



Ergon Energy Corporation Limited

Specification for

HORIZONTAL DIRECTIONAL

DRILLING

RSC09

Abstract: Supply of materials and installation of conduit by Trenchless Technology

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1. Purpose and Scope

This specification details Ergon Energy's requirements for the supply of materials and installation of polyethylene ducting for underground cables by Horizontal Directional Drilling where such is required beneath obstructions, or for locations where necessary access for open excavation is not accessible or allowed.

All work shall be to Ergon Energy's required Construction Standard and in accordance with the Construction Issue Plan, this specification, and referenced documents.

2. References

2.1 Ergon Energy controlled documents

This specification shall be read in conjunction with the Ergon Energy documents listed below and if conflict is found to exist between various parts of this specification & the listed documents, priority shall be given in the following order:

- RSC06, UDC Main Specification,
- Construction Issue Plan and drawings provided
- This Specification
- RSC07, UDC Civil Works specification
- Underground Construction Manual

Note: Except where varied by this specification all referenced Clauses of RSC07 UDC Civil Works specification, apply.

3. Definitions, Acronyms, and Abbreviations

3.1 Definitions

3.1.1 Generally: The definitions in RSC07 UDC Civil Works specification, clause "Definitions" apply with the addition of the following.

3.1.2 Horizontal Directional Drilling: A guided direction drilling technique for the trenchless installation of pipelines, ducts (conduits) and cables.

4. Security

Developer responsibility for civil works - All issues of security for civil works are the responsibility of the Developer.

Ergon Energy responsibility for civil works - All issues of security for civil works are the responsibility of the Contractor.

5. Safety, Environmental and Ergonomic Considerations

Refer Clause 6.

6. Acts Regulations and Requirements

6.1 Laws and Authorisations

The Contractor must comply with all Laws and relevant Authorisations;

7. Variation from Construction Issue Plan

In addition to the requirements of RSC07 UDC Civil Works specification, clause "Variation from Construction Issue Plan", refer clause 17 "Bore Log", for drilling bore log requirements.

8. Pre-start Meeting

8.1 In conjunction with UDC Civil Works Projects

Where Horizontal Directional Drilling is planned to be undertaken as part of a Project to RSC07 UDC Civil Works specification, a pre-start meeting shall be held in conjunction with the pre-start meeting requirement in that specification.

8.2 Elsewhere

Prior to the commencement of site work Ergon Energy may require a pre-start meeting between the Contractor, Liaison Person and representatives of any other authorities involved. Note the meeting shall be arranged and facilitated by the Contractor and scheduled to allow sufficient time for all issues that may be raised to be resolved prior to the commencement of site work.

Normally five (5) working days notice of a meeting is required to the Liaison Person, however, where significant travel is required from the relevant Ergon Energy Depot additional notice is required as agreed with the Liaison Person.

Items to be established include: (but not limited to)

- The correct conduit alignment, route and depth. Variations to conduit routes shall be allowed only in accordance with the requirement of RSC07 UDC Civil Works specification, clause "Variation From Construction Issue Plan".
- The location of other services along the route and the clearances required to those services.
- The number and size of conduits to be installed.
- The correct fittings to be used for connection to electrical conduit and the requirement for cable pulling pits (if any).
- Requirement of RSC07 UDC Civil Works specification, clause "Underground Services and Damage to Property".

9. Audits

9.1 General

The requirements of RSC07 UDC Civil Works specification clause "Audits" shall apply except as varied below.

9.1.1 In conjunction with UDC Civil Works Projects

Where associated with a Project being undertaken to RSC07 UDC Civil Works specification, the additional requirement of Clause 9.1.2 below shall apply.

9.1.2 Other Projects

The Contractor shall be responsible for compliance with the specification and Construction Issue Plan; however Ergon Energy may conduct Audits as defined in Clauses 9.1.2.1 & 9.1.2.2 below.

Site Audits shall normally be arranged within two (2) working days of the Liaison Person being notified. Sites where significant travel is required from the relevant Ergon Energy Depot require additional notice as agreed with the Liaison Person.

9.1.2.1 During Construction.

The Contractor shall notify the Liaison Person at the stages of construction listed below and, whilst notification is mandatory, Audits may be carried out at Ergon Energy's discretion.

Requests shall be made for Audits at the following stages:

- at setting-up for the commencement of drilling
- at completion of drilling and prior to connection to PVC conduit or backfilling.

Should the Liaison Person not be notified at the above mentioned stages of work the Liaison Person may require the Contractor to uncover conduits or undertake such other work as is deemed necessary to make a satisfactory Audit.

Additional Audits may be undertaken throughout the course of construction at the discretion of the Liaison Person.

Note that Ergon Energy shall not be liable for rectification works or replacement of materials due to erosion or subsidence, or damage from any other cause, to excavations and/or materials that may result from excavations being left open pending Audit by the Liaison Person.

9.1.2.2 Final Audit

The requirements of RSC07 UDC Civil Works specification, clause "Final Audit" shall apply.

10. Construction Manual Drawings

The requirements of RSC07 UDC Civil Works specification, clause "Construction Manual Drawings" applies.

11. Materials

The requirements of RSC07 UDC Civil Works specification, clause "Materials" applies.

12. Underground Services and Damage to Property

The requirements of RSC07 UDC Civil Works specification, clause "Underground Services and Damage to Property" applies.

13. Electricity Cable Route and Alignments

The requirements of RSC07 UDC Civil Works specification, clause “Electricity Cable Route and Alignment” applies.

14. Excavation

The requirements of RSC07 UDC Civil Works specification, clause “Trenching” applies.

