

Section 02631

STORM SEWERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. New storm sewers and appurtenances, modifications to existing storm sewer system and installation of roadside ditch culverts.

1.02 MEASUREMENT AND PAYMENT

A. Unit Prices.

1. Payment for storm sewers, including elliptical or box, installed by open-cut, augered with or without casing, or tunneling is on linear foot basis. Measurement for storm sewers and roadside ditch culverts will be taken along center line of pipe from center line to center line of manholes or from end to end of culverts. Payment will be made for each linear foot installed complete in place, including connections to existing manholes and inlets.
2. Payment for storm sewer leads, including elliptical leads, is on a linear foot basis.
3. Payment for corrugated metal pipe storm sewer outfall, including timber bents, is on a linear foot basis.
4. Refer to Section 01270 - Measurement and Payment for unit price procedures.

- B. Stipulated Price (Lump Sum). If Contract is Stipulated Price Contract, payment for work in this Section is included in total Stipulated Price.

1.03 SUBMITTALS

- A. Conform to requirements of Section 01330 - Submittal Procedures.
- B. Submit manufacturer's literature for product specifications and installation instructions.
- C. Submit proposed methods, equipment, materials, and sequence of operations for sewer construction. Plan operations to minimize disruption of utilities to occupied facilities or adjacent property.

1.04 QUALITY ASSURANCE

- A. Provide manufacturer's certificate to Specifications.
- B. The Condition for acceptance shall be watertight storm sewer that is watertight both in pipe-to-pipe joints and in pipe-to-manhole connections.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's recommendations.
- B. Handle pipe, fittings, and accessories carefully with approved handling devices. Do not drop or roll pipe off trucks or trailers. Do not use materials cracked, gouged, chipped, dented, or otherwise damaged shall not be used materials for installation.
- C. Store pipe and fittings on heavy timbers or platforms to avoid contact with ground.
- D. Unload pipe, fittings, and appurtenances as close as practical to location of installation to avoid unnecessary handling.
- E. Keep interiors of pipe and fittings free of dirt and foreign matter.
- F. Store PVC pipe out of direct sunlight.

PART 2 PRODUCTS

2.01 PIPE

- A. Provide piping materials for storm sewers shall be of sizes and types specified unless otherwise indicated on Drawings.
- B. In diameters where material alternatives are available, provide pipe from single manufacturer for each pipe diameter, unless otherwise approved by City Engineer or otherwise shown on Drawings.
- C. Existing pipe that has been removed during construction cannot be reused.

2.02 PIPE MATERIAL SCHEDULE

- A. Use pipe materials that conform to requirements specified in one or more of the following sections as shown on the Drawings.
 - 1. 02611 - Reinforced Concrete Pipe.

2. Section 02641 - Monolithic Reinforced Concrete Sewers.
 3. Section 02612 - Precast Reinforced Concrete Box Sewers.
 4. Section 02642 - Corrugated Metal Pipe use only where Corrugated Metal Pipe is shown on Drawings.
 5. Section 02509 – Thermoplastic Plastic Pipe and Drains
- B. Provide pipe meeting minimum class, dimension ratio, or other criteria indicated.
- C. Pipe materials other than those listed above shall not be used for storm sewers.

2.03 BEDDING, BACKFILL, AND TOPSOIL MATERIAL

- A. Bedding and Backfill Material: Conform to requirements of Sections 02317 - Excavation and Backfill for Utilities, Section 02320 - Utility Backfill Material, and Section 2321 - Cement Stabilized Sand.
- B. Topsoil: Conform to requirements of Section 02911 - Topsoil.
- C. Use cement stabilized sand material for bedding and backfill in the pipe zone for all storm sewers.
- D. Above the pipe zone, use select backfill material up to pavement for storm sewers larger than 36 inches in diameter

PART 3 EXECUTION

3.01 PREPARATION

- A. Prepare traffic control plans and set up street detours and barricades in preparation for excavation when construction will affect traffic. Conform to requirements of Section 01555- Traffic Control and Regulation.
- B. Provide barricades, flashing warning lights, and signs for excavations. Conform to requirements of Section 01555 - Traffic Control and Regulation. Maintain barricades and warning lights for streets and intersections while Work is in progress or where traffic is affected by Work.
- C. Immediately notify agency or company owning utility lines, which are damaged, broken, or disturbed. Obtain approval from City Engineer and agency for repairs or relocations, either temporary or permanent.

- D. Remove old pavements and structures, including sidewalks and driveways in accordance with requirements of Section 02221 - Removing Existing Pavements and Structures.
- E. Install and operate dewatering and surface water control measures in accordance with Section 01578 - Control of Ground Water and Surface Water.

