELATED WORK:

A. Laboratory and field testing requirements: Section 01 45 29, TESTING LABORATORY SERVICES.

B. Subgrade Preparation: Paragraph 3.3 and Section 31 20 11, EARTH MOVING.

C. Pavement Markings: Section 32 17 23, PAVEMENT MARKINGS.

1.3 INSPECTION OF PLANT AND EQUIPMENT:

A. The Engineer shall have access at all times to all parts of the material producing plants for checking the mixing operations and materials and the adequacy of the equipment in use.

1.4 ALIGNMENT AND GRADE CONTROL:

A. The Contractor’s Registered Professional Land Surveyor specified in Section 00 72 00, GENERAL CONDITIONS shall establish and control the pavement (aggregate or asphalt base course and asphalt surface course) alignments, grades, elevations, and cross sections as shown on the Drawings.

1.5 SUBMITTALS:

A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, furnish the following:

B. Data and Test Reports:

1. Aggregate Base Course: Sources, gradation, liquid limit, plasticity index, percentage of wear, and other tests required by State Highway Department.

2. Asphalt Base/Surface Course: Aggregate source, gradation, soundness loss, percentage of wear, and other tests required by State Highway Department.

3. Job-mix formula.

C. Certifications:

1. Asphalt prime and tack coat material certificate of conformance to State Highway Department requirements.

2. Asphalt cement certificate of conformance to State Highway Department requirements.

D. One copy of State Highway Department Specifications.

E. Provide MSDS (Material Safety Data Sheets) for all chemicals used on ground.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Aggregate base, Asphaltic base and asphalt concrete materials shall conform to the requirements of the following and other appropriate sections of the latest version of the State Highway Material Specifications, including amendments, addenda and errata. Where the term "Engineer" or "Commission" is referenced in the State Highway Specifications, it shall mean the Engineer or Owner.

2.2 AGGREGATES:

A. Provide aggregates consisting of crushed stone, gravel, sand, or other sound, durable mineral materials processed and blended, and naturally combined.

B. Coarse Aggregate: Sound, angular crushed stone, crushed gravel, or properly cured crushed blast furnace slag, complying with ASTM D 692_88.

C. Fine Aggregate: Sharp edged natural sand or sand prepared from stone, properly cured blast furnace slag, gravel, or combinations thereof, complying with ASTM D 1073.

D. Mineral Filler: Rock or slag dust, hydraulic cement, or other inert material complying with ASTM D 242.

2.3 ASPHALTS:

A. Comply with provisions of Asphalt Institute Specification SS2:

1. Asphalt cement: ASTM D 3381 for viscosity graded material; ASTM D 946 for penetration graded material

2. Prime coat: Cutback asphalt type, ASTM D 2027; MC_30, MC_70 or MC_250

3. Tack coat: Emulsified asphalt; ASTM D 977

2.4 SEALER:

A. Provide a sealer consisting of suitable fibrated chemical type asphalt base binders and fillers having a container consistency suitable for troweling after thorough stirring, and containing no clay or other deleterious substance.

B. Where conflicts arise between this specification and the requirements in the latest version of the State Highway Specifications, the State Specifications shall control.

PART 3 - EXECUTION

3.1 GENERAL:

The Asphalt Concrete Paving equipment, weather limitations, job-mix formula, mixing, construction methods, compaction, finishing, tolerance, and protection shall conform to the requirements of the appropriate sections of the State Highway Specifications for the type of material specified.

3.2 MIXING ASPHALTIC CONCRETE MATERIALS:

A. Provide hot plant-mixed asphaltic concrete paving materials.

1. Temperature leaving the plant: 290 degrees F minimum, 320 degrees F maximum.

2. Temperature at time of placing: 280 degrees F minimum.

3.3 SUBGRADE:

A. Shape to line and grade and compact with self-propelled rollers.

B. All depressions that develop under rolling shall be filled with acceptable material and the area re-rolled.

C. Soft areas shall be removed and filled with acceptable materials and the area re-rolled.

D. Should the subgrade become rutted or displaced prior to the placing of the subbase, it shall be reworked to bring to line and grade.

E. Proof-roll the subgrade with maximum 50 ton gross weight dump truck as directed by Engineer or Owner. If pumping, pushing, or other movement is observed, rework the area to provide a stable and compacted subgrade.

3.4 BASE COURSES:

A. Subbase (when required)

1. Spread and compact to the thickness shown on the drawings.

2. Rolling shall begin at the sides and continue toward the center and shall continue until there is no movement ahead of the roller.

3. After completion of the subbase rolling there shall be no hauling over the subbase other than the delivery of material for the top course.

B. Base

1. Spread and compact to the thickness shown on the drawings.

2. Rolling shall begin at the sides and continue toward the center and shall continue until there is no movement ahead of the roller.

3. After completion of the base rolling there shall be no hauling over the base other than the delivery of material for the top course.

C. Thickness tolerance: Provide the compacted thicknesses shown on the Drawings within

a tolerance of minus 0.0" to plus 0.5".

D. Smoothness tolerance: Provide the lines and grades shown on the Drawings within a tolerance of 3/16 inch in ten feet.

E. Moisture content: Use only the amount of moisture needed to achieve the specified compaction.

3.5 PLACEMENT OF ASPHALTIC CONCRETE PAVING:

A. Remove all loose materials from the compacted base.

B. Apply the specified prime coat, and tack coat where required, and allow to dry in accordance with the manufacturer's recommendations as approved by the Architect or Engineer.

C. Receipt of asphaltic concrete materials:

1. Do not accept material unless it is covered with a tarpaulin until unloaded, and unless the material has a temperature of not less than 280 degrees F.

2. Do not commence placement of asphaltic concrete materials when the atmospheric temperature is below 50 degrees F, not during fog, rain, or other unsuitable conditions.

D. Spreading:

1. Spread material in a manner that requires the least handling.

2. Where thickness of finished paving will be 3" or less, spread in one layer.

E. Rolling:

1. After the material has been spread to the proper depth, roll until the surface is hard, smooth, unyielding, and true to the thickness and elevations shown own the drawings.

2. Roll in at least two directions until no roller marks are visible.

3. Finished paving smoothness tolerance:

a. No depressions which will retain standing water.

b. No deviation greater than 1/8" in six feet.

3.6 APPLICATION OF SEAL COAT:

A. Prepare the surfaces, mix the seal coat material, and apply in accordance with the manufacturer's recommendations as approved by the Architect or Engineer.

B. Apply one coat of the specified sealer.

C. Achieve a finished surface seal which, when dry and thoroughly set, is smooth, tough, resilient, of uniform black color, and free from coarse textured areas, lap marks, ridges, and other surface irregularities.

3.7 PROTECTION:

Protect the asphaltic concrete paved areas from traffic until the sealer is set and cured and does not pick up under foot or wheeled traffic.

3.8 FINAL CLEAN-UP:

Remove all debris, rubbish, and excess material from the work area.

END OF SECTION 32 12 16

SECTION 32 13 13
CONCRETE PAVING & WALKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

A. Extent of Portland cement concrete paving is shown on drawings, including curbs, gutters, walkways, and pavement. Concrete pavement replacement is limited to areas where concrete pavement currently exists.

B. All concrete replacement for trench repairs shall be to neat saw cut lines.

C. All joints in pavement replacement shall align with existing joint line, including expansion joints, sawed joints and construction joints.

D. Compacted Subgrade is specified in "Earthwork" section.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Comply with local governing regulations if more stringent than herein specified.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Forms: Steel, wood, 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.
   1. Use flexible spring steel forms or laminated boards to form radius bends as required.

B. Coat forms with a nonstaining form release agent that will not discolor or deface surface of concrete.

C. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A 185.
   1. Furnish in flat sheets, not rolls, unless otherwise acceptable to Architect/Engineer.

D. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 60.

E. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

F. Expansion Joint Materials: Use preformed expansion joint fillers and sealers.

G. Antispalling Compound: Combination of boiled linseed oil and mineral spirits, complying with AASHTO M-233.

H. Liquid-Membrane Forming and Sealing Curing Compound: Comply with ASTM C 309, Type I, Class A unless other type acceptable to Architect/Engineer. Moisture loss no more than 0.055 gr./sq. cm. when applied at 200 sq. ft. / gal.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. "Masterseal"; Master Builders.
      b. "A-H 3 Way Sealer"; Anti-Hydro Waterproofing Co.
      c. "Ecocure"; Euclid Chemical Co.
      d. "Clear Seal"; A. C. Horn.
      e. "J-20 Acrylic Cure"; Dayton Superior.
      f. "Sure Cure"; Kaufman Products Inc.
      g. "AR -30" W.R. Meadows.
      h. "Spartan-Cote"; The Burke Co.
      i. "Sealkure"; Toch Div. - Carboline.
      j. "Kure-N-Seal"; Sonneborn-Contech.
      k. "Polyclear"; Upco Chemical/USM Corp.
      l. "L&M Cure"; L & M Construction Chemicals.
      m. "Klearseal"; Setcon Industries.
      n. "LR-152"; Protex Industries.
      o. "Hardtop"; Gifford - Hill.

2.2 CONCRETE MIX, DESIGN, AND TESTING

A. Comply with Standard Specifications of the Texas Department of Transportation - Highway Division for concrete mix design, sampling and testing, and quality control and as herein specified.

B. Design mix to produce normal-weight concrete consisting of Portland cement, aggregate, water-reducing or high-range water-reducing admixture (superplasticizer), air-entraining admixture, and water to produce the following properties:
   1. Compressive Strength: 3500 psi, minimum at 28 days, unless otherwise indicated for all concrete pavement, curbs and gutters; and 3000 psi minimum at 28 days for all sidewalks.
   2. Slump Limits: 8 inches minimum for concrete containing high- range water-reducing admixture (superplasticizer); 3 inches for other concrete.
   3. Air Content: 4 to 6 percent.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Remove loose material from compacted subgrade surface immediately before placing concrete.

B. Proof-roll prepared subgrade surface to check for unstable areas and need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

3.2 FORM CONSTRUCTION

A. Set forms to required grades and lines, braced and secured. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

B. Check completed formwork for grade and alignment to following tolerances:
   1. Top of forms not more than 1/8 inch in 10 feet.
   2. Vertical face on longitudinal axis, not more than 1/4 inch in 10 feet.

C. Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.

D. Slope step treads at 1/4 inch per foot to drain.

E. Slope sidewalks at 1/4 inch per foot in the direction of drainage.

3.3 REINFORCEMENT

A. Locate, place and support reinforcement as shown on the drawings, using standard materials for supporting reinforcing steel.

B. Concrete walks shall be doweled to the foundation at all entrances and where concrete walks are adjacent to the foundation, in accordance with the details shown on the drawings.

3.4 CONCRETE PLACEMENT

A. Do not place concrete until subgrade and forms have been checked for line and grade. Moisten subgrade if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

B. 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.

C. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

D. Deposit and spread concrete in a continuous operation between transverse joints as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

E. Curbs and Gutters: Automatic machine may be used for curb and gutter placement at Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results that meet or exceed minimums specified. Machine placement must produce curbs and gutters to required cross-section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.

3.5 JOINTS

A. General: Construct expansion, weakened-plane (contraction), and construction joints true to line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.

B. When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.

C. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into areas as shown on drawings. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:
   1. Sawed Joints: Form weakened-plane joints with powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.

D. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for more than 1/2 hour, except where such placements terminate at expansion joints.
   1. Construct joints as shown or, if not shown, use standard metal keyway-section forms.
   2. Where load transfer-slip dowel devices are used, install so that one end of each dowel bar is free to move.

E. Expansion Joints: Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks, and other fixed objects, unless otherwise indicated.
   1. Locate expansion joints at 60 feet o.c. for each pavement lane unless otherwise indicated.

F. Extend joint fillers full width and depth of joint, not less than 1/2 inch or more than 1 inch below finished surface where joint sealer is indicated. If no joint sealer, place top of joint filler flush with finished concrete surface.

G. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.

H. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

I. Fillers and Sealants: Comply with requirements of applicable Division 7 sections for preparation of joints, materials, installation, and performance.

3.6 CONCRETE FINISHING

A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

B. After floating, test surface for trueness with a 10-ft. straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

C. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

D. After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface as follows:
   1. Broom finish by drawing a fine-hair broom across concrete surface perpendicular to line of traffic. Repeat operation if required to provide a fine line.
   2. Burlap finish by dragging a seamless strip of damp burlap across concrete, perpendicular to line of traffic. Repeat operation to provide a gritty texture.

E. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Architect/Engineer.

3.7 CURING

A. Protect and cure finished concrete paving with membrane-forming curing and sealing compound or approved moist-curing methods.

3.8 REPAIRS AND PROTECTIONS

A. Repair or replace broken or defective concrete, as directed by Architect/Engineer.

B. Drill test cores where directed by Architect/Engineer when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just before final inspection.

END OF SECTION 32 13 13

SECTION 33 01 31
CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION – SANITARY SEWER

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Requirements and procedures for Closed Circuit Television (CCTV) Inspection of sanitary sewer.
B. Deviations from this Specification
   1. None.
C. Related Specification Sections include, but are not necessarily limited to:
   1. Section 33 03 10 – Bypass Pumping of Existing Sewer Systems

1.2 PRICE AND PAYMENT PROCEDURES

A. Pre-CCTV Inspection
   1. This work to be included as part of the Lump Sum Bid for the project. No separate payment will be made for CCTV inspection.
   2. Work shall include:
      a. Mobilization
      b. Cleaning
      c. Digital File
B. Post-CCTV Inspection
   1. This work to be included as part of the Lump Sum Bid for the project. No separate payment will be made for CCTV inspection.
   2. Work shall include:
      a. Mobilization
      b. Cleaning
      c. Digital File
C. Final- Manhole CCTV Inspection
   1. This work to be included as part of the Lump Sum Bid for the project. No separate payment will be made for CCTV inspection.
   2. Work shall include:
      a. Mobilization
      b. Cleaning
      c. Digital File

1.3 REFERENCES

A. Reference Standards
   1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification, unless a date is specifically cited.
   2. City of Fort Worth Water Department
   3. City of Fort Worth Water Department CCTV Inspection and Defect Coding Program (CCTV Manual). City of Fort Worth Water Department CCTV Inspection Log.
B. Definitions
   1. Pre-CCTV – CCTV Inspection performed by Contractor on existing mains prior to any line modification or replacement.
   2. Post CCTV – CCTV Inspection performed by Contractor following installation of new mains but before completion of other infrastructure (i.e., streets, sidewalks, final grading,

etc.)
3. Final CCTV – CCTV Inspection performed by Contractor on mains and manholes after all construction is complete. Includes CCTV of manholes (including grade rings, casting, etc.) after street construction, final grading, and manhole coating, if the coating is required.

C. Final Manhole CCTV – CCTV Inspection performed by Contractor on manholes and/or junction structures, after all construction is complete. Includes CCTV of the manholes/ (including grading rings, casting, etc.) after street construction, final grading and manhole coating, if coating is required.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination
   1. Sanitary Sewer Lines
      a. Meet with City of Fort Worth Water Department staff to confirm that the appropriate equipment, software, standard templates, defect codes and defect rankings are being used, if required.

B. Schedule
   1. Include Pre, Post, Final Manhole, and Final CCTV schedule as part of the Construction Progress Schedule per Section 01 32 16.
   2. Allow time for City review (2 week minimum – Notification needs to be sent out to Project Manager, City Inspector, & Field Operations). Post-CCTV can be scheduled and submitted for review after each sewer main construction has been completed.
   3. If CCTV is accepted by City Project Manager, proceed with work. If rejected, coordinate with City per Part 1.4 A.

1.5 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 00.

B. All CCTV submittals shall be submitted to the City Inspector to be uploaded to common location for review and comment by Water Operations and Inspections. Alternatively, the Inspector can provide Contractor access to upload directly to common location. Inspection and Water Operations staff shall be notified when CCTV upload is completed.

C. If inspected with Infrastructure Technologies IT Pipes Software per CCTV Manual provide video data per the CCTV Manual. Provide additional copy of video in video file MP4 with H.264 code – Advanced Video Coding and compression standard.

