

SECTION 733 - CONDUITS AND PITS FOR UNDERGROUND WIRING AND CABLING

##This section cross-references Section 173.

If Section 173 is relevant, it should be included in the specification.

If Section 173 is not included in the specification, all references to it should be struck out, ensuring that the remaining text is still coherent:

733.01 GENERAL

(a) Scope

This section covers the requirements for the supply and installation of conduits and pits, for underground electrical wiring and communications cabling within the state of Tasmania for works supervised by Department of State Growth. This document shall be read in conjunction with Department of State Growth Standard Drawings and individual contract documents.

(b) General requirements

The Contractor shall be responsible for the installation of all electrical and communications conduits, electrical cable pits, telecommunications pits and any other associated works covered under this specification in accordance with individual contract documents.

Conduits shall be installed in accordance with the relevant utility and industry codes, regulations and standards applying to their intended use.

All conduit and cable pit installation works for electrical wiring shall be carried out by, or under the direct site supervision of, an appropriately licenced electrical contractor and registered cabler.

(c)

733.02 MATERIALS

(a) Conduits

Unless otherwise specified, the Contractor shall provide all plastic conduits which shall comply with the following standards as appropriate:

- AS 1345 – Identification of pipes, conduits and ducts
- AS/NZS 2053 – Conduits and fittings for electrical installations

All conduits installed underground for electrical wiring, traffic signals and traffic services shall be heavy duty grade, rigid, solid wall, orange, UPVC conduit to AS/NZS 2053.2.

All conduits installed underground for communication cables shall be heavy duty grade, rigid, solid wall, white UPVC communication conduit complying with AS/NZS 2053.2, and complying with all relevant Australian Communications and Media Authority (ACMA) publications and standards.

The use of HDPE continuous conduit for bored road crossing is permitted. Where HDPE continuous conduit is used for electrical cables, it shall not be smaller in internal diameter than the specified UPVC heavy duty conduit. See Table 733.021 for typical conduit sizes.

Where HDPE continuous conduit is used for communications cables, it shall not be smaller in internal diameter than the dimensions shown in Table 733.021 below.

Table 733.021 Typical conduit sizes

	100 mm HD UPVC conduit		HDPE continuous conduit	
Electrical	114.1 mm OD	101.7 mm ID	125 mm OD	103 mm ID*
Comms	114 mm OD	104.5 mm ID	110 mm OD	90 mm ID

* HDPE Continuous conduit with a smaller ID than shown above shall not be used in place of 100 mm HD UPVC.

NOTE: Profile Wall Smooth Bore conduits and sandwich wall type conduits shall not be used for any Department of State Growth works.

(b) General arrangements and specified conduit sizes

General arrangements and specified conduit sizes for Department of State Growth works shall be in accordance with the relevant Department of State Growth specifications, guidelines and standard drawings.

Relevant standard drawings for traffic signal and other general works are listed in Table 733.022.

Relevant standard drawings for managed motorway works are listed in Table 733.023

Refer to TasNetworks Design Standards, Standard Drawings and other relevant documents with respect to all public lighting (streetlighting), electrical distribution cabinets, electrical installations, consumer mains and meter box.

Table 733.022 List of standard drawings for traffic signals and general works

Drawing number	Title
SD-101-001	RAG Bolts assembly
SD-101-002	Foundation for pedestals
SD-101-003	Bored Pile for MA, JUP and JUMA
SD-101-004	MA, JUMA, JUP and RSLP Baseplate detail
SD-101-005	Traffic Signal Post - Types 2T & 3
SD-101-006	JUP Base section
SD-101-007	JUMA Base section
SD-101-008	MA Base section
SD-101-009	JUMA, JUP and RSLP street light extension sections
SD-101-010	MA and JUMA outreach sections
SD-101-011	Typical 5.5M mast arm installation (2.5M outreach)
SD-101-012	Traffic Signal MA and JUMA Mast arm outreach clamping detail
SD-101-013	Traffic Signal MA and JUMA Overhead lantern mounting assembly
SD-101-014	MA, JUMA and JUP lantern support detail
SD-101-015	Spread Footing
SD-101-016	Traffic Signal MA, JUMA and JUP column conduit entry detail
SD-101-017	Weather Cap
SD-101-018	Pedestal location under or through verandas

