

SECTION 322 - STORM DRAINAGE AND STORMWATER MANAGEMENT

322.01 DESCRIPTION

Work includes all labor, material and equipment to construct storm drain systems and stormwater management facilities, including all appurtenances as shown on the drawings and as specified. The work shall include, but not be limited to, excavation, dewatering, backfilling, concrete and masonry work, embankments, filters, outlet works, structures, piping, appurtenances, completion of as built plans and closure of DPS permit, and all incidental items to complete the work as shown on the Drawings and as specified.

322.01.2 QUALITY ASSURANCE

- A. The following, referred to as reference specifications, are made part of these specifications where noted herein:
1. Maryland DNR, WRA, Stormwater Management Division Standards and Specifications for Infiltration, February 1984.
 2. Montgomery County Government Department of Transportation Storm Drain Design Criteria and Standards latest edition.
 3. USDA Natural Resources Conservation Service –Maryland Code No. 378 Standards and Specifications for Ponds, latest edition.
 4. Maryland Department of the Environment 2000 Maryland Stormwater Management Design Manual, Volumes I and II.
 5. Maryland Department of Transportation State Highway Administration Standard Specifications for Construction and Materials, July 2008.
 6. Montgomery County Department of Permitting Services (MCDPS) –Water Resources current construction standards and specifications for stormwater management facilities.

322.02 MATERIALS

- A. Pipe: MSHA Standard Specifications for Construction and Material, January 2008, Section 905. All reinforced concrete pipes through stormwater management embankments shall have bell and spigot joints with rubber gaskets and conform to ASTM Designation C-361, Type A-25, unless otherwise specified on Drawings.

Storm drain pipes, as installed, will conform as applicable to the following minimum standards:

Reinforced Concrete Pipe -----	A.A.S.H.T.O	M-170
Corrugated Steel Pipe -----	A.A.S.H.T.O	M-36
Corrugated Aluminum Pipe -----	A.A.S.H.T.O.	M-196

All corrugated metal pipe will be helically corrugated, 16 gauge minimum, with ½” x 2 2/3” corrugations, unless otherwise noted.

Pipes labeled CMP on this plan may be either steel or aluminum. Aluminum surfaces that are in contact with concrete will be painted with one coat of zinc chromate primer.

- B. Portland cement concrete, structures.: MSHA Standard Specifications for Construction and materials, January 2008, Sections 414, 902, 905, 908, 909, 911, 913, 915, 917, and 921.
- C. Precast Concrete structures: MSHA Standard Specifications for construction and materials, January 2008, Section 305.03.06.
- D. Brick for inlets: MSHA Standard Specifications for construction and materials, January 2008, Section 903.
 - 1. Cement for mortar: MSHA Standard Specifications for Construction and Materials, January 2008, Section 902.
 - 2. Sand for mortar: MSHA Standard Specifications for Construction and Materials, January 2008, Section 901.01, Table 901A.
- E. Pipe joint material: Shall be in conformance with the State of Maryland Highway Standard Specifications Section 907.06.
- F. Manholes and miscellaneous structures shall meet the requirements of Montgomery County DPWT Standards. All storm drain structures are subject to modification by the engineer to meet field conditions. Where the drop on the main line through a structure can be accommodated by an invert slope of 1 ½:1 flatter, a rounded channel lined with sewer brick on edge will be built to the crown of the pipes.
- G. Embankment material: Shall be as specified on Drawings, required by appropriate reference documents, and confirmed by on-site Geotechnical Engineer.
- H. Cast-in-place concrete: Refer to Section 500.
- I. Filter media: All filter media shall confirm to the latest Montgomery County standards for the individual device.

322.03 CONSTRUCTION

- A. Storm Drainage
 - 1. Handling and alignment of pipe: Pipe shall be carefully handled and lowered into the trench. In laying pipe, special care shall be taken to insure that each length shall abut against the next in such a manner that there shall be no shoulder or unevenness of any kind along the inside of the bottom half of the pipe line.

