

SECTION 02530
STORM DRAINAGE STRUCTURES

02530.01 GENERAL**A. Description**

Storm drainage structure construction shall include, but not necessarily be limited to, furnishing and installing or constructing in place: pipe endwalls, inlets, catch basins, manholes, spring boxes, junction boxes, steps, barriers, and miscellaneous structures of concrete or brick masonry built to the shapes and dimensions shown in accordance with the Contract Documents.

B. Related Work Included Elsewhere

1. Trench excavation, backfill, and compaction; Section 02250.
2. Riprap installation; Section 02291.
3. Cast-in-place concrete; Section 03300.
4. Precast concrete structure installation; Section 03400.
5. Brickwork, unit masonry; Section 04200.

C. Quality Assurance

1. Materials

The Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents.

2. Field Tests

No testing will be conducted on storm drainage structures installed in accordance with this Section; however, the work will be visually inspected by the Engineer.

D. Submittals

1. Shop Drawings

Shop drawings shall be submitted as specified in the "General Provisions" for all materials listed in Section 02530.02 when indicated in the Section where the materials are specified.

2. Certification of Compliance

Certificates of compliance shall be submitted as specified in the "General Provisions" for materials listed in Section 02530.02 when indicated in the Section where the materials are specified.

02530.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for storm drainage structures.

B. Contractor's Options

1. The Contractor may furnish aluminum or plastic-coated steel manhole steps.
2. The Contractor may furnish precast, cast-in-place, or masonry construction for miscellaneous storm drainage structures, unless otherwise noted.

C. Detailed Material Requirements

1. Riprap shall be the size specified in the Contract Documents and shall meet the material requirements specified in Section 02291.02.
2. Granular bedding for storm drain structure foundations and for porous backfill adjacent to headwalls shall meet the requirements of AASHTO M 43, size number 57, as specified in Section 02621.02.
3. Portland cement concrete for cast-in-place structures shall be Mix No. 3 as specified in Section 03310, unless otherwise noted.
4. Precast manhole bases, joints, risers, cone sections, grade rings, and other precast structures shall be as specified in Section 03400.
5. Quick-setting non-shrink grout and mortar shall be as specified in Section 03600.
6. Mortar for brickwork shall be as specified in Section 04100.02.
7. Brick for manhole inverts and miscellaneous structures shall be sewer brick as specified in Section 04200.02.
8. Frames, covers, gratings, ladders, and steps shall be as specified in Section 05500. Covers shall be labeled in accordance with the Standard Details. Frames, covers, and grates shall be factory coated with a coal tar paint meeting the requirements of Federal Military Specification MIL-C-18480A. Steps and ladders shall be as dimensioned in the Standard Details.

9. Waterproofing for exterior of manholes and miscellaneous structures shall be as specified in Section 07100.02.

02530.03 EXECUTION

A. General

1. Excavation, foundation preparation, backfill, and compaction shall be as specified in Section 02250.
2. Manholes, pipe endwalls, inlets, catch basins, junction chambers, and other structures shall be constructed or installed in accordance with the Standard Details and as specified herein.
3. Miscellaneous structures shall be constructed where shown and as indicated on the Plans or as directed by the Engineer.
 - a. Cast-in-place concrete construction shall be as specified in Section 03300.03.
 - b. Brick construction shall be as specified in Section 04200.03.
4. Pipelines connected to manholes and other structures shall have a pipe joint not more than 2 feet from the exterior wall of the structure.

B. Construction Sequence

Underground drainage structures, including earthwork and backfilling incidental thereto, shall be completed before the adjacent roadway surfacing is placed. Manholes, catch basins, and inlets shall not be completed to final grade until after the grading has been finished and all necessary arrangements have been made to insure suitable connections and tie-ins at proper grade and alignment with pavements, gutters, curbs, etc.

C. Castings

Grates and/or frames for grates and covers for inlets and manholes shall be set in full beds of mortar or be otherwise properly secured as indicated on the Plans or Standard Details so as to be held rigidly in place to proper grade and alignment.

