

SECTION 33 40 00

STORM SEWERAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes all storm sewerage system piping and appurtenances from the parking lot and roof downspouts to the point of disposal.
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Division 31 Section "Earthwork" for excavation and backfill required for storm sewerage system piping and structures.
 - 2. Division 03 Section "Cast-in-Place Concrete" for cast-in-place concrete drainage structures.
 - 3. Division 32 Section "Portland Cement Concrete Paving" for paving coordination with drainage structures.
- C. This Section includes the removal of existing storm sewerage lines and structures by the Contractor prior to commencing new storm sewerage installation.

1.2 SUBMITTALS

- A. Product data for drainage piping specialties.
- B. Shop drawings for precast concrete storm drainage manholes, drop inlets and catch basins, including frames, covers, and grates.
- C. Shop drawings for cast-in-place concrete or field-erected masonry storm drainage manholes, drop inlets, and catch basins, including frames and covers.
- D. Coordination drawings showing pipe sizes, manholes and catch basins locations and elevations. Include details of underground structures and connections. Show other piping in the same trench and clearances from storm sewerage system piping. Indicate interface and partial relationship between piping and approximate structures.

1.3 QUALITY ASSURANCE

- A. Louisiana Standard Specifications: Comply with applicable requirements of "Louisiana Standard Specifications for Roads and Bridges", 2006 Edition, of the Department of Transportation and Development, Office of Highways, unless requirements specified in this

Section are more restrictive.

- B. City of New Orleans Standards: Comply with applicable standards of City of New Orleans Department of Public Works, unless requirements specified in this Section are more restrictive. Comply with requirements of the Sewerage and Water Board of New Orleans Network Engineering Dept., unless requirements specified in this section are more restrictive.
- C. Code Compliance: Comply with applicable portions of 2000 Louisiana State Plumbing Code, unless requirements specified in this Section are more restrictive.
- D. Environmental Compliance: Comply with applicable portions of local environmental agency regulations pertaining to storm sewerage systems.
- E. Utility Compliance: Comply with local utility regulations and standards pertaining to storm sewerage systems.

1.4 PROJECT CONDITIONS

- A. Site Information: Review site topographic survey, perform site inspection, research public utility records, and verify existing utility locations. Verify that storm sewerage system can be installed in compliance with Contract Documents and referenced standards. Locate existing storm sewerage system piping and structures that are to be abandoned, demolished, or removed.
- B. Sequencing and Scheduling: Coordinate connection to public sewer with utility company. Coordinate connection to existing storm drain system with the Sewerage and Water Board of New Orleans. Coordinate with other site utility work. Coordinate with City of New Orleans Department of Public Works when connecting any utility service.
- C. Protection: Protect storm sewerage during and after installation from other construction activities and from entry of soil, construction materials, waterborne trash and debris, liquid pollutants, and other foreign materials.

1.5 SEQUENCING AND SCHEDULING

- A. Coordinate connection to public sewer with utility company.
- B. Coordinate with roof downspout storm drainage piping.
- C. Coordinate with other utility work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. 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.
- f)

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 PIPE AND FITTINGS

A. General: Provide pipe and pipe fitting materials compatible with each other. Where more than one type of materials or products is indicated, selection is Installer's option.

B. Reinforced Concrete Sewer Pipe and Fittings: ASTM C 76, Class III, Wall B, for rubber gasket joints.

1. Gaskets: ASTM C 443, rubber.

C. Couplings: Elastomeric compression gasket, made to match pipe inside diameter or hub, and adjoining pipe outside diameter.

1. Gaskets: ASTM C 443, rubber for concrete pipe; and ASTM F 477, elastomeric seal for plastic pipe. Gaskets for dissimilar or other pipe materials shall be compatible with pipe materials being joined.

2.3 DROP INLETS

A. Brick/Concrete Drop Inlets: Brick and mortar, of depth indicated. Wall thickness shall be brick 8 inches minimum, and inside dimensions shall be 24x30 inches with a frame and grate, as indicated. Thickness of section of wall deeper than 8 feet shall be 14 inches minimum.

1. Wall: ASTM C 32, Grade MS, manhole brick.
 2. Mortar and Parging: ASTM C 270, Type S, using ASTM C 150, Type II Portland cement.
 3. Concrete Strength: Minimum 4,000 psi 28-day compressive strength.
 4. Bottom and Top: Reinforced concrete.
 5. Channel and Bench: Concrete.
 6. Steps: 3/4 inch wrought iron; cast into sidewall at 12-inch intervals.
- B. Drop Inlet Frames and Grates: ASTM A48-83, Class 35, heavy-duty, cast iron, 25 3/4-inch x 31 3/4-inch grate dimension with short slotted drainage openings.

2.4 MANHOLES

- A. Brick Manholes: Brick and mortar, of depth indicated, complying with Sewerage and Water Board Standard Drawing No. 7260-SWD, and Drawing No. D-870.
1. Base, Channel, and Bench: Concrete.
 2. Wall: ASTM C 32, Grade MS, manhole brick; 8-inch minimum thickness, 48-inch diameter, with tapered top for a 24-inch frame and cover. Thickness of section of wall deeper than 8 feet shall be 12 inches minimum.
 3. Mortar and Parging: ASTM C 270, Type S, using ASTM C 150, Type II Portland cement.
- 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-inch intervals.
- C. Manhole Steps: Wide enough for an adult to place both feet on one step and designed to prevent lateral slippage off the step.
1. Material: Steel-reinforced plastic.
- D. Manhole Frames and Covers: ASTM A48-83, Class 35, heavy-duty, cast iron, 24-inch inside diameter by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch-diameter cover, indented top design, with lettering "DRAIN" cast into cover.

