6.2 REINFORCED CONCRETE CULVERT PIPES

6.2.1 Description

This work shall consist of concrete culvert pipes furnished and installed at such locations as are shown on the Drawings or as directed by the Engineer in accordance with these Specifications and in accordance with the classes, lines, levels, grades and dimensions shown on the Drawings.

The work shall include the furnishing and construction of such joints and such connections to other pipes, catch basins, manholes, walls and other items as may be required to complete the structure as shown on the Drawings. The work shall also include connection of existing drains, which have been interrupted by the road construction, to the new drainage system as directed by the Engineer.

6.2.2 Materials

6.2.2.1 Reinforced Concrete Pipe

Reinforced concrete pipes for culverts shall be constructed fully in accordance with the Drawings and Sections 5.1 and 5.2 of these Specifications.

6.2.2.2 Mortar

Mortar for joints shall contain one part Portland cement and two parts sand by dry volume unless otherwise required by the Drawings or the Specifications.

The amount of water in the mix shall be such that the consistency of the mortar is suitable for the purpose intended and to the satisfaction of the Engineer.

All mortar shall be used within 30 minutes of adding the water.

6.2.2.3 Reinforcement

Steel reinforcement shall be in accordance with Section 5.2 of these Specifications, except where modified by the Drawings.

6.2.2.4 Bricks

Bricks shall be in accordance with Section 5.5 of these Specifications.

6.2.3 Construction Methods

6.2.3.1 General

Pipes shall either be laid in existing ground, or if to be placed under the embankment fill this shall have been constructed to a height greater than the crown of the pipe in accordance with Section 2.6, before the Contractor will be permitted to excavate to place the pipes.

6.2.3.2 Excavation

The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe.

Before laying, the ground shall be trimmed true to line and grade, as directed by the Engineer, over sufficient width to permit satisfactory construction of the bedding.
Special care shall be taken to remove any hard or deleterious material from the foundation area.

When soft, spongy or unstable soil is encountered, such soil shall be removed under the pipe for a width and to a depth as directed by the Engineer and replaced with sand or other suitable selected material properly compacted to provide adequate support for the pipe.

The prepared surface shall provide a firm foundation of uniform density throughout the length of the culvert.

Excavated materials classified as suitable should either be utilised as back filling, embankment fill or if surplus be stockpiled on site as described in Section 2.2.3.4 of these Specifications. Excavated material classed as unsuitable shall be carried stockpiled as described in Section 2.2.3.3 of these Specifications.

6.2.3.3 Bedding

Bedding for pipe culverts shall conform to the requirements given below for Class “A” or “B” bedding, whichever is called for on the Drawings or by the Engineer.

If the class of bedding is not shown, Class “B” bedding shall be provided.

A) Class “A” Bedding - Concrete cradle for pipe culverts shall consist of a continuous concrete cradle constructed of Class 15 concrete in conformity with the details shown on the Drawings and the requirements of Section 5.1 of these Specifications.

B) Class “B” Bedding - Class “B” bedding shall be constructed by bedding the pipe culverts in a trench cut in the natural ground or embankment to a depth as shown on the Drawings. The pipe culverts shall be bedded on a thickness of bedding material as shown on the Drawings accurately shaped by a template to fit the lower part of the pipe culvert exterior.

6.2.3.4 Installation

All concrete culvert pipes shall be laid with reinforced and mortared joints. The pipe shall be laid carefully and in straight lines. Before succeeding sections of pipe are laid, the lower half of the groove of the proceeding section shall be plastered on the inside with cement mortar of sufficient thickness to bring the inner surface of the abutting pipes flush and even. At the same time the upper half of the succeeding pipe shall be similarly plastered with mortar. After the pipe is laid, the remainder of the joint shall be filled with similar mortar, and sufficient additional mortar shall be used to form a bead around the joint. The inside of the joint shall be wiped and finished smooth. The mortar on the outside shall be protected with brickwork to allow backfilling to proceed.

6.2.3.5 Backfilling

Backfilling shall be carried out with material as indicated on the Drawings. It shall be placed in uniform layers not exceeding 15 centimetres in uncompacted depth and compacted as embankment fill for layers at the depths concerned below subgrade. Special care shall be taken to compact the material under the haunches of the pipe and to ensure that the backfill shall be brought up evenly on both sides of the pipe.

Sand fill for bedding shall conform to the requirements for backfill of sand to structures in Section 2.5. Embankment fill shall conform of the requirements of Section 2.6.
6.2.4 Measurement

Culvert pipe shall be measured as the linear metres from end to end of each pipe structure, complete and accepted in place.

Excavation, bedding or concrete surrounding, backfill and tamped fill as well as cutting of holes for connection pipes will be considered incidental to the laying of the pipe and will not be measured as such. Headwalls shall be measured and paid for in accordance with Section 6.3.

6.2.5 Payment

Reinforced concrete culvert pipe measured as provided above shall be paid for at the Contract unit price per linear metre for the particular size specified on the Drawings. The price shall be full compensation for furnishing, hauling and installing the pipe, jointing, excavation, dewatering, pumping and bailing, bedding, backfilling, compaction and for all labour, tools, equipment and incidentals necessary to complete the work.

Pay items shall be:

6/2/1 Reinforced Concrete Culvert Pipe - Class A bedding (Diameter as Specified)  Linear Metre
6/2/2 Reinforced Concrete Culvert Pipe - Class B bedding (Diameter as Specified)  Linear Metre