SD-101-019	Controller foundation details
SD-101-021	Cable Pit Installation details
SD-101-022	Cable Pit access cover
SD-101-023	Detector pit installation details
SD-101-024	RAG Bolt assembly for cabinet
SD-101-025	Mini Mast Arm (Type 2D)
SD-101-026	Components for standard traffic signal and street lighting poles
SD-101-027	JUMA and JUP Street Lighting extension spigot detail and spigot cap
SD-101-028	Detector pit (Extra Small) details
SD-101-029	Small pit details
SD-101-030	Large Pit Details
SD-101-031	Extra Large Pit Details
SD-101-101	Traffic Signal Mounting Brackets
SD-101-102	Lantern and Mounting bracket orientation
SD-101-103	2T Lantern mounting details
SD-101-104	Visor dimensions
SD-101-106	Door Openings and Cable Termination block mounting details
SD-101-107	Site Identification encoder
SD-101-129	29 way terminal assembly
SD-101-130	29 Terminal assembly for use with MA, JUMA and JUP
SD-101-151	51 way terminal assembly
SD-101-152	51 Terminal assembly for use with MA, JUMA and JUP
SD-101-201	Typical layout underground ducting
SD-101-202	Traffic Signal Mounting Arrangements
SD-101-203	Typical layout flashing pedestrian crossing
SD-101-301	Loop pattern and installation details Tas 4x1
SD-101-302	Preformed loop pattern and installation details (EZY Loop)
SD-101-401	Traffic Signal Fault sticker
SD-101-402	Walk with Care sticker
SD-101-403	Not in Use sign

(c) Bedding and backfill materials

Unless otherwise specified, the Contractor shall supply all bedding and backfill material in accordance with the requirements of clause 733.06.

(d) Pits

Unless otherwise specified, the Contractor shall supply all pits and lids in accordance with the requirements of clauses 733.07 and 733.08.

733.03 EXCAVATION, BORING AND TRENCHING

Unless otherwise specified, all conduits under a road carriageway shall be installed by boring.

HP Detailed proposals for boring under carriageways shall be submitted to the superintendent for review two weeks prior to the programmed commencement of work.

Boring by water jetting is not be permitted.

The annulus between the bore and the carrier conduits shall be filled by low thermal resistivity, flowable and pumpable grout mixture (comprising sand, cement and suitable additives such as flowable fill). The grout mixture shall be suitable for backfilling around conduits carrying high voltage electrical cables and shall have the following properties:

- low exothermic temperature generation during curing
- a thermal resistivity (TR) value of less than 1.2K.m/W when fully dried
- a maximum grout flow time through a standard flow cone test of 30 seconds in accordance with AS 1478.2
- compressive strength in the range of 0.5 to 2.0 MPa at 28 days
- a maximum heat of hydration of 35°C when tested in an insulated 300mm x 300mm cube.

Grouting shall fill the voids at low injection pressures without causing deformation to the conduits within the bore holes. The ends of conduits shall be sealed watertight to prevent ingress of grout.

HP Before backfilling the bore access excavation, the pressure grouting shall be inspected by the superintendent or representative.

Unless otherwise shown on the drawings or specified, borings and trenches shall comply with the depth requirements specified in Table 733.031 below.

Table 733.031 Minimum conduit cover

Location	Minimum depth of cover (mm)	Measured from:
Under highway pavement	1200	top of conduit to pavement surface
Under Arterial Road pavement	1200	top of conduit to pavement surface
Under local road pavement	600	top of conduit to pavement surface
Under open drains	750	top of conduit to invert level of drain
Under footpath or unpaved areas (low voltage circuits e.g. 240Vac)	600	top of conduit to finished surface level
Under footpath or unpaved areas (extra low voltage and comms conduits only)	300	top of conduit to finished surface level
Under footpath or unpaved areas	600	top of conduit to finished surface level
Under railway-road crossings	2000	*top of conduit to top of track surface level

HP Where minimum depth of cover is not possible, the Contractor may submit a request for an exemption for consideration by the Superintendent and Department of State Growth TSM SME. The Contractor shall not install any conduits with a reduced depth of cover unless approved by the Superintendent in writing

Where a reduced depth of cover is approved, a warning sign shall be installed on the ground above the conduit warning of the shallow conduit. The warning sign shall be aluminium or similar weather resistant material with the warning engraved into the surface.

Open trenching shall be permitted in unpaved areas and across unpaved subgrade areas.

Where open trench methods are accepted, the lines of trenches wherever practical, shall be straight and form the shortest link between terminals.

Where the open trench method of crossing under a carriageway pavement is accepted, the line of the trench shall be at right angles to the carriageway, and the edges of trenches located within a road pavement shall be sawcut.

Trench/conduit depth shall be maintained between pits and graded to avoid low points in the conduit run.

Any drains or services disturbed during the excavation or laying of conduits shall be immediately reported to the Superintendent and shall be reinstated promptly.

733.04 INSTALLATION OF CONDUITS

(a) General

All conduits shall be installed as shown on the Department of State Growth Standard Drawings and Contract specific drawings, or as otherwise specified.

