

Policy 11: Land Development Guidelines

SS6

Specification for Underground Public Utility Service Conduits

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1.0 General

- 1.1 The work covered by this specification comprises the installation of conduits across roadways and footpaths for water, gas, electricity and telecommunication services; installation of conduits longitudinally along footpaths for electricity and telecommunication services, and fixing of brass indicator discs embossed 'W', 'G', 'T' and 'E' respectively at water, gas, telecommunication and electricity conduit locations, including supply of materials as specified herein.

2.0 Acts, Regulations and Local Laws

- 2.1 The Contractor shall comply with all Acts, Local Laws and Regulations having jurisdiction over work under the Contract and shall be fully responsible for any breaches thereof.

3.0 Location and Setting Out

- 3.1 Conduits shall be constructed at locations and to details, lines and depths shown on the drawings approved by the relevant Authority or as directed by the Superintendent during construction.
- 3.2 The Contractor shall ensure that the utility trenches are on the correct alignment measured from property boundaries. Failure by the Contractor to arrange its work in this way will result in the services being re-laid on the correct alignment at the Contractor's expense. It shall be the Contractor's responsibility to ensure that sufficient survey information is available so that it may accurately set out this work on the correct alignment.

4.0 Trenches

- 4.1 Trenches shall be excavated to the dimensions shown on the drawings. The bottoms of trenches shall be firm and smooth and where they change in level from footpath to roadway or up an embankment, the change shall be gradual. Trenches shall be excavated so that the conduits may be laid with 75mm clearance all around from other obstructions. Conduits shall be bedded for 120 degrees of their circumference on at least 75mm of compacted approved sand or approved trench backfill material.
- 4.2 Unless otherwise approved by the Superintendent trenches across roadways and pavement areas shall be excavated before pavement material has been placed. Trenches along footpaths shall be excavated before topsoiling and grassing has been carried out.
- 4.3 Excavation in all materials where referred to herein shall include removal of rubbish, tree stumps, roots, etc. encountered, and making good poor or uneven foundations with approved material or additional bedding sand as directed by the Superintendent.

5.0 Material for Utility Service Conduits

- 5.1 All uPVC pipe conduits, joints and couplings shall comply with **AS1477**, **AS2053** and **AS2439** and shall be of the class specified on the drawings or Bill of Quantities.
- 5.2 Water Service conduits shall comply with **AS/NZS 1477 Series 1**.
All Water Service Conduits shall be DN100 PN 12 P.V.C. pressure pipes with solvent cement joints.
- 5.3 Unless otherwise stated in the Bill of Quantities or directed by the Superintendent conduits for electricity services shall comply with Energex specification – **U.R.D. Installation of Cables, Conduits, Service, Pillars and Padmount Substation Sites in Underground Residential Subdivisions**.
- 5.4 When materials are supplied by the Electricity, Telecommunication and Gas Authorities, the following shall apply:
- i) It shall be the Contractor's responsibility to ensure that conduits and other materials are delivered to the Site at a time to suit its works programme.
 - ii) Should any of the supplied materials be wasted or damaged by the Contractor the Contractor shall arrange for their replacement by the Authority and pay all costs in connection therewith.
 - iii) Surplus materials remaining at the completion of conduit construction shall be returned at the Contractor's expense to the Authority's Depot from which the materials were originally supplied.

6.0 Installation of Water Conduits

- 6.1 Water conduits shall be located and installed as shown on the drawings or as directed by the Superintendent.
- 6.2 During laying and backfill operations conduits shall remain true to line and level.

7.0 Installation of Electrical Conduits

- 7.1 Electrical conduits shall be located as shown on the drawings or as directed by the Superintendent. They shall be installed in accordance with Energex specification URD referred to in **Clause 5.3** herein.

8.0 Installation of Telecommunication Conduits

- 8.1 Telecommunication conduits shall be located as shown on the drawings or as directed by the Superintendent. They shall be installed as required by Telecommunication Authorities.

9.0 Installation of Gas Conduits

- 9.1 Gas conduits shall be located as shown on the drawings or as directed by the Superintendent. They shall be installed as required by the Gas Authority.

