

Restroom Building 846CM3040

**SECTION 33 30 00
SANITARY SEWERAGE UTILITIES**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Outside, underground sanitary sewer system, complete, ready for operation, including: gravity flow lines; cleanouts; connection to new building sanitary sewer; and all other incidentals.

1.2 RELATED WORK

- A. Maintenance of Existing Utilities: Section 01 00 00, GENERAL REQUIREMENTS.
- B. Excavation, Trenching, Pipe Bedding, Backfill, Shoring, Sheeting, Bracing: Section 31 20 00, EARTH MOVING.

1.3 QUALITY ASSURANCE

- A. Products Criteria:
 - 1. Multiple Units: When two or more units of the same type or class of materials or equipment are required, these units shall be products of one manufacturer.
- B. Comply with the rules and regulations of the authority having jurisdiction for installation of sanitary sewerage system (including septic tank and absorption field).

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submit manufacturers' product data sheets and shop drawings (as applicable) for the following products:
 - 1. Pipe (including fittings, joint materials and accessories).
 - 2. Cleanouts.
- C. At Project completion, submit the following:
 - 1. Record (as-built) drawings showing installed system as specified in this Section.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. During loading, transporting and unloading, exercise care to prevent damage to all products furnished.

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- B. Pipe shall be marked with manufacturer's identification symbol, size, date of manufacture, class of pipe, and applicable product specification identification number. The date of manufacture and name or trademark of manufacturer shall be marked on the septic tank structure.
- C. All materials shall be inspected upon delivery to the Site. Damaged or defective materials shall be rejected or repaired as determined by the COTR.
- D. Conform to manufacturers' recommendations for handling and storage of products. Exercise care to prevent damage to products. The interior of all pipe and structures shall be kept free from dirt and other foreign matter at all times.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. Referenced standards shall be the current version as of the date of advertisement of the project.
- B. ASTM International (ASTM):
 - A48/A48M.....Standard Specification for Gray Iron Castings
 - D2321.....Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
 - D3034.....Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
 - D3212.....Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
 - F477.....Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- C. Uni-Bell PVC Pipe Association:
 - Uni-B-6-98.....Recommended Practice Low Pressure Air Testing of Installed Sewer Pipe

PART 2 - PRODUCTS

2.1 PIPING:

- A. Gravity Flow Lines (Pipe and Fittings):
 - 1. Polyvinyl Chloride (PVC):
 - a. Pipe and Fittings, 4 to 15 inches in diameter, shall conform to ASTM D3034, SDR 35. Pipe and fittings shall have elastomeric gasket joints providing a watertight seal when tested in Sanitary Sewerage Utilities

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accordance with ASTM D3212. Gaskets shall conform to ASTM F477. Solvent welded joints shall not be permitted.

- b. Furnish perforated piping for the septic tank absorption field in accordance with the requirements of authorities having jurisdiction.

2.2 CLEANOUT FRAMES AND COVERS

- A. Frames and covers shall be gray iron casting conforming to ASTM A48. The frame and cover shall have a studded pattern on its cover, vent holes, and lifting slots. The cover shall fit firmly on the frame without movement when subject to vehicular or pedestrian traffic. The word "SEWER" shall be cast on the cover.

2.3 WARNING TAPE

- A. Standard, 4Mil polyethylene 3 inch wide tape detectable type, green with black letters and imprinted with "CAUTION BURIED SEWER LINE BELOW".

PART 3 - EXECUTION

3.1 BUILDING SERVICE LINES

- A. Install sanitary sewer service lines to point of connection within approximately 5 feet outside of buildings where service is required and make connections. Coordinate the invert and location of the service line with the installation of the building lines.
- B. Connections of service line to building piping shall be made after the new sanitary sewer system has been constructed, tested, and accepted for operation by the COTR. The Contractor shall install all temporary caps or plugs required for testing.
- C. When building services have not been installed at the time when the sanitary sewer system is complete, provide temporary plugs or caps at the ends of all service lines. Mark the location and depth of the service lines with continuous warning tape placed 12 inches above service lines.

3.2 PIPE SEPARATION

- A. Horizontal Separation - Water Mains and Sewers:

- 1. Existing and proposed water mains shall be at least 10 feet horizontally from any proposed gravity flow sanitary sewer or sewer service connection.
- 2. Gravity flow mains may be located closer than 10 feet but not closer than 6 feet to a water main when:
 - a. Local conditions prevent a lateral separation of ten feet; and
 - b. The water main invert is at least 18 inches above the crown of the gravity sewer; and

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- c. The water main is in a separate trench separated by undisturbed earth.

