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**2.22 PLASTIC CULVERT EXTENSIONS AND CULVERT LINERS****2.22.1 GENERAL**

This specification covers the installation of plastic pipes as liners inside existing culverts, and extensions of these plastic pipes beyond the ends of the existing culverts.

**2.22.2 MATERIALS****2.22.2.1 Plastic Pipe**

The Contractor shall supply plastic pipe complete with all necessary material required to join the plastic pipe sections in accordance with Specification 5.17, Supply of Polyvinyl Chloride Pipe and Specification 5.24, Supply of Polyethylene Pipe.

**2.22.2.2 Grout**

The Contractor shall supply grout suitable for low pressure pumping into the void between the plastic pipe used as a liner and the surrounding existing culvert and which has a minimum compressive strength of 500 kPa at 28 days.

Cement shall be sulphate resistant.

**2.22.3 CONSTRUCTION****2.22.3.1 Preparation For Installation**

The Contractor shall prepare the designated existing culverts for installation of the culvert liners by flushing and scouring the existing culverts with water under pressure, and by inspecting and correcting any minor protrusions within the existing culvert.

**2.22.3.2 Liner Installation**

The Contractor shall excavate or clear a trench for assembly of liner pipes at the upstream end of the existing culvert. He shall then push or pull the plastic pipe through the existing culvert with the spigot end first (working down grade) preventing any damage to the liner and connecting sections thereafter securely joined together. Pipes shall be joined together to form a flexible, watertight seal. Joints shall not be deflected beyond the manufacture's recommended maximum.

The Contractor will ensure that the liner remains at the existing culvert invert elevation during the grouting operation. Liners shall be installed in accordance with drawing CB6-2.29M1, Plastic Liner Installation and Grouting within Existing Culverts.

**2.22.3.3 Grouting**

The Contractor shall place grout using a low pressure pump to fill the void completely. Due care must be taken when pressure pumping so that excessive pressure will not damage the liner. When extension of the plastic culverts beyond the ends of the existing pipe is required, the Contractor shall complete grouting of the liner pipe before completing the backfill of the extension pipe and allow the Consultant to observe the grouting operation and the completion of the grouting.

**2.22.3.4 Plastic Pipe Culvert Extension Installation**

Extensions to existing plastic pipes or liners shall be made in accordance with Specification 2.4, Culverts, modified as follows:

- Plastic pipe shall be placed on the prepared base, with the separate sections securely joined with joints as specified in the applicable sections of Specifications 5.17 and 5.24.
- The pipe shall be installed true to the lines and grades as established by the Consultant. When designated, elbows shall be installed at locations as established to accommodate sharp changes in gradient or direction of the pipe.
- Backfilling and sloping the ends of plastic pipe shall be performed in accordance with Section 2.4.3.3.2, Backfilling Polyethylene Pipe.

**2.22.4 MEASUREMENT AND PAYMENT****2.22.4.1 Supply and Install Plastic Liner**

Measurement for the supply and installation of plastic culvert liners will be in metres based on the length along the centreline invert of pipe installed as a liner.

Payment will be made at the unit price bid per metre for "Culvert Liner - Supply and Install" for the applicable size of culvert as indicated in the unit price schedule. This payment will be full compensation for supplying all materials, flushing of existing culverts, correcting any protrusions in existing culverts, any excavation required for pipe assembly, installing the liner, end treatment if required, and the use of all equipment, tools, labour and incidentals necessary to complete the plastic culvert liner installation.

When, in the opinion of the Consultant, the installation of a liner must be abandoned before completion through no fault of the Contractor, payment will be made for the pipe installed at the applicable unit prices.

**2.22.4.2 Supply and Install Grout**

The Contractor shall provide a suitable means to measure the quantity of grout that has been placed into voids between the liner and the culvert to the nearest tenth of a cubic metre.

Payment for grouting will be made at the unit price bid per cubic metre for "Grouting Liners". This price will be full compensation for supplying all materials and equipment, installing the grout and all work incidental to the completed installation.

**2.22.4.3 Plastic Culvert Extensions**

Measurement and payment for the supply and installation of plastic culvert extensions will be made in accordance with Specification 2.4, Culverts.