10.0 Liaison with Public Utility Authorities

- 10.1 The Contractor shall liaise with all relevant Public Utility Authorities prior to completion of earthworks and commencement of pavement material to ensure correct sequence of construction activities.
- 10.2 Where the utility conduits are supplied by the service authority it shall be the Contractor's responsibility to request transport and receive the conduit material.

11.0 End Caps

- 11.1 After laying, all conduits shall be cleaned internally and subjected to the Superintendent's inspection before end caps are installed.

12.0 Brass Marker Discs

- 12.1 Brass marker discs shall be supplied and installed in accordance with the drawings.
- 12.2 In locations where there is no kerb and channel, concrete marker blocks shall be constructed. The marker blocks shall consist of Grade N25 concrete blocks 225 mm x 75 mm x 450 mm long with indentation for the indicator disc centrally placed on the top face of each block.

13.0 Backfill and Compaction

- 13.1 No service conduits shall be covered and backfilled until they have been inspected and approved by the Superintendent.
- 13.2 Backfill material shall be compacted by mechanical means to the standard specified in **Table 1** herein.

Table 1

Area of Work	Relative Compaction Required		Minimum Test Frequency ^{1,3}
	Cohesive Material	Non-Cohesive Material ²	
Backfill to Trenches			
Under roads to a depth 0.3m below sub-grade level	≥ 98% Std Density Ratio	≥ 80% Density Index	1 test per 2 layers per 40 linear metres
Commercial development areas	≥ 98% Std Density Ratio	≥ 70% Density Index	1 test per 2 layers per 40 linear metres
Elsewhere including under roads	≥ 95% Std Density Ratio	≥ 65% Density Index	1 test per 2 layers per 40 linear metres

Notes:

- 1 **Unless directed otherwise by the Superintendent.**
 - 2 **Non-cohesive material shall be defined as material which contains up to 5% by mass of soil particles passing a 75 μm sieve, except that silty sands with non-plastic fines may contain up to 12% passing a 75 μm sieve.**
 - 3 **For non-cohesive material, each compaction test may be replaced by three (3) Perth sand penetrometer tests provided that a correlation between the penetrometer test and the compaction test is established by the NATA accredited testing authority and approved by the Superintendent.**
- 13.3 Provision shall be made by the Contractor for outlet connections from the sand filled trenches to appropriate locations in the stormwater or sub-surface drainage system as approved by the Superintendent.
- 13.4 The Contractor shall arrange for compaction control testing of all backfill by a NATA accredited testing authority approved by the Superintendent. Testing shall be carried out in accordance with the appropriate test methods, sourced from either **Australian Standard AS1289** or the **Queensland Department of Main Roads, Materials Testing Manual**. The selection/application of test methods shall be made on a consistent basis. Inter-related tests shall be performed by methods from the same Standard/ Testing Manual.

14.0 Measurement and Payment

- 14.1 The construction of utility service conduits shall include supply of materials, excavation, removal of spoil, bedding, laying, jointing and cleaning of pipes, backfilling of trenches, cutting and plugging ends of conduits and the fixing of indicator discs to kerbing or the installation of concrete marker blocks with indicator discs where no kerb and channelling is constructed.
- 14.2 Quantities in the Bill of Quantities are horizontal linear lengths based on the dimensions and information provided on the drawings.
- 14.3 The cost of all work required by this specification shall be included in the relevant Bill Items (if part of the Contract) and/or the Lump Sum of the Contract generally.
- 14.4 Any charges to the Principal by any Service Authority for re-inspections or rectification work due to faulty workmanship or incorrect location by the Contractor will be treated as a debt due from the Contractor to the Principal.

15.0 Standards and Codes

- 15.1 This specification makes reference to the following Australian Standards:
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|---------------|--|
| AS1159 | Polyethylene Pipes for Pressure Applications |
| AS1289 | Method of Testing Soils for Engineering Purposes |
| AS1477 | Unplasticized PVC (uPVC) Pipes and Fittings for Pressure Applications |
| AS2053 | Non-Metallic Conduits and Fittings |
| AS2439 | Perforated Plastics Drainage and Effluent Pipe and Fittings |
- 15.2 Where in this specification, Australian Standards are referred to, the edition of such standard current at the time of tendering will be deemed to apply.