D. If inspected with other software provide video data in video file MP4 with H.264 code- Advanced Video Coding and compression standard.

E. Inspection Report shall include:
   1. Asset
      a. Date of Inspection
      b. City
      c. Project Name (Address accepted if project name does not exist)
      d. Main Number – as shown on drawings or GIS ID (if available)
      e. Upstream Manhole Station – as shown on drawings or GIS ID (if available)
      f. Downstream Manhole Station – as shown on drawings or GIS ID (if available)
      g. Pipe Diameter
      h. Material
      i. Pipe Length
      j. Mapsco Location Number
      k. Date Constructed
      l. Pipe Wall Thickness
      m. Grade Percentage
      n. Inspector Name

2. Inspection
    a. Inspection Number (i.e. 1st, 2nd, etc…)
    b. Crew Number
    c. Operator Name
    d. Operator Comments
    e. Reason for Inspection
    f. Equipment Number
    g. Camera Travel Direction is Upstream to Downstream – Deviation will require written justification, with the exception of stubouts & abandonment plugs that will always be recorded from the downstream side.
    h. Inspected Length (feet)
    i. Work Order Number (if required)
    j. City Project Number (if required)
    k. City Contract Name
    l. Consultant Company Name
    m. Consultant Contact Name
    n. Consultant Contact Phone Number
    o. Contractor Company Name
    p. Contractor Contact Name
    q. Contractor Contact Phone Number

F. CCTV overlay screen shall include (opening text to CCTV inspection)
    1. Date of inspection
    2. City Name
    3. City Project Number
    4. Project name
    5. Main number
    6. Upstream SS Manhole (or Plug) station
    7. Downstream SS Manhole station
    8. Diameter
    9. Grade/Slope
    10. Material
    11. Length
    12. Contractor
    13. Inspectors name
    14. Travel direction
    15. Date Constructed

1.6 INFORMATIONAL SUBMITTALS

A. Pre- and Post CCTV submittals
    1. CCTV video results shall be submitted to City that can be uploaded to shared common location by the inspection staff, upon confirmation that the submittal is complete (partial submissions are not accepted, except in special situations that are approved by the Water Department). For pre-CCTV submittals, approval of the submittal shall be provided by the Project Manager prior to construction start when connecting to existing sewer.
    2. Alternatively, the Inspector can provide Contractor access to upload directly to common location. Inspection and Water Operations staff shall be notified when CCTV upload is completed in order to confirm submittal is complete. Inspection Report (separate report file for each individual shall be submitted to Inspector or directly uploaded to shared common location.

B. Additional information that may be requested by the City:
    1. Listing of cleaning equipment and procedures

2. Listing of flow diversion procedures if required
3. Listing of CCTV equipment
4. Listing of backup and standby equipment
5. Listing of safety precautions and traffic control measures

1.7 CLOSEOUT SUBMITTALS

A. Final CCTV shall not be completed until all manholes and surface covers are set to final grade. All as built changes to plan and profile drawings (redlines), are required to be reflected on the final CCTV inspection information. Final CCTV shall not be completed until all as built corrections have been made.

1. Final CCTV submittals
   a. CCTV video results shall be submitted to City that can be uploaded to shared common location by the inspection staff, upon confirmation that the submittal is complete (partial submissions are not accepted, except in special situations that are approved by the Water Department). Alternatively, the Inspector can provide Contractor access to upload directly to common location. Inspection and Water Operations staff shall be notified when CCTV upload is completed in order to confirm submittal is complete. Sanitary sewer video file(s) in MP4 with H.264 code Advanced Video Coding and compression standard.
   b. City Project Number displayed within text of sanitary sewer video.
   c. Construction Plans identifying the line segments that were videoed. Include cover sheet, 1 digital copy of the redlines (Contractor to upload into Accela or BIM 360), overall line layout sheet(s), and plan and profile sheet(s).
      1) One (1) 11”X 17” copy
   d. Sanitary sewer line segment from drawings match line segments on Inspection Report. Recommend some minimum guidance for standardization of like segment submittals, to include proper identification of Project: name, CPN, line identification and stations, as well as format (e.g. PDF?) and minimum annotations required to explain deviations from policies as specified in this document, or any anomalies that are considered within tolerance.
   e. Inspection Report (separate report file for each individual shall be submitted to Inspector or directly uploaded to shared common location.
   f. Allow two (2) weeks to review before requesting final inspection. After review by the City Inspector and Water Field Operations, if applicable, a combined set of punch list items will be submitted to the Contractor for correction.

PART 2 – PRODUCTS

2.1 EQUIPMENT

A. Closed Circuit Television Camera
   1. The television camera used shall be one specifically designed and constructed for sewer inspection. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100 percent humidity/submerged conditions. The equipment will provide a view of the pipe ahead of the equipment and of features to the side of the equipment through turning and rotation of the lens. The camera shall be capable of tilting at right angles along the axis of the pipe while panning the camera lens through a full circle about the circumference of the pipe. The lights on the camera shall also be capable of panning 90-degrees to the axis of the pipe.
   2. The radial view camera must be solid state color and have remote control of the rotational lens. The camera shall be capable of viewing the complete circumference of the pipe and manhole structure, including the cone-section or corbel. The camera lens shall be an auto- iris type with remote controlled manual override.

B. Video Capture System
   1. The video and audio recording of the sewer inspections shall be made using digital video equipment. A video enhancer may be used in conjunction with, but not in lieu of, the required equipment. The digital recording equipment shall capture sewer inspection on USB drive, with each sewer segment (from upstream manhole to downstream manhole) inspection recorded as an individual file in MP4 with H.264 code format.
   2. The system shall be capable of printing pipeline inspection reports with captured images of defects or other related significant visual information on a standard color printer.
   3. The system shall store digitized color picture images and be saved in digital format on a USB drive.
   4. Camera footage, date and manhole numbers shall be maintained in real time and shall be displayed on the video monitor as well as the video character generators illuminated footage display at the control console.

PART 3 – EXECUTION

3.1 PREPARATION

A. General
   1. Prior to inspection obtain pipe and manhole asset identification numbers from the plans or City to be used during sections. Inspections performed using identification number other than the line number (or existing sanitary sewer main/lateral).
   2. CCTV Inspection shall not commence until the sewer section to be televised has been completely cleaned in conformance with Section 33 04 50.
   3. CCTV Inspection shall not commence until the sewer section to be televised has been completely cleaned in conformance with Section 33 04 50 (Sewer system should be connected to existing sewer system and should be active).
   4. A final CCTV Inspection of newly installed sewers (not yet in service) shall not commence until completion of the following items:
      a. Manhole final grade is set (after street paving, under Final CCTV, Final Manhole CCTV)
      b. Manhole lining is complete (after street paving, under Final CCTV, Final Manhole CCTV)
      c. Sewer main is cleaned
      d. Sewer air test is complete
      e. Vacuum test of manholes
      f. Installation of all lateral services and completion of low pressure testing of all new services
      g. All sewer main and manhole work is complete
   5. Once reviewed and accepted by Water Field Operations the sewer system should be connected to existing sewer system and ready for use upon final acceptance of the project.
   6. Temporary Bypass Pumping (if required) shall conform to Section 33 03 10.
B. General
   1. Use manual winches, power winches, TV cable, and power rewinds that do not obstruct the camera view, allowing for proper evaluation.
C. Pipe
   1. Begin inspection immediately after cleaning of the main.
   2. Move camera through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the main's condition.
   3. Do not move camera at speed greater than 30 feet per minute.
   4. During investigation, stop camera at each defect along the main.
   5. Record the nature, location and orientation of the defect or infiltration location as specified in the CCTV Manual.
   6. Service connection, Pan the Camera to get a complete overview of service connection

including zooming into service connection, include location (i.e. 1 o'clock, etc.).

