



## AUS-SPEC

### Infrastructure Specifications

### 1392 Trenchless conduit installation

**1392 TRENCHLESS CONDUIT INSTALLATION**

IMPORTANT: This document has been adapted from the NATSPEC suite of specification templates for use in the Cessnock City Council area by both Council and industry. NATSPEC regularly updates the base templates (currently in April and October each year), and Council may incorporate changes into its version of AUS-SPEC from time to time. To assist in highlighting any changes made by Council to the NATSPEC templates, the following conventions are used.

- See ANNEXURE M at the end of this document which contains (where practical) Cessnock City Council customisations (also known as 'office master' text). References to the Annexure are to also be inserted at relevant clauses in the main body of the document.
- Where content is added to the main body of the document, it is to be shown **in brown text like this**.
- Where content is deleted or excluded from the main body of the document, it is to be shown ~~struck through like this~~. Such clauses are to have no effect.

Where there is a conflict between main body text and Cessnock City Council specific clauses, Council's specific clauses shall prevail.

## **1 GENERAL**

### **1.1 RESPONSIBILITIES**

#### **General**

Requirement: Provide conduit, pipework and pits, using trenchless technology systems, as documented.

### **1.2 CROSS REFERENCES**

#### **General**

Requirement: This worksection is not a self-contained specification. In addition to the requirements of this worksection, conform to the following:

- 0136 *General requirements (Construction)*.
- 0152 *Schedule of rates (Construction)*.
- 0161 *Quality management (Construction)*.
- 0319 *Auxiliary concrete works*.
- 1101 *Traffic management*.
- 1102 *Control of erosion and sedimentation (Construction)*.
- 1151 *Road openings and restoration*.
- **1152 *Road openings and restoration (Utility Authorities)***.
- 1341 *Water supply - reticulation (Construction)*.
- 1342 *Water supply - pump stations (Construction)*.
- 1351 *Stormwater drainage (Construction)*.
- 1352 *Pipe drainage*.
- 1361 *Sewerage systems - reticulation (Construction)*.
- 1362 *Sewerage systems - pump stations (Construction)*.
- 1391 *Service conduits*.

### **1.3 STANDARDS**

#### **General**

Concrete pipes, design and installation: To AS/NZS 3725 (2007).

Horizontal directional drilling: To the ASTT *Standard for Horizontal Directional Drilling (2015)*.

Pipe bursting: To the ASTT *Standard for Pipe Bursting (2015)*.

Microtunnelling: To the ASTT *Standard for Microtunnelling and Pipe Jacking (2015)*.

## 1.4 INTERPRETATIONS

### Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- ASTT: Australasian Society for Trenchless Technology.

### Definitions

General: For the purposes of this worksection the definitions given in the ASTT Guidelines (2010) for horizontal directional drilling, pipe bursting, microtunnelling and pipe jacking apply.

## 1.5 TOLERANCES

### General

Requirement: Install the conduit with horizontal and vertical alignments to the following tolerances:

- Horizontal position of the inlet and outlet conduit to the surveyed position:  $\pm 30$  mm.
- Vertical tolerance at the inlet/outlet of the conduit where installation commences:  $\pm 10$  mm.
- Conformance with documented average conduit grade:  $\pm 0.05\%$ .
- Conduit alignment at all joints:  $\pm 5$  mm deflection in any direction at 1.5 m from the joint.

## 1.6 SUBMISSIONS

### Authority approvals

Work located at rail and road crossings: Submit evidence of approvals from the relevant authorities including railways and road authorities.

### Calculations

Quantity calculations: Submit calculations for components such as pipes and equipment.

Submission time: 10 working days before commencement.

### Products and materials

Materials and product information: Submit product information for conduits, fittings and other components and evidence from the manufacturer that all conduit and pipework materials are suitable for the proposed method of trenchless installation.

Conduits, fittings and other components: Submit test data of conformance with the standards required in this worksection.

### Design documentations

Geotechnical information: Submit requirements for additional information.

Computer analysis: Submit analysis performed for the project methodology assessment.

Submission time: 10 working days before commencement.

### Execution details

Method statement: Submit a method statement including, as a minimum, details of the following:

- **Locations of all surrounding buried services and appurtenances, including Dial Before You Dig search results.**
- General description of methodology and sequence of operation.
- Procedures for dealing with geotechnical conditions.
- Conduit type, including details of compliance with the relevant Australian Standard and suitability to withstand the jacking forces.
- Jointing type.
- Grout type, methodology and equipment for grout injection, if required.
- Mechanical description of any motorised pumping, jacking, horizontal boring, directional drilling or mining equipment.
- Existing underground utility services, including the following:
  - . Treatment at conflict locations.
  - . Protection of services in zone of influence.
- Survey equipment and methodology.
- Direction of installation of conduit.
- Size, depth and position of temporary access pits.
- Location of temporary spoil site, if required, and the nature of haulage equipment.

- Programmed daily working hours and duration of operation.
- Strategy for dealing with noise pollution.
- Traffic management.
- Dewatering.

Submission time: 10 working days before commencement.

#### **Records**

Survey: Submit set-out survey of service conduit works.