All conduits for electrical and communications cabling shall be installed to conform to the relevant requirements of controlling legislation, regulations, industry codes and standards, including:

- AS/NZS 3000 Electrical installations (Australian/New Zealand Wiring Rules)
- AS/ACIF S009 Installation requirements for customer cabling (Wiring Rules), and any other relevant requirements of the Australian Communications and Media Authority (ACMA) for connections to telecommunication carriers network.

Installation of conduits shall be carried out in accordance with the approved installation method for the type of conduit as shown in Table 733.041.

Table 733.041 Approved conduit types

Conduit type	Installation method
HD UPVC Plain	Thrust bore Open trench
HDPE continuous (must have ID not less than that of 100 mm HD UPVC for electrical and 90 mm HD UPVC for communications)	Directional Bore

Conduits installed for Department of State Growth works shall be installed to the following requirements:

- (i) all conduits shall terminate in a pit
- (ii) only one size and type of conduit shall be used for a complete run between pits; unequal size conduits shall not be joined in the ground
- (iii) all conduits shall be temporarily sealed prior to cabling to avoid blockage
- (iv) changes in direction of conduit shall only be made at approved cable pits

- (v) changes in conduit direction to enable entry into the base of a cable pit may be by means of a sweep bend as shown in Table 733.042 below
- (vi) elbows and 'tees' shall not be used
- (vii) all conduit joints shall be correctly prepared and sealed with approved solvent cement
- (viii) conduits for detector cables shall be installed as shown in Department of State Growth Standard Drawings SD-101-201 and SD-101-023
- (ix) a 50 mm electrical (orange) conduit shall be used to convey the detector feeder cable from the detector pit to the cable pit, as shown in Department of State Growth Standard Drawing SD-101-201.

Table 733.042 Acceptable conduit types

Conduit type	Minimum bend radius
HD UPVC Electrical	600mm
HD UPVC Communications	500mm

- (b) Conduit installation for traffic signals and other on-road electrical installations

Conduits installed for traffic signals and other on-road electrical installations shall be installed in accordance with this standard specification, Department of State Growth Standard Drawings detailed in Table 733.022 and individual contract documents.

A marker tape with trace wire shall be placed above all conduits in accordance with AS/NZS 3000:2018 Electrical installations (known as the Australian/New Zealand Wiring Rules).

- (c) Asbestos conduits

Where an existing site is being upgraded and asbestos conduits exist on site, the conduits shall be removed by a qualified asbestos removalist, and replaced by the Contractor..

HP Asbestos or suspected asbestos found on site that is not identified in the Project Specification shall be immediately reported to the Superintendent. The Contractor shall not disturb any asbestos or suspected asbestos unless approved by the Superintendent in writing.

733.05 DRAW CORDS

Each conduit for electrical wiring and communication cables shall be provided with one synthetic draw cord not less than 3 mm diameter and with a minimum breaking strain of 1.6 kN.

Where the conduit terminates in a pit, not less than 500 mm of the draw cord shall be tied to a marker peg 25 mm x 25 mm, not less than 300 mm long, and left coiled in the pit.

Where the conduit does not terminate in a pit, the draw cords shall be tied to a marker peg 100 mm x 100 mm, not less than 400 mm long, driven firmly into the ground with the top 50 mm projecting above finished surface and painted orange.

733.06 BACKFILLING

- (a) Material

Unless otherwise specified, materials used for bedding and backfilling shall be free from perishable matter and shall conform with the appropriate grading and plasticity index requirements specified in Table 733.061.

Table 733.061 Approved bedding and backfilling material

Material	Sieve size - AS (mm)					Plasticity index	
	75.0	37.5	19.0	2.36	0.075	Min	Max
	Percentage passing (by mass)						
Bedding	-	-	100	-	0-40	0	10
Selected backfill	-	100	-	-	10-40	5	20
Common backfill	100	-	-	40-100	-	-	-

Pavement material shall be as specified and shall comply with the relevant requirements of the appropriate pavement sections.

(b) Bedding

(i) General

Bedding material shall be placed and compacted for the full width of the trench to a depth of not less than 80 mm on an earth foundation or 200 mm on a rock foundation.

Following compaction, the bedding material shall be shaped sufficiently to maintain the conduit in line as the sections are placed in position. Shaping of bedding material is not required for conduits less than 100 mm nominal diameter.

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Once the bedding material has been laid and the conduits put in place, works shall not proceed prior to inspection by superintendent or representative.

When conduit sections are in position, additional layers of bedding material shall be placed and compacted to a height 150 mm above the bedding previously placed.