7. Joint defects, include comment on condition signs of damage, etc… Note offset and/or separation at a joint. Includes joints where one pipe is not correctly aligned with the connecting section of pipe causing a lip that could impede flow or a section of pipe that is aligned but has pulled apart horizontally and may not connect to the other section of pipe.
8. Notate visible pipe defects such as cracks, broken or deformed pipe, holes, offset joints, obstructions, sags or debris (show as % of pipe diameter). If debris has been found in the pipe during the post or final-CCTV inspection, additional cleaning is required, and pipe shall be re-televised.
9. Notate Infiltration/Inflow locations.
10. Notate Pipe material transitions.
11. Notate other locations that do not appear to be typical for normal pipe conditions. For example, locations could include conflicts between the replaced main with other utilities (including paving and storm sewer), causing pipe deflections, sags, etc. holding water. This could also include any damage to the main and/or services after the main has been replaced. These locations could occur between the Post-CCTB and Final-CCTV submittals.
12. Note locations where camera is underwater and levels as a % of pipe diameter. Camera underwater – Point in which the camera lens is 100% submerged underwater and/or 50% of the pipe's diameter. Camera emerged – Point in which the lens has emerged from being underwater. Severity is described in ranges by linear feet. This would include pipe deflections causing a considerable increase (i.e. double or more) in the depth of flow in the pipe (to at least between 1/3 to1/2 of the pipe diameter). See attached example photos at the end of this Specification showing the depth changes in % full of pipe.
13. Provide accurate distance measurement.
    a. The meter device is to be accurate to the nearest 1/10 foot.
14. CCTV recording segments are to be single continuous file item.
    a. A single segment is defined from manhole to manhole.
    b. Only single segment video's will be accepted and preferable include manhole inspections (manhole to manhole).
    c. Individual manhole inspection will require written justification, include under the final-CCTV bid item.
15. Pre-Installation Inspection for Sewer Mains to be rehabilitated.
    a. Perform Pre-CCTV inspection immediately after cleaning of the main and before rehabilitation work.
        1) No cleaning equipment in the main during CCTV.
        2) Water shall be present (or flowing) while recording CCTV to confirm system functionality.
    b. If, during inspection, the CCTV will not pass through the entire section of main due to blockage or pipe defect, set up so the inspection can be performed from the opposite manhole.
    c. City Project Manager (PM) shall review and may consult with Sewer Projects Reporting and Operations (SPRO) and provide comments on identified defects. Contractor shall present proposed repair method(s) for approval by the City PM, before proceeding with construction.
    d. Provisions for repairing or replacing the impassable location are addressed in Section 33 31 20, Section 33 31 21, Section 33 31 22 and Section 33 31 23.
16. Post and Final Installation Inspection
    a. Prior to inserting the camera, flush and clean the main in accordance to Section 33 04 50. Water should be present/flowing during the recording operation, to demonstrate the functioning or the installed system.
17. Documentation of CCTV Inspection
    a. Sanitary Sewer Lines
        1) Follow the CCTV Manual (CCTV standard manual supplied by City upon request)

for the inspection video, data logging and reporting or Part 1.5 E of this section.

D. Manhole

1. Final Manhole CCTV Inspection recording segments, will reveal condition of manhole in its entirety, including corrosion protection if applicable. Camera should pan the entire manhole while lowering to include complete view of invert. This requirement applies to new manhole installations and rehabilitated manholes after epoxy lining installed, if applicable.
2. Notate Infiltration/Inflow locations for Pre-construction CCTV recordings.
3. Post-Installation CCTV Inspection is only done after all construction is complete.

END OF SECTION 33 01 31

SECTION 33 03 10
BYPASS PUMPING OF EXISTING SEWER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Bypass pumping of the existing sewer system, required on 18-inch and larger sewer lines unless otherwise specified in the Contract Documents

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
1. Measurement
a. Measurement for this Item will be by lump sum.
2. Payment
a. The work performed and materials furnished in accordance with this Item will be paid for at the lump sum price bid for “Bypass Pumping”.
3. The price bid shall include:
a. Mobilization
b. Development of bypass plans
c. Transportation and storage
d. Setup
e. Confined space entry
f. Plugging
g. Furnishing and installation of pumps
h. Clean up
i. Manhole restoration
j. Surface restoration

1.3 REFERENCES

A. Reference Standards
1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification, unless a date is specifically cited.
2. Occupational Safety and Health Organization (OSHA).

1.4 ADMINISTRATIVE REQUIREMENTS

1. Coordination Schedule meeting with Owner to review sewer shutdown prior to replacing or rehabilitating any facilities.
2. Owner reserves the right to delay schedule due to weather conditions, or other unexpected emergency within the sewer system.
3. Review bypass pumping arrangement or layout in the field with Owner prior to beginning operations. Facilitate preliminary bypass pumping run with Owner staff present to affirm the operation is satisfactory to the Owner.
4. After replacement or rehabilitation of facilities, coordinate the reestablishment of sewer flow with Owner staff.
5. Provide onsite continuous monitoring during all bypass pumping operations using one of the following methods:
a. Personnel on site

b. Portable SCADA equipment

1.5 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 00.

B. All submittals shall be approved by the Owner prior to delivery.

1.6 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS

A. For 18-inch and larger sewer lines, submit a detailed plan and description outlining all provisions and precautions that will be taken with regard to the handling of sewer flows. Submit the plan to the Owner for approval a minimum of 7 days prior to commencing work. Include the following details:

1. Schedule for installation and maintenance of the bypass pumping system
2. Staging areas for pumps
3. Pump sizes, capacity, number of each size, and power requirements
4. Calculations for static lift, friction losses, and velocity
5. Pump curves showing operating range and system head curves
6. Sewer plugging methods
7. Size, length, material, joint type, and method for installation of suction and discharge piping
8. Method of noise control for each pump and/or generator, if required
9. Standby power generator size and location
10. Suction and discharge piping plan
11. Emergency action plan identifying the measures taken in the event of a pump failure or sewer spill
12. Staffing plan for responding to alarm conditions identifying multiple contacts by name and phone numbers (office, mobile)
13. A contingency plan to implement in the event the replacement or rehabilitation has unexpected delays or problems

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Pumping

1. Provide equipment that will convey 100 percent of wet weather peak flow conditions.
2. Provide fully automatic self-priming pumps. Foot-valves or vacuum pumps are not permitted for priming the system.
3. Pumps must be constructed to allow dry running for periods of time to account for the cyclical nature of sewer flow.
4. Provide 1 stand-by pump for each size to be maintained on site. Place backup pumps on line, isolated from the primary system by valve.
5. If multiple pumps are required to meet the flow requirements, provide the necessary fittings and connections to incorporate multiple discharges.
6. Noise levels of the pumping system must follow the requirements of the City noise ordinance for gas wells.

B. Piping

1. Install pipes with joints which prevent the incident of flow spillage.

C. Plugs or Stop Logs
   1. Plugs
      a. Select a plug that is made for the size and potential pressure head that will be experienced.
      b. Provide an additional anchor, support or bracing to secure plug when back pressure is present.
      c. Use accurately calibrated air pressure gauges for monitoring the inflation pressure.
      d. Place inflation gauge at location outside of confined space area. Keep the inflation gauge and valve a safe distance from the plugs.
      e. Never over inflate the plug beyond its pressure rating.
   2. Stop Logs
      a. Use stop log devices designed for the manhole or sewer vault structure in use.
      b. If applicable, obtain stop logs from Owner that may be used on specific structures.

PART 3 - EXECUTION

3.1 PREPARATION

A. Locate the bypass pipelines in area to minimize disturbance to existing utilities and obtain approval of those locations from the City.

B. Make preparations to comply with OSHA requirements when working in the presence of sewer gases, oxygen-deficient atmospheres and confined spaces.

C. Do not begin bypass preparation and operation until Owner approval of the submittals requested per this Specification.

3.2 INSTALLATION

A. Install and operate pumping and piping equipment in accordance to the submittals provided per this Specification.

B. Sewer flow stoppage
   1. Plugging
      a. Use confined space procedures and equipment during installation when necessary.
      b. Thoroughly clean the pipe before insertion of the plug.
      c. Insert the plug seal surface completely so it is fully supported by the pipe.
      d. Position the plug where there are not sharp edges or protrusions that may damage the plug.
      e. Use pressure gauges for measuring inflation pressures.
      f. Minimize upstream pressure head before deflating and removing.

