

**SECTION 02500  
GRAVITY SANITARY SEWERS**

**PART I: GENERAL**

**1.1 GENERAL REQUIREMENTS**

- A. Gravity sanitary sewers and appurtenances, including stacks and service connections.
- B. All connections to existing manholes shall be cored, no exceptions. Resilient connectors shall be supplied and used for all connections to manholes, new or existing.

**1.2 MEASUREMENT AND PAYMENT**

- A. Unit Prices:
  - 1. Payment for gravity sanitary sewers by open-cut or within Potentially Petroleum Contaminated Area (PPCA) is on a linear foot basis, complete in place, including sewer pipe, connections to existing manholes, post-installation television inspection and testing. Measurement shall be taken along centerline of pipe from centerline to centerline of manholes.
  - 2. Payment for television inspection of existing gravity sanitary sewer shall be on a linear foot basis. Measurement shall be taken along centerline of pipe from centerline to centerline of manholes. See Section 02520 – Television Inspection of Sanitary Sewer Lines.
  - 3. Refer to Section 01270 – Measurement and Payment for unit price procedures.
- B. Stipulated Price (Lump Sum):
  - 1. If Contract is Stipulated Price Contract, payment for work in this Section is included in Total Stipulated Price.

**1.3 SUBMITTALS**

- A. Conform to requirements of Section 01330 – Submittal Procedures.
- B. Submit proposed methods, equipment, materials and sequence of operations for sanitary sewer construction. Plan operations to minimize disruption of utilities to occupied facilities or adjacent property.
- C. Test Reports: Submit test reports and inspection videos as specified in Part III of this Section. DVD's become property of the City.

**1.4 QUALITY ASSURANCE**

- A. Qualifications: Install sanitary sewer that is watertight both in pipe-to-pipe joints and in pipe-to-manhole connections. Perform testing in accordance with Section 02525 – Acceptance Testing for Gravity Sanitary Sewers Lines.
- B. Regulatory Requirements.

1. Install sanitary sewer lines to meet minimum separation distance from potable water line, as scheduled below. Separation distance is defined as the distance between outside of water pipe and outside of sanitary sewer pipe. When possible, install new sanitary sewers no closer to water lines than nine feet (9 Ft) in all directions. Where this separation distance cannot be achieved, new sanitary sewers shall be installed as specified in this Section.
2. Make notification to the Project Manager when water lines are uncovered during sanitary sewer installation where the minimum separation distance cannot be maintained. The Project Manager shall prescribe the method to protect water lines from sanitary sewer lines.
3. Lay gravity sewer lines in straight alignment and grade.

#### 1.5 PRODUCT DELIVERY, STORAGE and HANDLING

- A. Inspect pipe and fittings upon arrival of materials at job site.
- B. Handle and store pipe materials and fittings to protect them from damage due to impact, shock, shear or free fall. Do not drag pipe and fittings along ground. Do not roll pipe unrestrained from delivery trucks.
- C. Use mechanical means to move or handle pipe. Employ acceptable clamps, rope or slings around outside barrel of pipe and fittings. Do not use hooks, bars or other devices in contact with interior surface of pipe to lift or move lined pipe.

#### 1.6 REFERENCES

- A. CTFS – City of Friendswood Technical Specifications.

## PART II: PRODUCTS

### 2.1 PIPE

- A. Provide piping materials for gravity sanitary sewers of sizes and types indicated on the Drawings or as specified.
- B. Unlined reinforced concrete pipe shall not be used for gravity sanitary sewer.

### 2.2 PIPE MATERIAL SCHEDULE

- A. Unless otherwise shown on the Drawings, use pipe materials that conform to requirements specified in one (1) or more of following Sections:
  1. Section 02215 – Ductile Iron Pipe (DIP) and Fittings.
  2. Section 02220 – High Density Polyethylene Pipe (HDPE).
  3. Section 02235 – Polyvinyl Chloride Pipe (PVC).
- B. Where shown on the Drawings, provide pipe meeting minimum class, dimension ratio or other criteria indicated.
- C. Pipe materials other than those listed above shall not be used for gravity

**02500-2**

sanitary sewers.

### 2.3 APPURTENANCES

- A. Stacks: Conform to requirements of Section 02505 – Sanitary Sewer Service Stub-outs or Reconnections.
- B. Service Connections: Conform to requirements of Section 02505 – Sanitary Sewer Service Stub-outs or Reconnections.
- C. Roof, street or other type of surface water drains shall not be connected or reconnected into sanitary sewer lines.

