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5.16 SUPPLY OF REINFORCED CONCRETE PIPE AND RELATED JUNCTIONS, FITTINGS AND MATERIALS

5.16.1 GENERAL

This specification covers the supply and fabrication of the following material by the Contractor:

- (1) Reinforced Concrete Pipe
- (2) Joints and Fittings utilizing Reinforced Concrete Pipe
- (3) Precast Reinforced Concrete Manhole Risers and Tops
- (4) Concrete Masonry Units for Construction of Catch Basins and Manhole
- (5) Rubber Gasket Joints, and
- (6) Cement Mortar

All references to "Standards" or "Specifications" refer to the latest edition at the time of tender.

5.16.2 MATERIALS

5.16.2.1 **Reinforced Concrete Pipe**

5.16.2.1.1 Round and Elliptical Pipe

Reinforced Concrete Pipe shall conform to the material and fabrication requirements of the A.S.T.M. Specification C 76M.

The following information shall be clearly marked on each section of pipe:

- (1) The pipe class
- (2) The date of manufacture, and
- (3) The name or trade-mark of the manufacturer.

This information shall be marked on the outside for pipe sizes up to and including 900 mm diameter and on the inside for pipe sizes over 900 mm diameter.

End sections shall be supplied with either square or sloped ends as required by the order. The dimensions of the sloped ends shall conform to details shown on the plans herein.

5.16.2.1.2 Curved Pipe Sections

Curved pipe sections shall conform to all the specification requirements of Round and Elliptical Pipe as described in Section 5.16.2.1.1.

The ends of the pipe sections shall be bevelled to the degree corresponding to the desired radius of curvature and shall be so formed that when the pipe sections are laid together they will form a continuous and uniform curved line.

5.16.2.1.3 Joints, Fittings and Bends

Joints and fittings shall include special sections fabricated for the purpose of connecting manholes and branch lines to the main conduit. The pipe sections utilized in forming the joint, fitting or bend shall conform to all the specification requirements of Round and Elliptical Pipe as specified in Section 5.16.2.1.1. The Sections shall be fabricated to form an integral unit, and the class of pipe shall be not less than specified on the detail drawing for the unit. The connection at the joint shall permit the utilization and development of the same degree of beam and circumferential strength as the main section of the conduit adjacent thereto.

Manhole fittings shall be provided with ladder rungs of the size and at the spacing shown on the detail drawing.

5.16.2.2 Precast Reinforced Concrete Manhole Risers and Tops

Precast Reinforced Concrete Manhole Risers and Tops shall conform to all the material and fabrication requirements of the A.S.T.M. Specification C 478.

5.16.2.3 Concrete Masonry Units for Construction of Catch Basins and Manholes

Concrete masonry units for construction of catch basins and manholes shall conform to all the material and fabrication requirements of the A.S.T.M. Specification C 139.

5.16.2.4 Rubber Gasket Joints

Joints for circular concrete sewer and culvert pipe using flexible watertight rubber-type gaskets shall conform to all the material and fabrication requirements of A.S.T.M. Specification C 443.

5.16.2.5 Cement Mortar

The cement mortar mixture shall be composed of one part Portland Cement and two parts sand by volume. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar. The sand shall conform to the requirements of A.A.S.H.T.O. Specification M 45-83I, or shall be an equivalent, subject to approval by the Consultant. The cement shall conform to the requirements of A.A.S.H.T.O. Specification M85-84I.

5.16.3 INSPECTION, SAMPLING AND TESTING

All materials shall be subject to inspection, sampling and quality assurance testing by the Consultant and the Contractor shall provide safe, convenient access, acceptable to the Consultant, for inspection and sampling of the materials, and shall co-operate in the inspection and sampling process when requested to do so. Inspection, sampling and testing of Reinforced Concrete Pipe and related joints and fittings shall be in accordance with the methods prescribed in A.S.T.M. Specification C 76M. In particular, acceptance shall be on the basis of load bearing tests, material tests and inspection of the completed product.

Inspection, sampling and testing of Precast Reinforced Concrete Manhole Risers and Tops shall be in accordance with the methods prescribed in A.S.T.M. Specification C 478.

Inspection, sampling and testing of Concrete Masonry Units for Construction of Catch Basins and Manholes shall be in accordance with the methods prescribed in A.S.T.M. Specification C 139.

All materials which do not meet requirements of the specifications shall be rejected. No rejected material, the defects of which have subsequently been corrected, shall be used unless approval in writing has been given by the Consultant. Stocked materials, even though accepted in delivery, shall be subject to test and shall meet requirements of the specifications at the time they are to be used in the work.

5.16.4 MEASUREMENT AND PAYMENT

Payment for the supply of reinforced concrete pipe including couplers, related junctions, fittings and appurtenances will be included in the unit price bid per metre for "Culverts - Supply and Install" for the applicable types and sizes of culvert specified.