C. Sewer flow control and monitoring
   1. Take sufficient precautions to ensure sewer flow operations do not cause flooding or damage to public or private property. The Contractor is responsible for any damage resulting from bypass pumping operations.
   2. Begin continual monitoring of the sewer system as soon as the sewer is plugged or blocked. Be prepared to immediately start bypass pumping if needed due to surcharge conditions.
   3. Sewer discharge may be into another sewer manhole or appropriate vehicle or container only. Do not discharge sewer into an open environment such as an open channel or earthen holding facility.
   4. Do not construct bypass facilities where vehicular traffic may travel over the piping.

a. Provide details in the suction and discharge piping plan that accommodate both the bypass facilities and traffic without disrupting either service.

3.3 SITE QUALITY CONTROL

A. Site Tests and Inspections

1. Perform leakage and pressure tests of the bypass pumping pipe and equipment before actual operation begins. Have Owner staff on site during tests.

3.4 CLOSEOUT ACTIVITIES

A. Once plugging or blocking is no longer necessary, remove in such a way that permits the sewer flow to slowly return to normal – preventing surge, surcharging and major downstream disturbance.

END OF SECTION 33 03 10

SECTION 33 30 00
SANITARY SEWERS

PART 1 - GENERAL

1.1 SUMMARY:

A. Extent of outside utility work required by this section is indicated on Drawings and by requirements of this section. Types of systems specified in this section include:
   1. Gravity flow sanitary sewer system.
   2. Existing sanitary sewers shall remain in operation throughout the construction of the replacement sewer system. All buildings and facilities shall have sewer service. Contractor shall notify Project Manager when tie in to existing sewer services is planned. Tie ins shall be normally be accomplished during off hours for each building.

1.2 REFERENCES:

A. ASTM D 3033 - Type PSP Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.

B. ASTM D 3034 - Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.

C. ASTM F 477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

D. ASTM C 478 - Precast Reinforced Concrete Manhole Sections.

E. ASTM A 48 - Gray Iron Castings.

F. ASTM C 33 - Concrete Aggregates.

1.3 QUALITY ASSURANCE:

A. Conformance to applicable City of Fort Worth codes, ordinances and standards.

1.4 SUBMITTALS

A. Submit product data or pipe materials, pipe fittings, valves and accessories, manholes and accessories, under provisions of Division 1.

B. Shop drawings of precast concrete manholes or proposed built-in place manholes.

C. Submit Certificates as listed below to Architect/Engineer in accordance with Division 1.
   1. Certificate of Completion and Approval - Pipe Pressure and Leakage Tests.
   2. Certificate of Completion and Approval - Pipe Flushing and Purging.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver products to site under provisions of Division 1.

B. Store and protect products under provisions of Division 1.

1.6 FEES AND PERMITS:

A. Pay the cost of all fees including impact fee, permits or other charges as required in connection with the installation of the system.

1.7 COORDINATION:

A. Coordinate the work to assure that inverts and center- lines are properly set at point of connection to receive building piping.

B. Verify and coordinate the locations of all existing underground utilities by City of Fort Worth, utility companies or private utilities on the site prior to start of work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include but are not limited to the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cleanouts:
   a. Ancon, Inc.
   b. Josam Co.
   c. Smith (Jay R.) Mfg. Co.
   d. Wade Div.; Tyler Pipe.
   e. Zurn Industries, Inc.; Hydromechanics Div.
2. Underground Warning Tapes:
   a. Allen Systems, Inc.; Reef Industries, Inc.
   b. Brady (W.H.) Co.; Signmark Div.
   c. Calpico, Inc.
   d. Carlton Industries, Inc.
   e. EMED Co., Inc.
   f. Seton Name Plate Co.

2.2 SANITARY SEWER PIPE:

A. PVC Piping (4" and Greater): Pipe: ASTM D 3033 or D 3034, SDR 35. Fittings: PVC. Joints: ASTM F 477, elastomeric gaskets.

B. Couplings: Rubber or elastomeric sleeve and stainless steel band assembly fabricated to match outside diameters of pipes to be joined.

1. Sleeves: ASTM C 425, rubber for vitrified clay pipe; ASTM C 443, rubber for concrete pipe; ASTM C 564, rubber for cast-iron soil pipe; and ASTM F 477, elastomeric seal for plastic pipe. Sleeves for dissimilar or other pipe materials shall be compatible with pipe materials being joined.
2. Bands: Stainless steel, one at each pipe insert.

2.5 MANHOLES

A. Precast Concrete Manholes: ASTM C 478, precast reinforced concrete, of depth indicated with provision for rubber gasket joints.

1. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having a separate base slab or base section with integral floor.
2. Riser Sections: 4-inch minimum thickness; 48-inch diameter, and lengths to provide depth indicated.
3. Top Section: Eccentric cone type, unless concentric cone or flat-slab-top type is indicated. Top of cone to match grade rings. Top of cone shall be cast to accept 30” diameter manhole ring and cover to conform to City of Fort Worth standards.
4. Grade Rings: Provide 2 or 3 reinforced concrete rings, of 6 to 9 inches total thickness and match 24-inch diameter frame and cover.

5. Gaskets: ASTM C 443, rubber.
6. Steps: Cast into base, riser, and top sections sidewall at 12-to 16-inch intervals.
7. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
8. Channel and Bench: Concrete.

B. Cast-in-Place Manholes: Reinforced concrete of dimensions and with appurtenances indicated.
1. Bottom, Walls, and Top: Reinforced concrete.
2. Channel and Bench: Concrete.
3. Steps: Cast into sidewall at 12- to 16-inch intervals.

C. Concrete: Portland cement mix, 3000 psi.
1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

D. Reinforcement: Steel conforming to the following:
1. Fabric: ASTM A 185, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615, Grade 60, deformed.

E. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, heavy-duty, ductile iron, 30-inch inside diameter by 7- to 9-inch riser with 4-inch minimum width flange, and 32-inch-diameter cover, indented top design, with lettering "SANITARY SEWER" cast into cover.

2.6 CLEANOUTS

A. General: Provide cast-iron ferrule and countersunk brass cleanout plug, with round cast-iron access frame and heavy-duty, secured, scoriated cast-iron cover.

2.7 IDENTIFICATION

A. Metallic-Lined Plastic Underground Warning Tapes: Polyethylene plastic tape with metallic core, 6 inches wide by 4 mils thick, solid green in color with continuously printed caption in black letters "CAUTION - SEWER LINE BURIED BELOW."

PART 3 - EXECUTION

3.1 EXCAVATION AND BACKFILL

A. Pile excavated material suitable for backfill a sufficient distance away from the trench to prevent overloading, slides and cave-ins. Dispose of excavated materials not suitable for backfill.

3.2 PIPING GENERALLY

A. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of the underground sanitary sewerage system piping. Location and arrangement of piping layout take into account many design considerations. Install the piping as indicated, to the extent practical.

B. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.

C. Use manholes for changes in direction, except where a fitting is indicated. Use fittings for

branch connections, except where direct tap into existing sewer is indicated.

D. Use proper size increasers, reducers, and couplings, where different size or material of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.

E. Install piping pitched down in direction of flow, at minimum slope of 2 percent, except where indicated otherwise.

F. Extend sanitary sewerage system piping to connect to building sanitary drains, of sizes and in locations indicated.

G. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed, by tunneling, jacking, or a combination of both.

3.3 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. Join and install PVC pipe as follows:
   1. Pipe and gasketed fittings, joining with elastomeric seals in accordance with ASTM D 3212 and in accordance with manufacturer's recommendations.

3.4 SEWER PIPING:

A. Where the location of sanitary sewer pipe is not defined by dimension on the drawings, lay pipe no closer horizontally than 10 feet from water pipe.

B. Cement mortar joints will not be allowed for joining piping in lieu of specified rubber gaskets.

C. Bring cleanouts flush to finished grade and terminate with a brass screw plug having a countersunk head. Set flush in an 18" x 18" square x 6" thick concrete collar. Pour 1/4 yard concrete around main and cleanout riser.

D. Adjust cleanout covers flush with the finished grade or surface in which they occur.

3.5 LAMPING:

A. Each run of sewer shall be lamped to insure that the sewer has proper alignment and grade and that no section of pipe is collapsed.