B. Vertical Separation - Water Mains and Sewers at Crossings:

1. Water mains shall be separated from sewer mains so that the invert of the water main is a minimum of 24 inches above the crown of gravity flow sewer mains. The vertical separation shall be maintained within 10 feet horizontally of the sewer and water crossing. When these vertical separations are met, no additional protection is required.
2. In no case shall pressure (force) sanitary main cross above, or within 24 inches of water lines.
3. When it is impossible to meet (1) above, the gravity flow sewer may be installed 18 inches above or 12 inches below the water main, provided that both the water main and sewer shall be constructed of push-on or mechanical ductile pipe. The pipe for the sewer shall conform to the requirements for pressure sewers specified herein. Piping for the water main shall conform to Section 33 10 00, WATER UTILITIES.
4. The required vertical separation between the sewer and the water main shall extend on each side of the crossing until the perpendicular distance from the water main to the sewer line is at least 10 feet.

3.3 GENERAL PIPING INSTALLATION

- A. Lay pipes true to line and grade. Gravity flow sewer shall be laid with bells facing upgrade.
 - B. Do not lay pipe on unstable material, in wet trench or when trench and weather conditions are unsuitable for the work.
 - C. Support pipe on compacted bedding material. Excavate bell holes only large enough to properly make the joint.
 - D. Inspect pipes and fittings, for defects before installation. Defective materials shall be plainly marked and removed from the site. Cut pipe shall have smooth regular ends at right angles to axis of pipe.
 - E. Clean interior of all pipe thoroughly before installation. When work is not in progress, open ends of pipe shall be closed securely to prevent entrance of storm water, dirt or other substances.
 - F. Lower pipe into trench carefully and bring to proper line, grade, and joint. After jointing, interior of each pipe shall be thoroughly wiped or swabbed to remove any dirt, trash or excess jointing materials.
 - G. Do not lay sewer pipe in same trench with another pipe or other utility. Sanitary sewers shall cross at least 2 feet below water lines.
 - H. Do not walk on pipe in trenches until covered by layers of bedding or backfill material to a depth of 12 inches over the crown of the pipe.
 - I. Warning tape shall be continuously placed 12 inches above sewer pipe
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J. Install gravity sewer line in accordance with the provisions of these specifications and the following standards:

1. Polyvinyl Chloride (PVC) Piping: ASTM D2321.

3.4 CLEANOUTS

- A. Six inches in diameter and consisting of a ductile iron 45 degree fitting on end of run, or combination "wye" fitting and 1/8 bend in the run with ductile iron pipe extension, water tight plug or cap and cast frame and cover flush with finished grade. Center-set cleanouts, located in unpaved areas, in a 12 by 12 by 6 inches thick concrete slab set flush with adjacent finished grade.
- B. The top of the cleanout assembly shall be 2 inches below the bottom of the cover to prevent loads being transferred from the frame and cover to the piping.

3.5 INSPECTION OF SEWERS

- A. Inspect and obtain the COTR's approval. Thoroughly flush out before inspection. Lamp test between structures and show full bore indicating sewer is true to line and grade. Lip at joints on the inside of gravity sewer lines are not acceptable.

3.6 TESTING OF SANITARY SEWERS

- A. Gravity Sewers (Select one of the following):
 1. Air Test: PVC Pipe, Uni-Bell Uni-B-6. Clean and isolate the section of sewer line to be tested. Plug or cap the ends of all branches, laterals, tees, wyes, and stubs to be included in the test to prevent air leakage. The line shall be pressurized to 4 psi and allowed to stabilize. After pressure stabilization, the pressure shall be dropped to 3.5 psi greater than the average back-pressure of any groundwater above the sewer. The minimum test time shall be as specified in Uni-Bell Uni-B-6.
 2. Exfiltration Test:
 - a. Subject pipe to hydrostatic pressure produced by head of water at depth of 3 feet above invert of sewer at upper manhole under test. In areas where ground water exists, head of water shall be 3 feet above existing water table. Maintain head of water for one hour for full absorption by pipe body before testing. During one hour test period, measured maximum allowable rate of exfiltration for any section of sewer shall be 3.0 gallons per hour per 100 feet.
 - b. If measurements indicate exfiltration is greater than maximum allowable leakage, take additional measurements until leaks are located. Repair and retest.
 3. Infiltration Test: If ground water level is greater than 3 feet above invert of the upper manhole, infiltration tests are acceptable. Allowable leakage for this test will be the same as for the exfiltration test.

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April 3, 2012

Fort Sam Houston National Cemetery

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3.7 RECORD (AS-BUILT) DRAWINGS

- A. During the progress of the sanitary sewerage system installation, record installed locations, elevations, and all changes and deviations from the original design by marking up the Drawings. Mark-ups shall include the following information: surveyed locations and invert elevations for pipes and structures; pipe diameter; structural dimensions; and material type. Show all deviations from the Drawings.

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