- Submission time: 5 working days before installation.

Work-as-executed drawings: Submit drawings including service conduit system information sheets and works, **in electronic native (e.g. DWG) and open formats (e.g. DXF) with PDF copies.**

#### **Samples**

Materials: Submit samples of conduits, fittings and other components.

#### **Subcontractors**

Specialist subcontractor: Submit name and contact details of proposed contractor specialising in trenchless technology.

Contractor's personnel: Submit a training and experience register.

Submission time: 10 working days before commencement.

#### **Tests**

Load tests: Submit test data for conduits and pipework of conformance to the requirements of this worksection.

### **1.7 INSPECTIONS**

#### **Notice**

General: Give notice so that inspection may be made of the following:

- Bulkheads: Completed installation.
- Pits: Cleaned and reinstated lid.

## **2 MATERIALS**

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### **2.1 CONDUITS AND PIPEWORK**

#### **General**

Conduits and pipework: Conform to the following worksections:

- 1341 Water supply - reticulation (Construction).
- 1342 Water supply - pump stations (Construction).
- 1351 Stormwater drainage (Construction).
- 1352 Pipe drainage.
- 1361 Sewerage systems - reticulation (Construction).
- 1362 Sewerage systems - pump stations (Construction).
- 1391 Service conduits.

#### **Tests**

Load testing: Perform testing of conduit or pipework to the following standards:

- Precast concrete: Proof load test and watertightness to AS/NZS 4058 (2007).
- Heavy duty galvanized steel tube: To AS 1074 (1989).
- Flexible conduits: Bending test, flexing test, collapse test and test of pull out strength of joints to AS/NZS 61386.23 (2015).
- Rigid conduits: Bending test, flexing test, collapse test and test of pull out strength of joints, and pipe stiffness to AS/NZS 61386.21 (2015).

### 3 EXECUTION

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#### 3.1 GEOTECHNICAL

##### General

Geotechnical investigation: To AS 1726 (2017).

#### 3.2 TRENCHLESS METHODOLOGY

##### General

Required method: Use one of following methods of installation:

- Horizontal directional drilling (HDD).
- Pipe bursting.
- Microtunnelling and pipe jacking.

Methodology: Use method of installation best suited to the project and the following information:

- Geotechnical assessment.
- Cost factors. **Submit analysis demonstrating the technical infeasibility of trenching methods, and/or demonstrating that the whole-of-life costs (including maintenance, replacement and decommissioning) of the trenchless method are superior in comparison to traditional trenching, to the satisfaction of the Principal Certifier.**
- Alignment and level design.
- Pipe/conduit type required.
- System requirements.
- Crossing location.
- Pipeline route.

#### 3.3 CONSTRUCTION

##### General

Concrete work: To *0319 Auxiliary concrete works*.

Permanent and temporary pits or access chambers: To *1354 Drainage structures*.

Restoration of temporary pit surfaces: To *1151 Road openings and restoration*.

Structural renovation of non-pressure pipelines by internal lining: ASTT Spec DS-D001.

##### Installation

General: Conform to the following:

- Voids around the conduit: Eliminate by grouting before completion of works, using materials and grouting method documented in the approved method statement.
- Line and grade of conduit: To **TOLERANCES** or as documented.
- Joints on completion: Flush with the internal conduit walls and watertight.
- Bulkheads: Locate as documented. Install after conduit installation and before any grouting.
- Adjacent building foundations: Provide consistent support before, during and after installation.
- Trees: Preserve the stability and health of tree root systems marked for retention by the council's Tree Preservation Officer.

##### Bulkheads

Requirement: Provide bulkheads in conformance with the following:

- Construct in reinforced concrete as documented and to the approved method statement.
- Bond to the conduit to exclude direct grout pressure loss at the conduit/soil interface.
- Install bulkheads and provide grouting before starting construction of adjacent conduits using conventional trench techniques.

##### Protection measures

Protection: Protect buried pipes or sensitive surface structures adjacent to the installation.

Protection measures: Select from the following:

- Access chambers.
- Surface movement monitoring devices.

### 3.4 COMPLETION

#### General

Work-as-executed drawings: Record the locations of all conduits.

CCTV: Provide CCTV footage of installed pipeline and conduit conforming to the ~~1859 CCTV inspection of drainage conduits work section~~ *WSA 05-2013 Conduit Inspection Reporting Code of Australia*.

#### Pits

Requirement: Clean to remove debris and fit lids securely. *The proposed finished levels of pits are to be submitted to and approved by the roads authority (considering existing and future planned works adjacent to the installation).*

#### Testing

Ovality tolerances: Test completed conduits to the manufacturer's requirements.

Hydrostatic testing of PE pipes: To AS/NZS 2033 (2008).

