

**304.04.01** Structural Plate Pipe and Structural Plate Pipe Arch Culverts will be measured and paid for at the Contract unit price per linear foot. Measurement will be as follows: measure the top length and the bottom length and average. The average length will be the pay length for each pipe in the structure. For multiple pipes, the length will be totaled to obtain the total pay length.

**304.04.02** Excavation required below the planned elevation will be measured and paid for as specified in 301.04.

**304.04.03** Selected backfill will be measured and paid for as specified in Section 302.

**304.04.04** Headwalls will be measured and paid for as specified in Section 305.

## SECTION 305 — MISCELLANEOUS STRUCTURES

**305.01 DESCRIPTION.** This work shall consist of constructing miscellaneous cast-in-place concrete or masonry structures, installing precast concrete or polyethylene (PE) structures, and cleaning existing inlets as specified in the Contract Documents or as directed by the Engineer.

### **305.02 MATERIALS.**

Mortar Sand	901.01
Curing Materials	902.07
Concrete Mix No. 2, No. 3 or No. 6	902.10
Grout	902.11
Brick	903.02
PVC and PE Pipe	905
Reinforcement Steel	908
Steel	909.02
Castings for Frames, Covers, Gratings and Steps	909.04
Polyethylene (PE) Manholes	921.10
Zinc Coating	A 153
Stone	M 43 Size No. 57
Precast Concrete End walls, Inlets, and Manholes	M 199

**305.03 CONSTRUCTION.** Refer to Section 420 for portland cement concrete, Section 463 for brick masonry, and 402.03.01 for excavated material.

**305.03.01 Construction Sequence.** Underground drainage structures shall be completed before roadway surfacing is placed. Manholes, catch basins and inlets shall not be completed to final grade until the grading has been finished and all necessary arrangements have been made to ensure suitable connections and tie-ins at proper grade and alignment with pavements, gutters and curbs.

PE manholes shall be installed as recommended by the manufacturer.

**305.03.02 Castings.** Frames for grates and covers for inlets and manholes, except PE manholes, shall be set in full beds of mortar and rigidly secured in place to proper grade and alignment as specified in the Contract Documents.

**305.03.03 Pipe Connections.** Inlet and outlet pipes at drainage structures shall be set or cut flush with the inside faces of the structures and shall extend a sufficient distance beyond the outside faces of these 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 specified materials.

**305.03.04 Inverts.** Drainage structures containing two or more pipes shall have channeled inverts conforming to the Contract Documents.

**305.03.05 Drainage Structures.** Inlets and manholes shall contain two 8 in. minimum diameter blockouts for underdrains. The drainage structures shall be backfilled with No. 57 aggregate for a width of 1.5 ft outside of the structure and extend from the bottom of the structure to the subgrade.

**305.03.06 Precast Drainage Structures.** Working drawings for structures not detailed in the Contract Documents shall be submitted to the Engineer for approval prior to fabrication.

**Certification.** Certification from the manufacturer for each shipment of precast units is required. A copy of the certification shall be delivered to the Engineer, the Laboratory, and the Contractor with each shipment. One copy shall remain at the plant. The certification shall contain the name and address of the manufacturer, the type of structure, the identification number, the date of manufacture, the date of shipment, a statement indicating conformance with the Specifications, and the signature of the quality control manager. Noted on the unit shall be the station number and designation, the identification number, the name or

trademark of the manufacturer, the date manufactured, and a stamp indicating conformance with the Specifications.

No precast unit shall be shipped unless it has been tested and is shown to be in full compliance with the Contract Documents.

The placement and consolidation of the required bedding under the unit shall be a minimum 6 in. of No. 57 aggregate unless otherwise directed by the Engineer.

**305.03.07 Clean Existing Inlets.** The existing inlets shall be cleaned and the material disposed of as directed by the Engineer. If the existing grate has to be removed, it shall be replaced and anchored to the satisfaction of the Engineer.

**305.04 MEASUREMENT AND PAYMENT.** The payment will be full compensation for all excavation, concrete, masonry, special or precast units, reinforcement, ladder rungs, drip stones, No. 57 aggregate, underdrain stubs, frames, grates and covers, grade and slope adjustments, backfill and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**305.04.01** Standard Inlets and Manholes specified in the Contract Documents will be measured and paid for at the Contract unit price per each. When a structure exceeds the standard minimum depth specified in the Contract Documents, an additional payment will be made for the excess depth at the Contract unit price per linear foot for the pertinent Vertical Depth item.

**305.04.02** Standard End Walls, Headwalls, End Sections and Special Structures will be measured and paid for at the Contract unit price per each.

**305.04.03** Nonstandard End Walls and other miscellaneous structures such as steps, spring boxes, and junction boxes, constructed using brick masonry or concrete will be measured and paid for at the Contract unit price per cubic yard unless otherwise specified in the Contract Documents.

**305.04.04** No separate or additional measurement will be made for any precast concrete units, metal or castings used in the construction of any of the items noted above.

**305.04.05** Cleaning Existing Inlets will be measured and paid for at the Contract unit price per each, regardless of type, size, or depth of the inlet.

**305.04.06** When an existing drainage structure is to be removed and replaced with a new drainage structure in the same location, the cost to remove the existing drainage structure and a section of the existing pipe will be incidental to the cost of the new drainage structure.

## SECTION 306 — UNDERDRAINS, SUBGRADE DRAINS, AND SPRING CONTROL

**306.01 DESCRIPTION.** This work shall consist of constructing underdrains, subgrade drains, underdrain for spring control, underdrain pipe outlets, and blind drains using pipe, geotextile, and granular material as specified in the Contract Documents or as directed by the Engineer. Cleaning existing underdrain outlets is also included in this work.

### 306.02 MATERIALS.

No 57 Aggregate	901.01
Concrete Mix No. 2	902.10
Pipe	905
Geotextile, Class as specified	921.09
Securing Pins or Staples	921.09
Flexible Delineator Post and Rodent Screens	As approved by the Office of Materials and Technology

**306.03 CONSTRUCTION.** The Contractor shall coordinate the field installation of traffic barrier, signs, lighting, and landscaping with the Engineer to avoid any damage to the underdrains, subgrade drains, or outlet pipes. Any damage to the underdrains, subgrade drains, or outlet pipes shall be corrected to the satisfaction of the Engineer.

**306.03.01 Excavation.** Trenches shall be excavated to the dimensions and grade specified in the Contract Documents or as directed by the Engineer. The sides and bottom of trenches shall be smooth and uniform to prevent tearing of the geotextile when backfilling. Refer to 402.03.01 for excavated material.

**306.03.02 Geotextile.** Geotextile, when specified, shall be placed in conformance with the Contract Documents. The machine direction of the geotextile shall be parallel to the longitudinal direction of the trench. The geotextile shall be of sufficient width to completely enclose the underdrain trench including any specified overlaps.

The geotextile shall be placed tightly against the underdrain trench to eliminate voids beneath the geotextile. Wrinkles and folds in the