D. Pipe Connections

Inlet and outlet pipes at inlets, bend structures, wye branches and manholes shall be set or cut flush with the inside face of the walls of such structures and shall extend a sufficient distance beyond the outside face of the walls to provide ample room for making proper connections. The joint around the pipe in the structure wall shall be completely and neatly closed with mortar or other material, as may be specified, so as to make it watertight.

E. Inverts

Inlets containing two or more pipes, which require directional flow, shall have channeled inverts. The details of the channeled invert shall be as shown on the Standard Details.

F. Underdrain Stubs

When directed by the Engineer, inlets and manholes shall be constructed with two underdrain stubs for future connection of underdrain or for erosion control. The inlets or manholes shall be backfilled with AASHTO M 43 No. 57 aggregate for a width of 1.5 feet outside of the neat line from the top of footing to subgrade elevation.

G. Constructing New Structures Over Existing Pipelines

1. The area around the existing pipeline shall be carefully excavated in a manner to prevent disturbing or damaging the portion of the existing pipeline to remain after the new structure is installed.
2. Any soft or yielding material shall be removed and replaced with gravel or crushed stone, thoroughly compacted, to prevent the settlement of the new structure.
3. The existing pipe shall be cut, trimmed, or reinstalled as necessary to accommodate the new structure. When the existing pipe is to be cut, the Contractor shall use methods, which will neither damage the structural integrity of the pipe nor leave any sharp or rough edges.

02530.04 METHOD OF MEASUREMENT**A. Inlets and Manholes**

Measurement for inlets and manholes will be made of the number of each type constructed to a standard minimum depth as shown on the Standard Details, plus an additional measurement in linear feet of extra vertical depth of any unit in excess of the standard minimum depth. Measurement will be made from the lowest point in the manhole or inlet to the highest external point on the top of the manhole or inlet frame and cover or grate.

B. Standard Endwalls

Measurement for standard endwalls will be made on the basis of the count or number of each type and size of standard units built.

C. Nonstandard Endwalls and Miscellaneous Structures

Measurement for nonstandard endwalls and other miscellaneous structures such as spring boxes, junction boxes, special structures, etc. will be measured on the basis of the volume in cubic yards of masonry actually used in construction, or the number or type of each unit constructed as indicated in the Proposal.

02530.05 BASIS OF PAYMENT**A. General**

1. Payment will be made at the unit and/or lump sum prices bid. The prices bid shall include furnishing all labor, tools, equipment, and materials necessary to satisfactorily complete the work as shown, specified, and in strict accordance with the Contract Documents, and accepted by the Engineer.
2. The price bid for furnishing and installing or constructing in place, storm drainage structures shall include the following:
 - a. Excavation, backfill, and compaction as specified in Section 02250.
 - b. Furnishing and installing granular bedding for foundation as shown on the Standard Details and as required elsewhere in the Contract Documents.
3. Payment will be made for contingent items when ordered by the Engineer. Payment will be as specified in Sections 02951, 02952, 02953, 02954, 02955, 02956, and 02957.

B. Inlets and Manholes

Payment for inlets and manholes will be made per each type and size of inlet and manhole installed or constructed. An additional payment will be made for the vertical depth in excess of the standard minimum; depth at the unit price bid per linear foot for each type and size of inlet and manhole unless otherwise noted. The price(s) bid shall include furnishing and installing masonry, precast, or cast-in-place concrete units; drip stones; steps; concrete encasement; grout; gravel bedding; frames, grates and covers; weepholes and exterior aggregate; and all items necessary to satisfactorily complete the work as specified.

C. Standard Endwalls

Payment for standard endwalls will be made per each type and size of standard endwall installed or constructed. The price(s) bid shall include furnishing and installing precast or cast-in-place units, gravel bedding, porous backfill and all items necessary to satisfactorily complete the work specified.

D. Nonstandard Endwalls and Miscellaneous Structures

Payment for nonstandard endwalls and other miscellaneous structures such as spring boxes, junction boxes, etc., will be made on the basis of the unit price per cubic yard of concrete of the mix specified, or for each structure constructed to limits shown on the Contract Documents. The price(s) bid shall include all items necessary to satisfactorily complete the work as shown and/or specified.