2.5 CLEANOUTS

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

2.6 CONCRETE AND REINFORCEMENT

A. Concrete: Portland cement mix, 4,000 psi (5,000 psi for precast).

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.

B. Reinforcement: Steel conforming to the following:

1. Fabric: ASTM A 185, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615, Grade 60, deformed.

2.7 IDENTIFICATION

A. Plastic Underground Warning Tapes: Polyethylene plastic tape, 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 PREPARATION OF FOUNDATION FOR BURIED STORM SEWERAGE SYSTEMS

- A. Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation, throughout the length of the pipe.
- B. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid, and backfill with clean sand or pea gravel to indicated level.
- C. Shape bottom of trench to fit bottom of pipe. Fill unevenness with tamped sand backfill. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the foundation.

3.2 PIPE APPLICATIONS FOR UNDERGROUND STORM SEWERS

- A. Pipe Sizes 36 inches and Larger: Reinforced concrete sewer pipe and fittings.
- B. Pipe Sizes 8 to 30 Inches: PVC sewer pipe.

3.3 INSTALLATION, GENERAL

A. General Locations and Arrangements: Drawings (plans and details) indicate the general

location and arrangement of the underground storm 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 drop inlets 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 1 percent, except where indicated otherwise.
- F. Extend storm sewerage system piping to connect to existing drainage outfall or junction, as indicated on Plans.
- G. Sleeving: Install sleeve at retaining walls, or where jacking is required. Use Schedule 40, steel pipe 6 inches larger than sewer pipe.

3.4 PIPE AND TUBE 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.
 - 2. Installation in accordance with ASTM D 2321.
- B. Join concrete pipe and fittings with rubber gaskets in accordance with ASTM C 443, and install piping in accordance with applicable provisions of ACPA "Concrete Pipe Installation Manual."
- C. Join different types of pipe with standard manufactured couplings or fabricated fittings intended for that purpose.

3.5 DROP INLETS

- A. Construct inlets to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.6 MANHOLES

- A. General: Install manholes complete with accessories as indicated. Form continuous concrete or split pipe section channel and benches between inlets and outlet. Set tops of frames and covers flush with finish surface where manholes occur in pavements. Elsewhere, set tops 3 inches above finish surface, unless otherwise indicated.
- B. Construct brick manholes as indicated.
- C. Construct cast-in-place manholes as indicated.
- D. Provide rubber joint gasket complying with ASTM C 443 at joints of sections.
- E. Apply bituminous mastic coating at joints of sections.

3.7 CLEANOUTS

- A. Install cleanouts and extension from sewer pipe to cleanout at grade as indicated. Set cleanout frame and cover in concrete block 18 by 18 by 12 inches deep, except where location is in concrete paving. Set top of cleanout 1 inch above surrounding earth grade or flush with grade when installed in paving.

3.8 CATCH BASINS

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.9 TAP CONNECTIONS

- A. Make connections to existing piping and underground structures so that finished work will conform as nearly as practicable to the requirements specified for new work.
- B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap, with not less than 6 inches of 4000-psi 28-day compressive-strength concrete.
- C. Make branch connections from side into existing 4- to 21-inch piping by removing section of existing pipe and installing wye fitting into existing piping. Encase entire wye with not less than 6 inches of 4000-psi 28-day compressive-strength concrete.
- D. Make branch connections from side into existing 24-inch or larger piping or to underground structures by cutting opening into existing unit sufficiently large to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated.

On outside of pipe or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

1. Provide concrete that will attain minimum 28-day compressive strength of 4000 psi, unless otherwise indicated.
 2. Use epoxy bonding compound as interface between new and existing concrete and piping materials.
- E. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris, concrete, or other extraneous material that may accumulate.

3.10 CLOSING ABANDONED STORM SEWERAGE SYSTEM

- A. Abandoned Piping: Close open ends of abandoned underground piping that is indicated to remain in place. Provide sufficiently strong closures to withstand hydrostatic or earth pressure that may result after ends of abandoned utilities have been closed.
1. Close open ends of concrete or masonry utilities with not less than 8-inch-thick brick masonry bulkheads.
- B. Abandoned Structures: Remove structure and close open ends of the remaining piping or remove top of structure down to not less than 3 feet below final grade; fill structure with approved compacted backfill, to within 1 foot of top of structure remaining, and fill with concrete.

3.11 INSTALLATION OF IDENTIFICATION

- A. Install continuous plastic underground warning tape during back-filling of trench for underground water service piping. Locate 6 to 8 inches below finished grade, directly over piping.

3.12 FIELD QUALITY CONTROL

- A. Testing: Perform testing of completed piping in accordance with local authorities having jurisdiction.
- B. Cleaning: Clear interior of piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.
1. In large, accessible piping, brushes and brooms may be used for cleaning.
 2. Place plugs in ends of uncompleted pipe at end of day or whenever work stops.
 3. Flush piping between manholes, if required by local authority, to remove collected debris.

- C. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.
1. Make inspections after pipe between manholes and manhole locations has been installed and approximately 2 feet of backfill is in place, and again at completion of project.
 2. If inspection indicates poor alignment, debris, displaced pipe, infiltration, or other defects, correct such defects and reinspect.

END OF SECTION