### 2.4 BEDDING, BACKFILL and TOPSOIL MATERIAL

- A. Bedding and Backfill: Conform to requirements of Section 02125 – Excavation and Backfill for Utilities, Section 02140 – Utility Backfill Materials and Section 02145 – Cement-Stabilized Sand.
- B. Topsoil: Conform to requirements of Section 02905 – Topsoil.

## PART III: EXECUTION

### 3.1 PREPARATION

- A. Prepare traffic control plans and set up street detours and barricades in preparation for excavation when construction shall affect traffic. Conform to requirements of Section 01555 – Traffic Control and Regulation.
- B. Provide barricades, flashing warning lights and warning signs for excavations. Conform to requirements of Section 01555 – Traffic Control and Regulation. Maintain barricades and warning lights where work is in progress or where traffic is affected by work.
- C. Perform the Work in accordance with OSHA standards. Employ trench safety system as specified in Section 02280 – Trench Safety System for excavations over five feet (5 Ft) deep.
- D. Immediately notify agency or company owning any utility line which is damaged, broken or disturbed. Obtain approval from the Project Manager and agency or utility company for repairs or relocations, either temporary or permanent.
- E. Remove old pavements and structures including sidewalks and driveways in accordance with requirements of Section 02105 – Removing Existing Pavements and Structures.
- F. Install and operate dewatering and surface water control measures in accordance with Section 01585 – Control of Ground and Surface Water.
- G. Do not allow sand, debris or runoff to enter sanitary sewer system.

### 3.2 DIVERSION PUMPING

- A. Install and operate required bulkheads, plugs, piping and diversion pumping equipment to maintain sewage flow and to prevent backup or overflow. Obtain approval for diversion pumping equipment and procedures from the Project Manager.

**02500-3**

- B. Design piping, joints and accessories to withstand twice the maximum system pressure or fifty pounds per square inch (50 psi), whichever is greater.
- C. No sewage shall be diverted into area outside of sanitary sewer.
- D. In event of accidental spill or overflow, immediately stop overflow and take action to clean up and disinfect spillage. Promptly notify the Project Manager so that required reporting can be made to Texas Commission on Environmental Quality (TCEQ) by the Project Manager or the City.

### 3.3 EXCAVATION

- A. Earthwork: Conform to requirements of Section 02125 – Excavation and Backfill for Utilities. Use bedding as indicated on the Drawings.
- B. Line and Grade: Establish required uniform line and grade in trench from benchmarks identified by the Project Manager. Maintain this control for minimum of one hundred feet (100 Ft) behind and ahead of pipe-laying operation. Use laser beam equipment to establish and maintain proper line and grade of the Work. Use of appropriately sized grade boards which are substantially supported is also acceptable. Protect boards and location stakes from damage or dislocation.
- C. Trench Excavation: Excavate pipe trenches to depths shown on the Drawings and as specified in Section 02125 – Excavation and Backfill for Utilities.

### 3.4 PIPE INSTALLATION BY OPEN CUT

- A. Install pipe in accordance with pipe manufacturer's recommendations and as specified in following paragraphs.
- B. Install pipe only after excavation is completed, bottom of trench fine graded, bedding material is installed and trench has been approved by the Project Manager.
- C. Install pipe to line and grade indicated. Place pipe so that it has continuous bearing of barrel on bedding material and is laid in trench so interior surfaces of pipe follow grades and alignment indicated. Provide bell holes where necessary.
- D. Install pipe with spigot ends toward the downstream end of flow such that water flows out of the spigot and into the bell.
- E. Form concentric joint with each section of adjoining pipe so as to prevent offsets.
- F. Keep interior of pipe clean as installation progresses. Remove foreign material and debris from pipe.
- G. Provide lubricant, place and drive home newly laid sections of pipe with come-along winches so as to eliminate damage to pipe. Install pipe to "home" mark where provided. Use of backhoes or similar powered equipment shall not be allowed unless protective measures are provided and approved in advance by the Project Manager.
- H. Keep excavations free of water during construction and until final inspection.