3.6 WYE BRANCHES AND CONNECTION TO EXISTING SEWERS:

A. Commercially manufactured wye branches shall be installed where sewers connect existing sewers shown on the drawings or where directed, by the Architect/Engineer.

   1. Cutting into pipe for connections shall not be done except in special approved cases.
   2. Conditions where connecting pipe cannot be adequately supported on undisturbed earth or tamped backfill, the pipe shall be encased in concrete or supported on a concrete cradle as directed, by the Architect/Engineer.

3.7 CONNECTION TO EXISTING STRUCTURES:

A. Pipe connections to existing structures shall be made in such a manner that the finished work shall meet the essential requirements specified for new construction, including all necessary concrete work, cutting and shaping.
   1. Connections shall be centered on the structure.
   2. Holes for the new pipe shall be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1-1/2 times the dia. of the

pipe.

3. Cutting the structure shall be done in a manner that will cause the least damage to the walls.

3.8 TESTING

A. Sanitary Sewers

1. Hydrostatically test and make watertight at 5 feet head pressure. Retain for 4 hours. No allowable leakage. Repair all leaking joints and retest.

3.9 CLEAN-UP:

A. Upon completion of the installation of the outside utility lines, and appurtenances, all debris and surplus material resulting from the work shall be removed.

END OF SECTION 33 30 00

SECTION 33 31 15
HIGH DENSITY POLYETHYLENE (HDPE) PIPE FOR SANITARY SEWER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. High Density Polyethylene (HDPE) pipe 8-inch and larger for the use in sanitary sewer rehabilitation by pipe enlargement per Section 33 31 23

B. Related Specification Sections include, but are not necessarily limited to:
1. Section 33 01 31 – Closed Circuit Television (CCTV) Inspection
2. Section 31 23 33 –Excavation, Trenching and Backfilling for Utility Systems
3. Section 33 31 21 – Sanitary Sewer Pipe Enlargement
4. Section 33 31 50 – Sanitary Sewer Service Connections and Service Line

1.2 REFERENCES

A. Reference Standards
1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification, unless a date is specifically cited.
2. ASTM International (ASTM):
a. D3350, Standard Specification for Polyethylene Plastic Pipe and Fittings Materials.
b. F2620, Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.

1.3 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS

A. Product Data
1. Gravity pipe
2. Manufacturer
3. Nominal pipe diameter
4. Pressure Rating
5. Standard Dimension ratio (SDR)
6. Cell classification
7. Laying lengths

B. Certificates
1. Furnish an affidavit certifying that all HDPE gravity pipe meets the provisions of this Section and has been tested and meets the requirements of ASTM standards as listed herein.

1.4 QUALITY ASSURANCE

A. Qualifications
1. Manufacturers
a. Finished pipe shall be the product of 1 manufacturer for each size, unless otherwise specified by the Owner.
1) Change orders, specials and field changes may be provided by a

different manufacturer upon Owner approval.

b. Pipe manufacturing operations shall be performed under the control of the manufacturer.

c. All pipe furnished shall be in conformance with and ASTM D3350.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements

1. Pipe and fittings shall be transported, stored and handled in accordance with the manufacturer's guidelines.
2. Secure and maintain a location to store the material in accordance with Section 01 66 00.

PART 2 - PRODUCTS

2.1 EQUIPMENT, PRODUCT TYPES AND MATERIALS

A. Materials

1. Pipe and Fittings
   a. Material shall be minimum DR-17 Extra High Molecular Weight, High Density Polyethylene PE 3408, Cell Class PE345464D or E (inner wall shall be white or light in color) per ASTM D3350.
   b. Material shall be homogeneous throughout and free of:
      1) Abrasion, cutting or gouging of the outside surface extending to more than 10 percent of the wall thickness in depth
      2) Cracks
      3) Kinking (generally due to excessive or abrupt bending)
      4) Flattening
      5) Holes
      6) Blisters
      7) Other defects
   c. Pipe with gashes, nicks, abrasions or any such physical damage which may have occurred during storage and/or handling, which are larger/deeper than 10 percent of the wall thickness shall not be used and shall be removed from the construction site.
   d. Pipe and fittings shall be uniform in color, opacity, density and other physical properties.
      1) Pipe and fittings not meeting these criteria will be rejected.
   e. Pipe Markings
      1) Meet the minimum requirements of ASTM D3350.
      2) Minimum pipe markings shall be as follows:
         a) Marking intervals shall be at 6-inch intervals
         b) Manufacturer's Name or Trademark and production record
         c) Nominal pipe size
         d) ASTM or Standard Dimension Ratio (SDR) designation
         e) Cell classification
         f) Seal of testing agency that verified the suitability of the pipe
2. Connections
   a. Use only manufactured fittings.
   b. See Section 33 31 50.
3. Detectable Metallic Tape
   a. See Section 33 30 00.
4. Polyethylene Repair Clamp
   a. Smith-Blair Full Circle Clamp Style 228 or 263.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General
   1. Install pipe, fittings, specials and appurtenances as specified herein, and in accordance with the pipe manufacturer's recommendations.
   2. Lay pipe to the lines and grades as indicated in the Drawings.
   3. If applicable excavate and backfill trenches in accordance with Section 31 23 33.

B. Pipe Handling
   1. Haul and distribute pipe and fittings at the project site.
   2. Handle piping with care to avoid damage.
      a. Inspect each joint of pipe and reject or repair any damaged pipe prior to lowering into the trench.
      b. Use only nylon ropes, slings or other lifting devices that will not damage the surface of the pipe for handling the pipe.
   3. At the close of each operating day:
      a. Keep the pipe clean and free of debris, dirt, animals and trash – during and after the laying operation.
      b. Effectively seal the open end of the pipe using a gasketed night cap.

C. Pipe Joining
   a. Join pipe in accordance with ASTM F2620.
   b. Operators must be certified by the manufacturer to use the fusion equipment.
   c. Follow the time and temperature recommendations of the manufacturer.
   d. Joints shall be stronger than the pipe itself, be properly aligned and contain no gaps or voids.
   e. Remove bead projection on the outside of the pipe to reduce drag during pipe installation process.

D. Connection Installation
   1. See Section 33 31 50.

E. Detectable Metallic Tape Installation
   1. See Section 33 30 00.

3.2 SITE QUALITY CONTROL

A. Field Tests and Inspections
   1. Closed Circuit Television (CCTV) Inspection
      a. Provide a Post-CCTV inspection in accordance with Section 33 01 31.
   2. Hydrostatic Test
      a. Provide a Hydrostatic Test in accordance with Section 33 30 00.

END OF SECTION 33 31 15

SECTION 33 31 23
SANITARY SEWER PIPE ENLARGEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Requirements to rehabilitate existing sanitary sewers by the pipe enlargement system, herein called Pipe Bursting or Pipe Crushing (Pipe Bursting/Crushing)
      a. This system includes splitting or bursting the existing pipe to install a new polyethylene pipe and reconnect existing sewer service connections.

B. Deviations from this City of Fort Worth Standard Specification
   1. None.

C. Related Specification Sections include, but are not necessarily limited to:
   1. Division 0 — Bidding Requirements, Contract Forms, and Conditions of the Contract
   2. Division 1 — General Requirements
   3. Section 33 01 30 — Sewer and Manhole Testing
   4. Section 33 01 31 — Closed Circuit Television (CCTV) Inspection
   5. Section 33 03 10 — Bypass Pumping of Existing Sewer Systems
   6. Section 33 05 10 — Utility Trench Excavation, Embedment and Backfill
   7. Section 33 31 15 — High Density Polyethylene (HDPE) Pipe for Sanitary Sewer
   8. Section 33 31 50 — Sanitary Sewer Service Connections and Service Line

PRICE AND PAYMENT PROCEDURES

D. All work shall be included in the Lump Sum Bid price.

1.2 REFERENCES

A. Abbreviations and Acronyms
   1. HDPE — High Density Polyethylene
   2. CCTV — Closed Circuit Television

B. Definitions
   1. Pipe Bursting/Crushing
      a. The reconstruction of gravity sewer pipe by installing an approved pipe material by use of a static, hydraulic or pneumatic hammer “moling” device, suitably sized to break out the old pipe or by using a modified boring “knife” with a flared plug that implodes and crushes the existing sewer pipe.
      b. Forward progress of the "mole" or the "knife" may be aided by the use of hydraulic equipment or other apparatus.
      c. The replacement pipe is either pulled or pushed into the bore.
      d. The method allows for replacement of pipe sizes from 8-inches through 21-inches and/or upsizing in varying increments up to 21-inches.

