

SECTION 02730
SANITARY SEWER PIPELINES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Installation of sanitary sewer pipelines.
- B. Point repairs on existing sanitary sewer pipelines.

1.02 RELATED WORK

- A. Section 02220 - Excavation, Backfilling, and Compacting.
- B. Section 02575 - Pavement Repair.
- C. Sections 02605 - Manholes.
- D. Section 02610 - Pipe and Fittings.
- E. Section 02732 - Sanitary Sewer Service Lines
- F. Section 02734 - Inspection and Testing of Sanitary Sewer Pipelines, Manholes, and Service Lines.
- G. Section 03300 - Cast-in-place Concrete.

1.03 DEFINITIONS

- A. New Pipelines - Pipelines installed in such a manner that there is no sewage flow during construction.
- B. Replacement Pipelines - Pipelines installed in a trench while there is a flow from "live" service connections.
- C. Point Repairs - Replacement of a short section (less than 50 feet in length) in an existing pipeline.
- D. Force Mains - Sewer pipelines that transport wastewater under pressure from a pump station to a discharge point.

1.04 QUALITY ASSURANCE

- A. Inspect all pipelines per Section 02734 - Inspection and Testing of Sanitary Sewer Pipelines, Manholes, and Service Lines.

1.05 SUBMITTALS

- A. Submit to the Engineer of Record all materials and procedures not described in these specifications. Approval from Little Rock Wastewater is required prior to installation of any materials not described in these specifications.

1.06 REFERENCES

Not Used.

1.07 PROTECTION

- A. In all cases, the Contractor is responsible for protecting public and private property and protecting any person or persons who might be injured as a result of the Contractors' Work.
- B. All utilities shown on the plans may not represent the exact location; however, the Contractor is responsible for verifying these locations and contacting "Arkansas One Call System" before excavating.

PART 2 - PRODUCTS

2.01 BEDDING AND BACKFILL

- A. Refer to Section 02220 - Excavation, Backfilling, and Compacting.

2.02 PIPE AND FITTINGS

- A. Refer to Section 02610 - Pipe and Fittings.

2.03 MANHOLES, MANHOLE RINGS, AND LIDS

- A. Refer to Section 02605 - Manholes.

2.04 CONCRETE

- A. Refer to Section 03300 - Cast-in-place Concrete.

PART 3 - EXECUTION

3.01 EXCAVATION - GENERAL

- A. Perform excavation and prepare bedding in accordance with Section 02220 - Excavation, Backfilling, and Compacting.
- B. Never lay pipe in a water-filled trench, or when trench conditions or weather are unsuitable for such Work.
- C. Divert surface water and de-water trenches during excavation.
- D. Excavate for bells so that the entire barrel of the pipe will be uniformly supported on the pipe bedding before placing pipe in the trench.

3.02 LAYOUT

- A. The Contractor shall install sewer lines, wyes, and manholes as shown on the Plans.

3.03 SHALLOW BURY

- A. Ductile iron pipe shall be required when the existing grade or the proposed finish grade, whichever is less, provides less than 30 inches of cover. The ductile iron pipe shall, whenever feasible, extend from manhole to manhole. The ductile iron pipe shall meet the requirements of Section 02610 - Pipe and Fittings, of these Specifications.

3.04 PIERS

- A. Install concrete piers as indicated on the plans per Section 03300 - Cast-in-place Concrete.

3.05 STEEP GRADES

- A. Whenever the grade of the sewer line exceeds 15 percent, ductile iron pipe shall be required. The ductile iron pipe shall meet the requirements of Section 02610 - Pipe and Fittings, of these Specifications.
- B. Sewers on 20 percent slopes or greater shall be anchored securely with concrete anchors spaced as follows:
 - 1. Not over 36 feet center to center on grades 20 percent and up to 35 percent.
 - 2. Not over 24 feet center to center on grades 35 percent and up to 50 percent.
 - 3. Not over 16 feet center to center on grades 50 percent and over.
- C. Anchor collars should be placed on downstream side of bell. Where no bell is available, a retainer gland shall be installed.

3.06 PIPE INSTALLATION

- A. Inspect each joint of pipe carefully before it is placed in the trench. Plainly mark and separate from the remaining pipe any joint found to be cracked, warped, or otherwise damaged. Remove these damaged joints from the project site as soon as possible.
- B. Cut pipe in a neat and workmanlike manner without damage to pipe or pipe lining when trimming joint length.
- C. Lay all pipe with the bell upstream.
- D. Use proper equipment for lowering sections of pipe into trenches. Lower pipe carefully into the trench so the spigot and bell will not become contaminated.
- E. Lay each pipe joint to line and grade using laser beam grade light, keeping a minimum of six inches between the pipe and the trench wall.
- F. Keep the pipe joints' interior clean from all dirt and other foreign matter as the Work progresses. Maintain the pipe's interior cleanliness until accepted or put in service.
- G. Close the open ends of the pipeline temporarily with an appropriate manufactured plug at the end of each day's Work or when discontinuing pipe laying for an appreciable period.

