



Ergon Energy Corporation Limited

Specification for Installation of Underground Fibre

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1. Purpose and Scope

This section specifies requirements for the installation of underground fibre and includes trenching, under boring, conduits, installation of fibre and backfilling. The Schedule of Rates for Erection of Line Materials will cover all the works described in this Section unless specifically excluded herein.

The Contractor shall install the fibre and joint boxes including all fittings in accordance with this Section. Materials, except for the optical fibre cable, OPGW and joint boxes required to complete the works shall be provided by the Contractor. The Contractor shall be responsible for submitting all required forms, documentation and fees on behalf of Ergon Energy and shall allow for these in the schedule of rates.

The Contractor shall ensure that structures are not loaded above the permissible working loads.

Where specific requirements from other authorities differ, the more onerous shall apply.

2. References

2.1 Ergon Energy controlled documents

Underground Construction Manual
RSC09 Horizontal Directional Drilling

2.2 Other sources

MCE-SR-002 Work in or About QR Property
MCE-SR-003 Work Adjacent To Overhead Line Equipment
MCE-SR-16 Requirements for Services under the Railway Corridor
AS 4799 Installation of underground utility services and pipelines within railway boundaries
AS1289.5.5.1 Methods of testing soils for engineering purposes – Determination of the minimum and maximum dry density of a cohesionless material – Standard method

3. Acronyms, and Abbreviations

3.1 Acronyms and Abbreviations

AS Australian Standard
OPGW Optical Groundwire
OPTDR Optical Time Domain Reflectometer

4. Security

Nil

5. Safety, Environmental and Ergonomic Considerations

As per Ergon Energy's Safety, Environmental & Ergonomic Policies.

6. Requirements

All work shall comply with the following specifications and requirements

Underground Construction Manual	
RSC09	Horizontal Directional Drilling
MCE-SR-002	Work in or About QR Property
MCE-SR-003	Work Adjacent To Overhead Line Equipment
MCE-SR-16	Requirements for Services under the Railway Corridor
AS 4799	Installation of underground utility services and pipelines within railway boundaries

6.1 Backfill and Reinstatement of Excavation

6.1.1 Bedding Material

Bedding material only shall be used around conduit.

Conduit ends, including bends at each pillar location and elsewhere shall be securely supported in position during placement and compaction of bedding material.

All conduits shall be separated by compacted bedding material and spacers used to maintain separation between conduits shall be removed prior to bedding material compaction. Bedding material shall be placed in layers not exceeding 100mm, packed under and around the sides to avoid the formation of air pockets beneath pipes or collars, and finished at a level of 50mm minimum above conduits.

6.1.2 Backfilling Generally

Backfilling is to be completed as soon as practicable after the installation and Audit of conduits in trenches.

Polymeric cable protection cover shall be installed where required. Orange Caution Tape shall be installed where shown on the applicable TRENCHING drawing and backfilling continued.

Trenches in areas other than footpaths and roads e.g. private property shall be backfilled in loose layers not exceeding 250mm and compacted to achieve 95% of standard maximum dry density obtained in accordance with AS1289 5.5.1. In areas such as roadways and access tracks 98% of standard maximum dry density is required.

Rock, sharp objects or any other material that could damage conduit is not permitted in backfill within 200mm of the conduit.

6.1.3 Reinstatement of Surfaces

Permanent reinstatement of surfaces shall be carried out as soon as practical after backfilling, the surface level and finish shall match as near as possible the surface prior to excavation and be to the satisfaction of the local authority or owner and Ergon Energy as applicable. Additionally the reinstatement of concrete driveways and slabs shall include the drilling and doweling of adjoining concrete surfaces where practical during the reinstatement work.

6.2 Care of Optical Fibre Cable

Optical fibre cable shall be protected from damage at all stages of handling and installation. In particular excessive bending or crushing shall be avoided. Cable ends shall be suitably sealed to

prevent the ingress of water. Cables shall be handled using only suitable equipment and in such a manner as to prevent deformation or damage.

Conductors shall be protected from immersion in water or contamination with foreign materials. Vehicles shall not be driven over optical fibres on the ground.

Factors that can cause possible fibre damage, if they are excessive, are as follows:

- a) Tension
- b) Twisting
- c) Bending
- d) Crushing
- e) Vibration

6.3 Pre-installation Testing

6.3.1 Procedure

The attenuation of all optical fibres shall be checked at the time of delivery by the Contractor in the presence of the Superintendent or an Ergon Energy Representative. This will eliminate any possible concerns or disputes, which may occur when the cable is tested after installation. Attenuation data will be compared with that included on the Certified Test Reports supplied from the manufacturer.

After completion of this test, the Contractor shall seal the cable against water entry. This practice will be observed after each subsequent test, prior to splicing. Plastic caps shall be fitted using adhesive plastic tape to seal the ends.

6.4 Splicing and Termination of OPGW

The Contractor shall carry out the fibre terminations by fusion splicing methods such that the signal attenuation at each joint is less than 0.3 dB at 1310 nm and at 1550 nm. The average loss for all joints in any one fibre from substation to substation shall not exceed 0.12 dB. The fibre shall be arranged in the termination boxes with loops contained within trays in an orderly and consistent identifiable pattern with sufficient slack to allow re-jointing without resorting to extra optical fibre cable.

The Contractor shall be responsible for sealing the termination boxes such that they are watertight. The boxes and coiled OPGW and fibre cable shall be structurally secured in a neat and tidy manner. Materials used for securing the fibre cable and the terminal boxes shall be durable to give the required maintenance free design life of 50 years.

6.5 Post installation Testing

The attenuation of all fibres shall be checked with an OPTDR by the Contractor after installation of the OPGW and optical fibre cable and splicing of the fibres. The Contractor shall be responsible for all work and materials required to remedy any fibre defects that occurred during installation or for the remaking of joints that do not meet specification requirements.