C. Reference Standards
   1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification, unless a date is specifically cited.
   2. American Society for Testing and Materials (ASTM):
      a. D1248 Specifications for Polyethylene Plastic Molding and Extension Materials

b. D1693 Test for Environmental Stress-Cracking of Ethylene Plastics
c. D2122 Determining Dimensions of Thermoplastic Pipe and Fittings
d. D2837 Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials
e. D3350 Specification for Polyethylene Plastic Pipe and Fittings Materials
f. F714 Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter (3" IPS and Larger)

3. City of Fort Worth Code of Ordinances
   a. Part II, Chapter 23 Offenses and Miscellaneous Provisions, Section 8 Noise

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination
   1. Coordinate with City, Engineer, franchise utilities, etc. as described in the Drawings.
   2. Provide advanced notice prior to commencing actual pipe enlargement activities, as described in the Drawings, in order to allow the City to provide appropriate advanced notice to affected residents.
   3. Review the location and number of insertion or access pits with the City Inspector prior to excavation.

B. Sequencing
   1. Provide a bypass pumping plan, when required, detailing collection and discharge locations and method of bypass pumping in accordance with Section 33 0310, prior to the start of construction.
   2. Provide a phasing plan with the sequence of construction prior to the start of construction.

1.4 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 00.

B. All submittals shall be approved by the City prior to delivery.

1.5 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS

A. Special Procedure Submittals
   1. Provide a bypass pumping plan when required by Contract Documents in accordance with Section 33 03 10.
   2. Provide a phasing plan with the sequence of construction prior to the start of construction.

1.6 CLOSEOUT SUBMITTALS

A. Record Documentation
   1. Provide Closed Circuit Television inspection reports in accordance with Section 33 01 31.

1.7 MAINTENANCE MATERIAL SUBMITTALS [NOT USED]

1.8 QUALITY ASSURANCE

A. Qualifications
   1. The Contractor shall be certified by the particular Pipe Enlargement system manufacturer that such firm is a licensed installer of their system. No other Pipe Enlargement system other than those listed in these Specifications is acceptable.
   2. The Contractor shall be able to show that the personnel directly involved with the Pipe Enlargement have adequate experience with similar work.

B. Pre-construction and Post-construction Testing

1. Provide Pre-construction and Post-construction Closed Circuit Television (CCTV) Inspection of the pipeline to be replaced and/or enlarged in accordance with Section 33 01 31.

1.9 DELIVERY, STORAGE, AND HANDLING [NOT USED]

1.10 FIELD [SITE] CONDITIONS [NOT USED]

1.11 WARRANTY [NOT USED]

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED [OR] OWNER-SUPPLIED PRODUCTS [NOT USED]

2.2 EQUIPMENT, PRODUCT TYPES, MATERIALS

A. Manufacturers

1. Only the manufacturers as listed on the City's Standard Products List will be considered as shown in Section 01 60 00.

a. The manufacturer must comply with this Specification and related Sections.

1. Any product that is not listed on the Standard Products List is considered a substitution and shall be submitted in accordance with Section 01 25 00.

B. Materials

1. HDPE Pipe
   a. The pipe and fitting material shall conform to Section 33 31 15.
2. Service Saddles
   a. Conform to Section 33 31 50.
3. Repair Clamp
   a. Conform to Section 33 31 15.
4. Manhole Inverts and Benches
   a. Inverts and benches requiring replacement shall conform to Section 33 39 10.

2.3 ACCESSORIES [NOT USED]

2.4 SOURCE QUALITY CONTROL [NOT USED]

PART 3 - EXECUTION

3.1 INSTALLERS [NOT USED]

3.2 EXAMINATION

A. Verification of Conditions

1. Provide Pre-Construction Closed Circuit Television (CCTV) Inspection of the pipeline to be replaced/enlarged in conformance with Section 33 01 31.
   a. Inspection of the pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by Closed Circuit Color Television.

B. Evaluation and Assessment

1. Identify, by location, the presence of line obstructions in the existing sewer (heavy solids, dropped joints, protruding service taps or collapsed pipe) which will prevent completion of the pipe bursting/crushing process and which cannot be removed by conventional sewer cleaning equipment.
2. Identify, by location, the presence of sags in the sewer line(s) by the following

procedure:
a. Perform CCTV inspection.
b. Provide CCTV inspection results to the City.
c. The City Inspector will review the Pre-CCTV tapes to determine if any excessive sags exist and will inform the Contractor which segments of pipe are to be replaced by point repair.

3.3 PREPARATION

A. Bypassing Sewage
1. Bypass pump sewage in accordance with Section 33 03 10.

B. Line Obstructions

a. If identified in the CCTV inspection, remove line obstruction.Removal of obstruction is considered subsidiary to CCTV inspection.

C. Point Repairs
1. Perform point repair as identified on the Drawings or at the discretion of the City. This may include:
1) Pipe replacement
2) Digging a sag elimination pit and bringing the bottom of the pipe trench to a uniform grade in line with the existing pipe invert

3.4 INSTALLATION

A. Site Organization
1. Locate insertion or access pits such that their total number will be minimized and the length of replacement pipe installed in a single pull shall be maximized.
2. Use existing manholes wherever practical.
a. Manhole inverts and bottoms may be removed to permit access for installation equipment.
3. Locate equipment used to perform the work away from buildings so as not to create a noise impact. Conform to City of Fort Worth Code of Ordinances, Part II, Section 23-8.
a. Provide silencers or other devices to reduce machine noise as needed to meet requirements.

B. Schedule
1. Upon commencement of the actual pipe enlargement, do not begin a segment of work that cannot be completed before the end of the work day.

C. Finished Pipe
1. The installed replacement pipe shall be continuous over the entire length of each pipe segment from manhole to manhole and shall be free from visual defects such as foreign inclusions, concentrated ridges, discoloration, pitting, varying wall thickness, pipe separation and other deformities.
2. Carefully cut out the replacement pipe passing through or terminating in a manhole in a shape and manner approved by the Engineer.
3. Streamline and improve the manhole invert and benches to ensure smooth flow.
4. The installed pipe shall meet the leakage requirements of the pressure test specified herein.

D. Pipe Jointing
1. Assemble and join sections of HDPE replacement pipe on the job site above ground.
2. Use the heating and butt-fusion system for jointing in strict conformance with the manufacturer's printed instructions and in accordance to Section 33 31 15.

3. Ensure that the butt-fusion joints have a smooth, uniform, double rolled back bead made while applying the proper melt, pressure and alignment.
4. It shall be the sole responsibility of the Contractor to provide an acceptable butt-fusion joint.
5. Make all joints available for inspection by the Engineer before insertion.
6. Join the replacement pipe on site in appropriate working lengths near the insertion pit.
    a. The maximum length of continuous replacement pipe which shall be assembled above ground and pulled on the job site at any 1 time shall be 600 linear feet.
7. For situations where the replacement pipe is not pulled all the way to the manhole, a repair clamp shall be utilized to connect segments of the HDPE pipe, as approved by the Engineer.

E. New Pipe Installation
    1. Install new pipe in accordance with the manufacturer's recommendations.

F. Anchoring New Pipe and Sealing Manholes
    1. After the new pipe has been installed in the entire length of the sewer section, anchor the pipe at manholes.
        a. The new pipe shall protrude in the manholes for enough distance to allow sealing and trimming (but not less than 4 inches).
    2. Wait a minimum of 10 hours after installation before sealing the new pipe at manholes.
    3. Provide a flexible gasket connector in the manhole wall at the end of the new pipe, centered in the existing manhole wall.
    4. Grout flexible connector in the manhole, filling all voids the full thickness of the manhole wall.
    5. Restore manhole bottom and invert.