3.07 PIPE TO PIPE CONNECTIONS

- A. Make all pipe joints in strict accordance with the manufacturer's recommendation and as stated below for the particular type of connection. Make all joints watertight in accordance with the latest ASTM Standards.
- B. Slip-type or Push-on Joints Connection Procedure
 1. Clean the bell and spigot end of the pipes prior to jointing thoroughly with a brush. Exercise particular care to clean the gasket seat.
 2. Apply pipe lubricant and attach gasket in strict accordance with the specific joint manufacturer's recommendations. Clean and insert the rubber gasket in the gasket seat within the bell. Insert the spigot end of the upstream pipe in

the bell of the downstream pipe. Push the upstream joint until it is in firm contact with the shoulder of the bell.

C. Mechanical Joints Connection Procedure

1. Clean thoroughly the spigot end of the pipe, the bell of the connecting pipe, and the rubber gasket as specified for slip-type or push-on joints. Clean the gland in a similar manner.
2. After the gland and gasket are placed on the spigot end of the pipe, a sufficient distance from the end to avoid fouling the bell, insert the spigot end in the fitting bell to the point of firm contact with the bell shoulder. Then advance the rubber gasket into the bell and seat in the gasket seat. Exercise care to center the spigot end within the bell. Bring the gland into contact with the gasket, enter all bolts, and make all nuts hand tight. Exercise continued care to keep the spigot centered in the bell.
3. Make the joints tight by turning the nuts with a torque wrench: First partially tightening a nut, then partially tightening the nut 180 degrees away from it. Work around the pipe with uniformly applied tension until the required torque is applied to all nuts. Required torque ranges and indicated wrench lengths for standard cast iron bolts are as follows:

Diameter	Range of Torque	Length of Wrench
<u>Inches</u>	<u>Foot Pounds</u>	<u>Inches</u>
5/8	40 – 60	8
3/4	60 – 90	10
1	70 – 100	12
1-1/4	90 – 120	14

- D. Reinforced Rubber Couplings
 - 1. Install reinforced rubber coupling only where dissimilar pipe materials are connected.
 - 2. Take care that proper alignment is maintained and a minimum spacing between pipes does not exceed one-half inch.
 - 3. Encase rubber coupling in Class B concrete as shown on the Standard Details.

3.08 WYE FITTINGS FOR SERVICE CONNECTIONS

- A. Use in-line wye fittings for all service connections except on ductile iron pipe.
- B. The wye material and joint type must match that of the mainline pipe.
- C. Use taps instead of wyes only on ductile iron pipe.
- D. Install wye branches at the location of live services or as indicated on the construction plans. Install wye connections for services in accordance with the manufacturer's recommendations.
- E. Place Class "B" concrete under each wye branch to prevent cracking or twisting under earth loads.
- F. Mark wyes for future connections using detectable tape or ski rope terminated at the ground surface. Install on each service wye either:
 - 1. A service stub terminated with a plugged bell; or,
 - 2. A plugged adapter capable of connecting to a four-inch cast iron service.
- G. Terminate wyes for future connections in a bell suitable for connection of a four-inch service line pipe as specified herein. Securely plug all wyes and service stubs for future connections.
- H. For Service Wye Details, see the Standard Details.

3.09 BACKFILLING AND INSPECTION

- A. Before backfilling, place concrete encasement at transitions between different types of pipe and around all reinforced rubber couplings as shown in the Project Plans. Use Class B concrete per Section 03300-Cast-in-place Concrete.
- B. Before backfilling, install concrete anchor collars in accordance with the details at the location and interval and shown on the Plans. Use Class A concrete and reinforce with steel bars per Section 03300-Cast-in-place Concrete.
- C. After the pipeline is installed and visually inspected by the Engineer of Record, backfill the trench per Section 02220-Excavation, Backfilling, and Compacting.
- D. Test the pipeline per Section 02734-Inspection and Testing of Sanitary Sewer Pipelines, Manholes, and Service Lines.
- E. Repair all pavements per Section 02575-Pavement Repair.
- F. Repair all incidental damage to buildings, structures, utilities, pavements, landscaping, etc.
- G. Repair sodded and grass areas to original condition.

3.10 CONNECTION OF NEW SEWER PIPELINES TO EXISTING SANITARY SEWERS

- A. Construct, clean, test, and obtain Little Rock Wastewater approval before connecting new pipeline to the existing sewer.
- B. Connection of new sewer pipelines to existing sanitary sewers cannot be made until the entire project is ready for final acceptance by the Little Rock Wastewater.
- C. All new pipelines must connect to the existing system at a new or existing manhole. If a new manhole is built over an existing sewer line, do not break out the top of the existing pipe until the new line is accepted. New pipelines cannot be connected to an existing manhole prior to final acceptance without permission from the Little Rock Wastewater.
- D. If a new pipeline is to discharge into an existing manhole, divert the sewage flow around the existing manhole while the tie-in is under construction. Intercept the

sewage flow at the existing manhole first upstream from the tie-in construction. Provide suitable pumping equipment and re-routing conduit to pump the sewage around the tie-in construction. Discharge into an appropriate manhole downstream from the construction.