2. Bedding of Pipe: Before joints are made, each pipe shall be well bedded on a solid foundation and no pipe shall be brought into position until the preceding length has been thoroughly embedded and secured in place. Any defects due to settlement shall be made good by the Contractor at his own expense. Bell holes shall be dug sufficiently large to insure the making of proper joints. *Trench bedding materials shall comply with MCDPWT standard Class C trenching condition.* Where any portion of the proposed storm drain system is located in a fill section, provide select fill material compacted to 95% A.A.S.H.T.O. T-99 density from original undisturbed ground up to structure bottom slabs and pipe bedding. All bedding will be class C in accordance with Montgomery County standards, unless otherwise noted. H.D.P.E. Pipe requires AASHTO class (M-294), ASTM class 3 (D-2321) select bedding material.
3. Equipment for handling material: Proper and suitable tools and appliances for the safe and convenient handling and laying of pipes shall be used.
4. Cleaning pipe: The pipes shall be thoroughly cleaned before they are laid and shall be kept clean until acceptance of the completed work. The open ends of all pipelines shall be provided with a stopper carefully fitted so as to keep dirt and other substances from entering. This stopper shall be kept in the end of the pipe line at all times when laying is not in actual progress.
5. Cutting the pipe: Whenever a pipe requires cutting, to fit into the line or to bring it to the required location, the work shall be done in a satisfactory manner so as to leave a smooth end. Cost of cutting the pipe shall be included in the unit price for the pipe.
6. Trench water: The excavation in which the pipe is being laid shall be kept free from water and no joint shall be made under water. Water shall not be allowed to rise in the excavation until the joint material has received its set. Care shall be used to secure water tightness and to prevent damage to, or disturbing of, the joints during the backfilling process, or at any other time.
7. Laying the pipe in freezing weather: No pipe shall be laid upon a foundation into which frost has penetrated, nor at any time when the Commission Construction Manager shall deem that there is danger of the formation of ice or the penetration of frost at the bottom of excavation, unless all required precautions as to the minimum length of open trench and promptness of backfilling are observed.
8. Grade all disturbed areas to provide positive drainage.

B. Stormwater Management

The construction of all stormwater management facilities shall conform to the approved drawings, Montgomery County Stormwater Management construction standards, MDE Stormwater Design Manual Volumes I&II, and the State of Maryland Highway Standard

Specifications. The Contractor is responsible for fully understanding the design and function of the proposed facilities and for constructing facilities in full compliance with design standards. The Contractor shall identify an Engineer in Charge to oversee and inspect construction of the facilities under the direction of a Professional Engineer registered in the State of Maryland and familiar with the design, construction, and function of these facilities.

Any adjustments to the construction of the facilities shall be reviewed and approved by this independent firm and they shall provide a sealed certification documenting full compliance with the design standards and intent.

The Contractor shall verify all critical inverts and elevations throughout construction to verify conformance with the design and standards. This information shall be provided to the Commission's Construction Manager at stages during construction as determined in the field for each individual project. The Contractor shall make any corrections and adjustments required to fully provide required design volumes, function, and structural integrity of facilities at no additional cost to the owner. The Contractor shall also verify that all site improvements, flow paths, and drainage areas to each facility are in conformance with the approved design plans.

The Contractor is responsible for providing As-Built plans certified by the Engineer in Charge and appropriate support documents to MCDPS in accordance with the standards and Checklist requirements in place at the time of construction, such as DPS As-Built/Record Drawing Plan review Checklist. The Contractor shall make any and all repairs and/or modifications required to obtain As-Built approval by MCDPS and final release of permit at no additional costs to the owner. The Contractor shall be solely responsible for maintenance of all stormwater-related facilities until final acceptance of the facilities by MCDPS, and shall perform full cleanout and/or dredging of facilities prior turn over to the owner.

322.04 MEASUREMENT AND PAYMENT

Payment will be full compensation for all material, labor, equipment, tools and incidental items necessary to complete the work. Payment shall be made on a unit rate or lump sum basis as shown in the bid proposal. Payment for as built drawing and closure of stormwater management permit will be paid under section 111 – As Built Drawing (Record Drawing) and Support Documentations. Full Payment for stormwater management related bid items (up to 20% of the full value of this item) maybe withheld at the discretion of the Commission pending MCDPS approval of as built plans.