15. Polyethylene Pipe Conduit

15.1 Material

Note the polyethylene pipe conduit specified has proved to be adequate for the minimum depths required. However, deeper installations including crossing under built-up roads, creeks etc may require a thicker wall conduit due to the deformation caused by factors such as the high bearing pressure of the ground / water. The Contractor is responsible for assessing whether or not the specified conduit is adequate for the particular application and is to provide a conduit of sufficient wall thickness to ensure undue deformation does not occur. Should installed conduit be deformed to the extent that cable can not be installed, or can not be installed without undue difficulty, the Contractor shall return and install an adequate polyethylene conduit at no cost to Ergon Energy. The timing of such installation shall be at the discretion of the Liaison Person.

As a minimum, conduit shall be polyethylene pressure pipe complying with AS/NZS 4130, having minimum performance equivalent to PE80 material, classification PN10.

In addition, conduit shall meet the following requirement:

- coloured orange over the entire outer surface. Co-extruded pipe is acceptable.
- marked ‘ELECTRICAL’ in accordance with AS/NZS 2053
- suitable for the mechanical forces of installation.

Note the internal diameter of polyethylene pressure pipe specified above is considerably less than comparable diameter Light Duty, rigid orange PVC to AS/NZS2053.

The following schedule of conduit sizes defines the PE pipe sizes that shall be installed for the common range of PVC conduit utilised by Ergon Energy and any proposed change requires the written agreement of the Liaison Person.

SCHEDULE OF CONDUIT SIZES				
PVC Conduit to AS/NZS 2053			Polyethylene Pipe (as specified above)	
Nominal Size (mm)	Inside Dia. (mm)		Outside Dia. (mm)	Nominal Inside Dia. (mm)
	Light Duty	Heavy Duty		
40*	-	33	63	53
80	84	79	110	94
100	108	102	125	106
125	133	125	140	118
150	151	143	180	158

*Note: Only Heavy Duty PVC used for this size.

16. Horizontal Directional Drilling

16.1. Electrical Safety

Trailing earth leads shall be provided by Ergon Energy and shall be bonded to excavation plant operated in or near Zone, Bulk Supply and Transmission Switchyards.

Should a ground-based operator be in contact with machine controls equipotential matting is required beneath the operator and shall be bonded to the machine chassis to limit operator step and touch potential. Equipotential matting shall be provided by the Contractor.

16.2. Generally

The accuracy of property boundary pegs and finished surface levels shall be established by the Contractor before drilling and installation of conduit, and the required clearance to other services shall be maintained. Conduit incorrectly located relative to final boundary locations and finished surface will be rejected and rectification shall be at no cost to Ergon Energy.

Cover to the top of conduit shall be not less than:

- the minimum depth required by the controlling road authority for any conduit installed under a roadway; and
- the minimum depth required by the Council regional/shire authority for cable installed in other locations; and
- regardless of conduit diameter the top of conduit shall in no case be less than 900mm below the finished road or ground surface.

Additional depth below ground may be necessary to avoid heaving of the surface.

Note the above requirement applies only to conduit installed in conjunction with Horizontal Directional Drilling and not to orange electrical PVC conduit that is installed together with orange warning tape via open trenching.

A tracking system shall be used to ensure the bore follows the required installation profile and achieves required clearances to underground obstructions in addition to ensuring the minimum depth of cover is maintained.

Care shall be taken to ensure conduit is not damaged during installation.

Ends shall be cleanly and squarely cut and temporarily plugged to the satisfaction of the Liaison Person.

Joints where movement may occur during cable installation, (e.g. transition joints close to bends) shall be provided with a cast concrete collar to ensure movement does not occur.

Where new works adjoin existing works and specific requirements are not detailed on the Construction Issue Plan the Contractor shall consult the Liaison Person to ascertain Ergon Energy's requirements.

If conduit has been improperly installed, jointed, or damaged, the Contractor is required to return to site and reinstall at no cost to Ergon Energy .

After installation all conduit shall be cleaned of all dirt and foreign matter and an approved unused 6mm synthetic draw cord shall be installed. If during cable installation the conduit is found not to

be clean, or the draw cord improperly installed or jointed, the Contractor may be required to return and rectify at no cost to Ergon Energy.

16.3. Work on Queensland Rail Property

Requirements of the following documentation shall apply and take precedence over the requirements of clause 16.2:

- AS 4799-2000; and
- QR documentation MCE-SR-002; MCE-SR-003; MCE-SR-16.

16.4. Rock

Where feasible, rock should be avoided and the Contractor shall notify the Liaison Person, prior to proceeding, so that alternatives may be considered. Note that any proposed change requires prior approval by the Liaison Person.

17. Bore Log

A bore log shall accompany the As Constructed Plan to confirm depth and alignment along each bore. The log shall be neat and legible, presented in tabular form. Information provided shall include for each bore, as a minimum:

- Project name and location;
- Contractor details;
- Date;
- bore No;
- size and No of conduits installed;
- depth below finished surface level to the top of the bore at approximately 3m spacing;
- alignment with property boundary; and
- other information considered necessary by either the Contractor or Liaison Person.

18. Conduit / Cable Markers

The requirements of RSC07 UDC Civil Works specification, clause “Conduit / Cable Markers” shall apply.

19. Backfill and Reinstatement of Excavation

The requirements of RSC07 UDC Civil Works specification, clause “Backfill and Reinstatement of Excavation” shall apply.

20. Clean-up on Completion

The requirements of RSC07 UDC Civil Works specification, clause “Clean-up on Completion” shall apply.

21. Faults Found During Cable Installation

The requirements of RSC07 UDC Civil Works specification, clause “Faults Found During Cable Installation – Design by Ergon Energy” shall apply.