- E. Connect new pipelines to existing manholes in a neat, workmanlike manner, to ensure a watertight connection.

3.11 GRAVITY SEWER PIPELINE INSTALLATION – LIVE SEWER PIPELINES AND POINT REPAIRS

- A. Install sewer pipeline and point repairs as detailed above for new pipelines with the following exceptions:
 - 1. Divert all upstream flow around the section to be replaced with plugs or pumps. The bedding must be kept dry during installation. If trench bottom is too wet, excavate wet portion and replace with suitable bedding material.
 - 2. Make transitions to original pipe using materials and procedures specified. Take care that replacement pipe is aligned properly with no offsets. Install concrete encasement around transitions. Take care that no concrete from the encasement enters the existing pipeline. If this occurs, remove the concrete.
 - 3. At the end of each day's work, and when for any reason the laying of pipe will be discontinued for an appreciable period, place a temporary section of pipe in the live line.
 - 4. Pressure testing is not required. Visual and television testing are required.
 - 5. Mandrel testing may be required.
 - 6. Service line pressure testing is not required.
 - 7. A temporary debris catcher, as shown in the Standard Details, shall be used in the downstream manhole.

3.12 GRAVITY SEWER PIPELINE INSTALLATION - AERIAL CROSSINGS

- A. Construct piers as shown on Plans.
- B. Install pipe on piers to grade.

3.13 FORCE MAIN PIPELINE INSTALLATION

- A. Install all pipe and fittings to the line and grade as detailed on the Plans. Submit fitting substitution requests to the Engineer of Record for approval.
- B. Remove all dirt and other foreign matter from the inside of pipe and fittings before they are lowered into the trench. Keep pipe and fittings clean during and after laying. Take care to keep dirt out of the bells. Plug all pipe openings at the end of each days work or when pipe laying is discontinued.
- C. Use proper equipment for lowering sections of pipe into trenches. Lower pipe carefully into the trench so the spigot and bell will not become contaminated.
- D. Cut pipe in a neat and workmanlike manner without damage to pipe or pipe lining when trimming joint length.
- E. Install pipe with bell ends facing in the direction of laying. Face bells upgrade on lines on an appreciable slope.
- F. When necessary to deflect pipe from a straight line in either the horizontal or vertical plan to avoid obstructions, do not deflect the pipe beyond the point recommended by the pipe manufacturer.
- G. Before backfilling, install concrete thrust blocking in accordance with Standard Details on Plans.
- H. Test the pipeline per Section 02734-Inspection and Testing of Sanitary Sewer Pipelines, Manholes, and Service Lines.
- I. Install all flushing stations, check valves, air and vacuum release valves, and all necessary fittings according to manufactures recommendation.
- J. After the pipeline is installed and visually inspected by the Engineer of Record, backfill the trench per Section 02220-Excavation, Backfilling, and Compacting. Repair all pavements per Section 02575-Pavement Repair. Repair all incidental damage to buildings, structures, utilities, pavements, landscaping, etc.
- K. Repair sodded and grass areas to original condition.

3.14

FORCE MAIN MARKING

- A. All force mains shall be fitted with tracing wire installed during construction.
 - 1. Tracing wire shall be 14 gauge or larger, solid core insulated copper wire. Stranded wire will not be allowed.
 - 2. Tracing wire shall be buried directly under the pipeline for depths not to exceed six (6) feet. For depths exceeding six (6) feet the tracing wire shall be buried directly over the centerline of the pipe at a depth no greater than six (6) feet and a minimum of four (4) feet.
 - 3. The tracing wire shall be brought to the surface, at intervals not to exceed 1000 feet, and secured within termination boxes suitable for recovery and affixing electronic locator transmitters to locate the force main in the future. All termination boxes and their locations shall be approved by Little Rock Wastewater prior to installation.
- B. Electronic Marking Devices (EMD) shall be installed along the route of all force mains.
 - 1. EMDs shall be placed at all force main tees, bends, and changes in direction, including both vertical and horizontal fixtures.
 - 2. EMDs shall be placed at intervals not to exceed 400 feet along sections between valves, bends, tees or other fixture requiring the placement of EMDs.
 - 3. Where force mains are constructed along curved routes, EMDs shall be placed at the beginning and end of all curve sections and at intervals along the curve sections not to exceed 200 feet.
 - 4. EMDs shall be buried directly over the centerline of the pipe with a minimum of 6 inches of backfill between the top of the pipe and the EMD. EMDs shall be buried at a minimum depth of 2 feet and a maximum depth of 5 feet.
 - 5. Little Rock Wastewater will provide all EMDs for placement along force mains. It shall be the responsibility of the Engineer of Record to get approval from Little Rock Wastewater, prior to construction, for the locations and approximate quantity of EMDs required for the project. Little Rock Wastewater will acquire and provide EMDs to the Engineer of Record for placement of EMDs during construction.
- C. As Built Drawings submitted by the Engineer of Record shall provide stationing for all tracing wire termination boxes and stationing for all EMDs installed along the force main route.

END OF SECTION 02730