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## 2.7 UNDERGROUND ELECTRICAL CONDUITS

### 2.7.1 GENERAL

#### 2.7.1.1 **Description**

This specification covers the supply and installation of underground electrical conduit and appurtenances.

### 2.7.2 MATERIALS

All materials shall be supplied by the Contractor in accordance with Drawings CB6-2.7M1 and CB6-2.7M2 and the following:

#### 2.7.2.1 **Conduit**

The Contractor shall supply the conduit with all necessary couplings, fittings and cement. Flexible conduit for underground electrical installation shall be heavy duty 75 psi medium density polyethylene made to quality assurance Z299.3.

Rigid conduit for underground electrical installation shall be polyvinyl chloride pipe, type DB2 conforming to CSA Standard B196-1, or latest revision, or as permitted under Clause 446 of the Electrical Utility Regulations, Alberta Labour.

#### 2.7.2.2 **Fish Wire**

Fish wire (brace wire) shall be 3.66 mm soft galvanized wire with a minimum weight of 2.5 kg per 30.5 m of wire.

#### 2.7.2.3 **Conduit Locating Pins**

Conduit locating pins shall be 450 mm X 12 mm bent steel, deformed bars, or 300 mm X 10 mm spikes, as required.

#### 2.7.2.4 **Select Backfill Material**

Select backfill material may be the previously excavated material free of lumps and stones larger than 25 mm in diameter, sand, uncrushed rock not exceeding 25 mm in diameter, or crushed rock not exceeding 16 mm in diameter.

### 2.7.3 CONSTRUCTION

#### 2.7.3.1 **General**

The conduit shall be installed by either the trench excavation or pushed conduit method in accordance with Drawings CB6-2.7M1 and CB6-2.7M2. Underground conduit shall normally be trench excavated except where underground conduit is designated to be placed under existing pavement or surfacing structure, in which case the conduit shall be installed by the pushed conduit method.

The fish wire shall be placed in the conduit and wound around the conduit locating pins for future assistance in locating the ends of the conduit.

Conduit required to be installed concurrently with a grading operation shall be installed upon completion of the subgrade construction.

### **2.7.3.2 Trench Excavation**

A trench shall be excavated to the depth and grade required, and a base shall be formed to provide a firm foundation of uniform density throughout the length of the trench. The trench shall be no wider than necessary to permit satisfactory installation of the conduit and thorough compaction of the backfill material around the conduit. The excavation shall be performed in such a manner as to cause the least possible damage to the adjacent embankment surface and other improvements.

Excavation through roadways open for use by public traffic shall be performed in such a manner that not more than one traffic lane is restricted at any time.

### **2.7.3.3 Pushed Conduit**

Installation by means of augering, drilling, or pushing shall be classified as pushed conduit. Pushed conduit shall be installed at a minimum depth of 0.8 metres below the existing surface. The Contractor shall not be allowed to cut the existing surface without permission from the Consultant. Permission to cut the existing surface will not be considered unless the Contractor has made a minimum of three workmanlike attempts at each crossing and has been unable to successfully install the conduit by pushing.

The diameter of the auger or drill bit shall not exceed the diameter of the conduit by more than 50 mm.

### **2.7.3.4 Placing Conduit and Backfill**

The conduit shall be placed in the prepared trench. Select backfill material shall be used in the first 0.15 m layer of backfill and shall be left untamped. The remaining backfill comprised of the previously excavated material or select backfill material shall be placed in layers not exceeding 0.15 m in depth and shall be thoroughly compacted for the full limits of the trench. Excess excavated material shall be deposited in embankment or uniformly distributed, as directed by the Consultant, and any disturbed areas shall be shaped and left in a neat and tidy condition.

When excavation of trenches for installation of conduit requires the removal of concrete, asphalt pavement, asphalt bases and/or base materials, the Contractor shall replace and reconstruct the disturbed portion of the surface with materials of equal quality. The work shall be left in a condition satisfactory to the Consultant and shall conform with the adjacent surface.

Flexible conduit shall be placed in continuous lengths with no joints between junction or pole bases.

Rigid conduits may be jointed with approved couplings cemented in accordance with the manufacturer's instructions.

2.7.4 MEASUREMENT AND PAYMENT

2.7.4.1 **Underground Electrical Conduit - Trench Excavation**

Conduit installed by the trench excavation method will be measured by the length in metres of conduit pipe complete in place.

Conduit installed by the trench excavation method will be paid for at the price bid per metre for "Underground Electrical Conduit - Supply and Install - Trench Excavation". This payment will be full compensation for excavating and preparing the base, supplying, hauling and placing select backfill material, supplying and installing all conduit materials, backfilling, compacting, site restoration, traffic accommodation, and all labour, equipment, tools and incidentals necessary to complete the work in accordance with the plans and specifications herein.

Replacement and reconstruction of disturbed portions of the subgrade will not be measured or paid for separately, but shall be considered incidental to the Work.

2.7.4.2 **Underground Electrical Conduit - Pushed Conduit**

Pushed conduit installation will be measured by the length in metres of the augered hole. Any remaining conduit extending beyond the augered hole will be measured as "Underground Electrical Conduit - Trench Excavation".

Pushed conduit installation will be paid for at the price bid per metre for "Underground Electrical Conduit - Supply and Install - Pushed Conduit". This payment will be full compensation for traffic accommodation, excavating, preparing and backfilling of the pit excavations, supplying and installing all conduit materials, compacting, site restoration, and all labour, equipment, tools and incidentals necessary to complete the work in accordance with the plans and specifications herein.

In the event that the Contractor has to cut the existing surface, removal, replacement and reconstruction of disturbed portions of concrete, asphaltic pavement, asphaltic bases and/or base material will not be measured and paid for separately, but shall be included in the price bid per metre for "Underground Electrical Conduit - Supply and Install - Pushed Conduit".