3.02 EXCAVATION

- A. Earthwork. Conform to requirements of Section 02317 - Excavation and Backfill for Utilities. Use bedding as indicated on Drawings.
- B. Line and Grade. Establish required uniform line and grade trench from benchmarks identified by City Engineer. Maintain this control for minimum of 100 feet behind and ahead of pipe-laying operation. Use laser beam equipment to establish and maintain proper line and grade of Work. Use of appropriately sized grade boards, which are substantially supported also acceptable.
- C. Trench Excavation. Excavate pipe trenches to level as indicated on Standard Details. Backfill excavation with specified bedding material to level of lower one-third of pipe barrel. Tamp and compact backfill to provide bedding at indicated grade. Form bedding foundation to minimum depth of one-eighth of pipe diameter, but not less than 6 inches.

3.03 PIPE INSTALLATION

- A. Install in accordance with pipe manufacturer's recommendations and as specified in this section.
- B. Install pipe only after excavation is completed, bottom of trench is shaped, bedding material is installed, and trench has been approved by City Engineer.
- C. Install pipe to line and grade indicated on Drawings. Place pipe so that it has continuous bearing of barrel on bedding material with no voids, and is laid in trench so interior surfaces of pipe follows grades and alignments indicated.
- D. Install pipe with bells of pipe facing upstream of anticipated flow.
- E. Form concentric joint with each section of adjoining pipe to prevent offsets.
- F. Place and drive home newly laid sections with a sling or come-a-long winches to eliminate damage to sections. Unless otherwise approved by City Engineer, provide end protection to prevent damage while using backhoes or similar powered equipment to drive home newly laid sections.

- G. Keep interior of pipe clean as installation progresses. Where cleaning after laying pipe is difficult because of small pipe size, use suitable swab or drag inside pipe and pull it forward past each joint immediately after joint has been completed.
- H. Keep excavations free of water during construction and until final inspection.
- I. When work is not in progress, cover exposed ends of pipes with pipe plug specifically designed to prevent foreign material from entering pipe.
- J. For PVC Pipe:
 - 1. Provide a minimum cover as per City Standard detail from top of pavement to top of pipe, but no less than 2 feet below ditch flowline.
 - 2. Accomplish transitions to different material of pipe in a manhole or inlet box. No adapter, coupling for dissimilar pipe, or saddle connections allowed.
 - 3. Provide pipe sections in standard lengths with minimum length of 13 feet. Pipe may be field modified to shorten length no less than 4 feet, unless otherwise approved by City Engineer. Field modify pipe per manufacturer's recommendations.
 - 4. No beveling at joint allowed. Cut to be perpendicular to longitudinal axis.
 - 5. Provide gasketed bell and spigot joints installed per manufacturer's recommendations. Gasketed pipe joints; clean and free of debris, show no leakage after installation.

3.04 PIPE INSTALLATION OTHER THAN OPEN CUT

- A. Conform to requirements of Section 02448 - Pipe and Casing Augering for Sewers where required.
- B. Conform to requirements of Section 02441 - Microtunneling and Pipe-Jacking Tunnels where required.
- C. Not allowed for plastic sewer pipe.

3.05 INSTALLATION OF APPURTENANCES

- A. Construct manholes to conform to requirements of Sections 02081 - Cast-in-place Concrete Manholes, Section 02082 - Precast Concrete Manholes, and Section 2087 - Brick Manholes for Storm Sewers. Install frames, grate rings, and covers to conform to requirements of Section 02084 - Frames, Grates, Rings, and Covers.

- B. Install pipe culverts with approved end treatments. Approved end treatments include concrete headwalls, wingwalls and collars. Refer to City Standards detail for end treatment requirements.
- C. Install inlets, headwalls, and wingwalls to conform to requirements of Section 02632 - Cast-in-place Inlets, Headwalls, and Wingwalls and Section 02633 - Precast Concrete Inlets, Headwalls, and Wingwalls.
- D. Rehabilitate existing manholes to conform to requirements of Section 02555 - Manhole Rehabilitation. Adjust manhole covers and inlets to grade conforming to requirements of Section 02086 - Adjusting Manholes, Inlets, and Valve Boxes to Grade.
- E. Dimension for Type C and Type E manholes shall be as shown on Drawings.

3.06 INSPECTION AND TESTING

- A. Perform post installation television inspection in accordance with Section 02531 - Gravity Sanitary Sewers.
- B. Mandrel Testing. Perform a mandrel test in accordance with Section 02533 - Acceptance Testing for Sanitary Sewers.
- C. Pipe & Joint Leakage Test. Perform low-pressure air test or water test (an exfiltration test) in Section 02533 - Acceptance Testing for Sanitary Sewers.

3.07 BACKFILL AND SITE CLEANUP

- A. Backfill trench after pipe installation is inspected and approved by City Engineer.
- B. Backfill and compact soil in accordance with Section 02317 - Excavation and Backfill for Utilities.
- C. Repair and replace removed or damaged pavement and sidewalks as specified in Section 02951 - Pavement Repair and Resurfacing.
- D. In unpaved areas, grade surface as uniform slope to natural grade as indicated on Drawings. Provide minimum of 4 inches of topsoil and seed according to requirements of Section 02921—Hydromulch Seeding, or Section 02922 - Sodding, as required.

END OF SECTION