- I. When the Work is not in progress, cover exposed ends of pipes with approved plug to prevent foreign material from entering pipe.
- J. Where gravity sanitary sewer is to be installed under existing water line with separation distance of at least two feet (2 Ft) and less than nine feet (9 Ft), install new sanitary sewer pipe so that one (1) full eighteen foot (18 Ft) long pipe is centered on water line crossing. Embed sanitary sewer pipe in cement stabilized sand for minimum distance of nine feet (9 Ft) on each side of crossing.
- K. Where gravity sanitary sewer is to be installed under existing water line with separation distance of less than two feet (2 Ft), install new sanitary sewer using pressure-rated pipe as shown on the Drawings. Maintain minimum six inch (6 In) separation distance. Embed sanitary sewer pipe in cement stabilized sand for minimum distance of nine feet (9 Ft) on each side of crossing.
- L. Where the length of a stub-out is not indicated, install the stub-out to the right-of-way line and seal the free end with an approved plug. If stub-out is perpendicular to the right-of-way line then install pipe to the right-of-way-line.
- M. At no time shall any pipe be dropped into the trench or from a height great than twelve inches (12 In). Should a pipe be dropped as noted, the pipe shall be removed and marked with an "X" as defective.

### 3.5 PIPE INSTALLATION OTHER THAN OPEN CUT

- A. For installation of pipe by augering, jacking or tunneling, conform to requirements of specification sections on tunneling augering, jacking and microtunneling work as appropriate.

### 3.6 INSTALLATION OF APPURTENANCES

- A. Service Connections: Install service connections to conform to requirements of Section 2505 – Sanitary Sewer Service Stub-outs or Reconnections.
- B. Stacks: Construct stacks to conform to requirements of 02505 – Sanitary Sewer Service Stub-outs or Reconnections.
- C. Construct sanitary sewer manholes to conform to requirements of Section 02300 – Cast-in-Place Concrete Manholes and Section 02305 – Precast Concrete Manholes, as applicable. Install frames, rings and covers to conform to requirements of Section 02315 – Frames, Grates, Rings and Covers.

### 3.7 INSPECTION AND TESTING

- A. Visual Inspection: Check pipe alignment in accordance with Section 02525 – Acceptance Testing for Gravity Sanitary Sewer Lines.
- B. Mandrel Testing: Use Mandrel Test to test flexible pipe for deflection. Refer to Section 02525 – Acceptance Testing for Gravity Sanitary Sewer Lines.
- C. Pipe Leakage Test: After backfilling line segment and prior to tie-in of

service connections, visually inspect gravity sanitary sewers where feasible and test for leakage in accordance with Section 02525 – Acceptance Testing for Gravity Sanitary Sewer Lines. Maintain piezometer installed to conform with Section 01585 – Control of Ground and Surface Water, until acceptance testing is completed.

**3.8 BACKFILL AND SITE CLEANUP**

- A. Backfill and compact soil in accordance with Section 02125 – Excavation and Backfill for Utilities.
- B. Backfill trench in specified lifts only after pipe installation is approved by the Project Manager.
- C. Repair and replace removed or damaged pavement, curbs, gutters and sidewalks as specified in Section 02845 – Pavement Repair and Resurfacing.
- D. Provide hydromulch seeding in areas of commercial, industrial or undeveloped land use over surface of ground disturbed during construction and not paved or not designated to be paved. Grade surface at uniform slope to natural grade as indicated on the Drawings. Provide minimum of four inches (4 In) of topsoil as specified in Section 02905 – Topsoil and apply hydromulch according to requirements of Section 02910 – Hydromulch Seeding.
- E. Provide sodding in areas of residential land use over surface of ground disturbed during construction and not paved or not designated to be paved. Grade surface at uniform slope to natural grade as indicated on the Drawings. Provide minimum of four inches (4 In) of topsoil per Section 02905 – Topsoil. Sod disturbed areas in accordance with Section 02915 – Sodding.

**3.9 POST-INSTALLATION TELEVISION INSPECTION**

- A. Prior to final acceptance of newly constructed gravity sanitary sewers, perform cleaning and closed circuit television inspection.
  - 1. Cleaning of sanitary sewer lines and manholes shall conform to Section 02530 – Sanitary Sewer Line Cleaning.
  - 2. Television inspection shall be performed after sanitary sewer line has been cleaned. Television inspection shall conform to Section 02520 – Television Inspection of Sanitary Sewer Lines.
- B. Upon completion of television inspection reviews by the Project Manager, the Contractor shall be notified regarding final acceptance of sanitary sewer segment.

**END OF SECTION**