G. Sewer Service Connections
    1. Install service connections in accordance with Section 33 31 50.

H. Rescue
    1. The cost for rescue of static, hydraulic or pneumatic hammer "moling" devices or modified boring "knives" that become stuck or excessively buried and require additional excavation to retrieve shall be the sole responsibility of the Contractor.

I. Surface Restoration
    1. Any damage caused to paving structures or any other surface fracture resulting from the pipe enlargement shall be repaired or replaced to the same condition, or better, at the expense of the Contractor.

3.5 REPAIR /RESTORATION [NOT USED]

3.6 RE-INSTALLATION [NOT USED]

3.7 FIELO [OR] SITE QUALITY CONTROL

A. Post-Construction Closed Circuit Television (CCTV) Inspection
    1. Video Inspection
        a. Conduct a Post-Construction CCTV Inspection in accordance with Section 33 01 31. SYSTEM STARTUP [NOT USED]

3.8 ADJUSTING [NOT USED]

3.9 CLEANING [NOT USED]

3.10 CLOSEOUT ACTIVITIES [NOT USED]

3.11 PROTECTION [NOT USED]

3.12 MAINTENANCE [NOT USED]

3.13 ATTACHMENTS [NOT USED]

END OF SECTION 33 31 23

REVISION LOG		
DATE	NAME	SUMMARY OF CHANGE

SECTION 33 31 50
SANITARY SEWER SERVICE CONNECTIONS AND SERVICE LINE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Sanitary sewer service connection, service line and 2-way cleanout from the main to the right-of-way, as shown on the Drawings, directed by the Engineer and specified herein for:
a. New Service
b. Private Service Relocation
c. Service Reinstatement

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment .
1. All work shall be included in the Lump Sum Bid Price.

B. Definitions
1. New Service
a. New service applies to the installation of a service with connection to a new or existing sewer main.
b. The service materials would include service line, fittings and cleanout.
2. Private Service Relocation
a. Private service relocation applies to the replacement of the existing sewer service line on private property typically associated with the relocation of the existing main.
b. Typical main relocation will be from a rear lot easement or alley to the street.
3. Service Reinstatement
a. Service reinstatement applies to the reconnection of an existing service to an existing main that has been rehabilitated by trenchless methods such as pipe enlargement (pipe bursting), slip lining or CIPP.

C. Reference Standards
1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification, unless a date is specifically cited.
2. ASTM International (ASTM):
a. ASTM D3034 Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
b. ASTM D1785 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120.
c. ASTM D2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
d. ASTM D2412 Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
e. ASTM D3212 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
3. Texas Commission on Environmental Quality
a. Title 30, Part I, Chapter 217, Subchapter C, Rule 217.54 – Criteria for Laying Pipe and Rule
b. Title 30, Part I, Chapter 217, Subchapter C, 217.55 – Manholes and Related Structures

1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling
   1. Provide advance notice for service interruption to Tarrant County site personnel.

1.4 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 00.

B. All submittals shall be approved by the Owner prior to delivery.

1.5 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS

A. Product data shall include, if applicable:
   1. Tee connection or saddle
   2. Fittings (including type of cleanout)
   3. Service line

B. Certificates
   1. Furnish an affidavit certifying that service line and fittings meet the provisions of this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements
   1. Gravity pipe shall be stored and handled in accordance with the manufacturer's guidelines.
   2. Protect all parts such that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.
   3. Protect all equipment and parts against any damage during a prolonged period at the site.
   4. Prevent plastic and similar brittle items from being directly exposed to sunlight or extremes in temperature.
   5. Secure and maintain a location to store the material in accordance with Section 01 66 00.

PART 2 - PRODUCTS

2.1 EQUIPMENT, PRODUCT TYPES, MATERIALS

A. Manufacturers
   1. The services and appurtenances shall be new and the product of a manufacturer regularly engaged in the manufacturing of services and appurtenances having similar service and size.

B. Materials/Design Criteria
   1. Service Line and Fittings (including tee connections)
      a. PVC pipe and fittings on public property shall be in accordance with Section 33 31 20.
      b. PVC pipe and fittings on private property shall be Schedule 40 in accordance with ASTM D1785.
      c. Ductile iron pipe and fittings shall be coated with ceramic epoxy in accordance with Section 33 11 10 and Section 33 11 11.
   2. Service saddle
      a. Service saddles shall only be allowed when connecting a new service to an existing sanitary sewer main and shall:

1) Be a 1-piece prefabricated saddle, either polyethylene or PVC, with neoprene gasket for seal against main
2) Use saddle to fit outside diameter of main
3) Use saddle with grooves to retain band clamps
4) Use at least 2 stainless steel band clamps for securing saddles to the main

b. Inserta tees service connections may not be used.

3. Cleanout
   a. Cleanout stack material should be in accordance with Standard Details or as shown on Drawings.
   b. For paved areas, provide a cast iron cleanout and cast-iron lid.
   c. For unpaved areas, provide PVC cleanout and polyethylene lid.
4. Coupling
   a. For connections between new PVC pipe stub out and existing service line, use rubber sleeve couplings with stainless steel double-band repair sleeves to connect to the line.

PART 3 - EXECUTION

3.1 INSTALLERS

A. A licensed plumber is required for installations of the service line on private property.

3.2 INSTALLATION

A. General
   1. Install service line, fittings and cleanout as specified herein, as specified in Section 33 05 10 and in accordance with the pipe manufacturer's recommendations.

B. Handling
   1. Haul and distribute service lines, fittings and cleanouts at the project site and handle with care to avoid damage.
      a. Inspect each segment of service line and reject or repair any damaged pipe prior to lowering into the trench.
   2. Do not handle the pipe in such a way that will damage the pipe.

C. Service Line
   1. Lay service line at a minimum grade of 2 percent, or at lines and grades as indicated in the Drawings.
   2. If service line is installed by bore as an alternative to open cut, the cost associated with open cut installation, such as pavement removal, trenching, embedment and backfill and pavement patch will not be included as part of the bore installation.
   3. Excavate and backfill trenches in accordance with 33 05 10.
   4. Embed PVC Pipe in accordance with 33 05 10.

D. Cleanout
   1. Install out of traffic areas such as driveways, streets and sidewalks whenever possible.
      a. When not possible, install cast iron cleanout stack and cap.
   2. Install 2-way cleanout in non-paved areas in accordance with Standard Details.
   3. Install 2-way cleanout in paved areas in accordance with Standard Details.

E. Service line connection to main
   1. New service on new or replacement main
      a. Determine location of service connections before main installation so the service fittings can be installed during main installation.
      b. Connect service line to main with a molded or fabricated tee fitting.

2. Reconnection to main after pipe enlargement
    a. Tapping the existing main and installing a strap on tee connection may be used.
    b. Allow the new main to recover from imposed stretch before tapping and service installation.
        1) Follow manufacturer's recommendation for the length of time needed.
    c. Tap main at 45 degree angle to horizontal when possible.
        1) Avoid tapping the top of main.
    d. Extend service line from main to property line or easement line before connecting to the existing service line.
3. New service on existing main
    a. Connect service line to main with a molded or fabricated tee fitting if possible.
    b. Tapping the existing main and installing a strap on tee connection may be used.

F. Private Service Relocation

1. Requirements for the relocation of service line on private property
    a. A licensed plumber must be used to install service line on private property.
    b. Obtain permit from the Development Department for work on private property.
    c. Pay for any inspection or permit fees associated with work on private property.
    d. Verify (by Exploratory Excavation of Existing Utilities) the elevations at the building cleanout and compare to data on the Drawings before beginning service installation.
    e. Submit elevation information to the City inspector.
    f. Verify that the 2 percent slope installation requirement can be met.
        1) If the 2 percent slope cannot be met, verify with the Engineer that line may be installed at the lesser slope.

3.3 RE-INSTALLATION

A. Service Relocation

1. All relocations that are not installed as designed or fail to meet the City code shall be reinstalled at the Contractor's expense.

3.4 FIELD QUALITY CONTROL

A. Inspections

1. Private property service line requires approval by the City plumbing inspector before final acceptance.

END OF SECTION 31 31 50