## 4 ANNEXURE A

### 4.1 ANNEXURE – GEOTECHNICAL

#### Information provided

~~Geotechnical information provided:~~

*Project-specific geotechnical information provided may optionally be listed in this Annexure:*

### 4.2 ANNEXURE - SUMMARY OF HOLD AND WITNESS POINTS

*For private developments, certain Hold and Witness Points where specifically noted below require representatives of both the Superintendent and the Principal Certifier (e.g. Council) to authorise release.*

Clause and description	Type	Submission/Inspection details	Submission/Notice times	Process held
SUBMISSIONS, Authority approvals  Work located at road and rail crossings	H	Evidence of approval of the Work from the relevant authorities.	10 days before commencement	Commencement
SUBMISSIONS, Products and materials  Conduits, fittings and other components	H	Testing data of conformance to required standards.	5 days before installation	Material ordering and delivery/ Installation
SUBMISSIONS, Tests  Load tests	H	Test data verifying conformance of conduits, pipework and other components.	5 days before installation	Material ordering and delivery/ Installation
SUBMISSIONS, Samples  Materials	H	Samples of conduits, pipework and other components.	5 days before installation	Material ordering and delivery/ Installation
INSPECTIONS, Notice  Bulkheads	W – <i>Superintendent and Principal Certifier</i>	Completed installation.	5 days before inspection	-
INSPECTIONS, Notice	W – <i>Superintendent</i>	Cleaned and reinstated lid.	5 days before inspection	-

Clause and description	Type	Submission/Inspection details	Submission/Notice times	Process held
Pits	and Principal Certifier			
Note: H = Hold Point, W = Witness Point				

#### 4.3 ANNEXURE – PAY ITEMS

This schedule applies to Council projects. For private development works use of this schedule is optional, at the Superintendent's discretion.

Pay items	Unit of measurement	Schedule rate inclusions
<b>1392.1 Mobilisation, establishment and demobilisation</b>	Item	All costs associated with the mobilisation, establishment and demobilisation of the trenchless conduit installation equipment and facilities
<b>1392.2 Trenchless installation of conduit</b>	Linear metre measured including access pits along the centreline of each particular type, class and size of conduit	All costs associated with: Survey and setting out -Supply of conduit -Installation -Jointing -Lining -Grouting -Excavation, removal and disposal -Temporary pits, excavation, backfill and restoration
<b>1392.3 Bulkheads</b>	Each bulkhead completed	All costs associated with activities and materials required to complete the bulkhead structures as documented
<b>1392.4 Excavation for temporary pits</b>	m <sup>3</sup> measured as volume of excavated pit. The plan area for payment is the area calculated from the outside dimensions of the pit, as documented. The depth is determined from site measurement of the distance from the surface to the base of the pit, at the time of excavation.	The schedule rate for this Pay item is an average rate covering all types of materials encountered during excavation including earth and rock components. All costs associated with the excavation of temporary pits including stockpiling and/or disposal of materials.
<b>1392.5 Backfill for temporary pits</b>	m <sup>3</sup> of compacted material measured as the volume of the excavated pit	All costs associated with handling, backfilling, compacting and finishing of materials recovered from stockpiles from the same source as pit backfill. Include backfill and compaction, in layers as documented, and restoration of surface to pre-construction condition.
<b>Traffic management</b>	Lump sum	To 1101 <i>Traffic management</i>
<b>Erosion and sedimentation control</b>		To 1102 <i>Control of erosion and sedimentation (Construction)</i>

#### 4.4 ANNEXURE - REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS 1074	1989	Steel tubes and tubulars for ordinary service
AS 1726	2017	Geotechnical site investigations
AS/NZS 2033	2008	Installation of polyethylene pipe systems
AS/NZS 3725	2007	Design for installation of buried concrete pipes
AS/NZS 4058	2007	Precast concrete pipes (pressure and non-pressure)
AS/NZS 61386		Conduits systems for cable management

AS/NZS 61386.21	2015	Particular requirements - Rigid conduit systems
AS/NZS 61386.23	2015	Particular requirements - Flexible conduit systems
ASTT Guidelines	2010	Guidelines for horizontal directional drilling, pipe bursting, microtunnelling and pipe jacking
ASTT HDD	2015	Standard for horizontal directional drilling
ASTT Microtunnelling	2015	Standard for microtunnelling and pipe jacking
ASTT Pipe	2015	Standard for pipe bursting
ASTT Spec DS-D001	2022	Specification: Design for structural renovation of pipelines by internal lining. Part1 – Circular non-pressure pipelines
EN 15804	2012	Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
ISO 14025	2006	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 21930	2017	Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services
WSA 05-2013	2013	Conduit Inspection Reporting Code of Australia

## 5 ANNEXURE M – CESSNOCK CITY COUNCIL SPECIFIC CLAUSES

M1.	Variations to or non-conformances with Council's AUS-SPEC are to be evaluated with reference to the procedure in Council's <i>Development Engineering Handbook</i> . Acceptance is to be obtained in writing from:  an authorised representative of Council's Director of Infrastructure and Engineering Services.	<b>Variation procedure</b>
M2.	This specification applies in addition to any development consent (DA) conditions. If there is any inconsistency, the conditions of consent shall prevail.	<b>DA Conditions</b>
M3.	Refer to the Cessnock City Council <i>Development Engineering Handbook</i> for final inspection, works-as-executed and handover requirements.	<b>Completion</b>

## 6 AMENDMENT HISTORY

0	15/01/2024	First Published
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