Bedding material must not be the same material excavated for the trench, it shall be clearly identifiable as introduced material.

(ii) Glass Fines

Where Glass Fines, produced by crushing recycled glass, is used as a bedding material, it must be:

- cubical in shape, not sharp edged or elongated and pass the 4.75 mm AS sieve
- generally free of contaminants such as paper, corks, metals, and other harmful materials (maximum limit of 2% by mass)
- primarily container glass and shall not include glass from ceramics, cathode ray tubes, fluorescent light fittings and laboratory glassware
- thoroughly washed and retested prior to use, where the measured Total Dissolved Solids (TDS) of the granular filter material exceeds 1500 mg/L.

(c) Filling

Unless otherwise specified or shown on the drawings, selected and common backfill shall be placed and compacted as follows under, around, and above the conduit after the sections are bedded:

(i) Conduits under area to be paved

Where the trench has been excavated from the design subgrade level or above, the trench shall be backfilled to design subgrade level with selected backfill material, and above that level with common backfill material or the specified pavement material.

Where the trench is excavated from below design subgrade level, the trench shall be filled with selected backfill material.

(ii) Conduits under area not to be paved

The trench shall be backfilled with selected backfill material to a level of 0.4 m above the top of the conduit and with common backfill above that level.

(iii) Conduits through existing paved area

Unless otherwise specified or shown on the drawings, the trench shall be backfilled to the existing subgrade level with selected backfill material and the pavement restored using materials in accordance with sub-clause (e) below.

(d) Compaction

Unless otherwise specified, bedding and backfill materials shall have during compaction, a uniform moisture content within the range 85% to 115% of the optimum moisture content as determined in the Standard Compaction test. Where backfill material contains material retained on a 37.5 mm AS sieve, the Standard compactive effort will be performed on the material passing the 37.5 mm AS sieve, and during compaction the moisture content of the material passing the 37.5 mm AS sieve shall be in the range 85% to 115% of the optimum moisture content so determined.

Bedding and backfill, the whole of which passes the 37.5 mm AS sieve, shall be compacted in layers to a density ratio of not less than 95% using handheld mechanical plant or excavator attached DPU for steep inclines.

Detailed proposals for the compaction of backfill materials of nominal size greater than 40 mm shall be submitted to the Superintendent for review before commencing work.

Where specified, pavement material shall be assessed for compaction in lots as defined in Section 173. The number of tests per lot shall be three. All pavement material shall have during compaction, uniform moisture content within the range 85% to 115% of the optimum moisture content as determined in the Modified Compaction test. All pavement layers shall be placed and compacted in layers to a density ratio of not less than 98%. The calculation of density ratio shall be based on Modified compactive effort.

(e) Pavement composition

Pavement layer	Material type	Thickness (mm)
##:		

733.07 CABLE PITS AND PIT LIDS (ELECTRICAL AND COMMUNICATIONS)

(a) General

All Cable pits, cable pit lids and pre-formed cable pit lid surrounds shall be in accordance with Department of State Growth standard specifications and drawings.

Pits and lids shall be installed in accordance with the appropriate Department of State Growth standard drawing and any pit manufacturers specific installation requirements.

Pits shall be located in accessible locations for maintenance activities.

On arterial roads pits shall not be installed within the trafficable area of the roadway. In extreme circumstances, the Superintendent in consultation with the Department of State Growth TSM SME may consider requests to install a pit in a trafficable area on an arterial road. In these instances, where approved, Heavy duty pit lids shall be provided where the pit is located within a road pavement.

Pits shall be constructed such that the level of the top of the pit lid matches the surrounding finished surface level.

The top of the pit wall shall be neatly finished such that the lid fits without movement.

Cable pit lids shall be labelled in accordance with SD-101-022 as appropriate.

The pit former shape shall not be distorted during installation.

Pits shall be placed, as far as is practicable, in an area that has an incline (i.e. slope) not more than 20°. Where the surrounding surface level is inclined greater than 20°, the pit lid shall be installed in accordance with the following requirements:

- (i) The pit former shall be vertical.
- (ii) The lid shall be horizontal.
- (iii) The lid shall be installed within a re-enforced concrete apron 'standing area' to enable safe access to the pit lid. The apron shall be large enough to enable temporary storage of a removed lid.
- (iv) A retaining wall shall be installed on the angled sides and high side of the slope. The retaining wall shall extend a minimum of 100 mm above the surrounding surface level.
- (v) A post, a minimum of 600 mm in height, shall be located on each upper corner of the retaining wall to ensure visibility for mowers and other maintenance personnel.
- (vi) Hand rails and access steps shall be installed where required by Australian Standards.

All pits, junction boxes or terminal pits for electrical purposes shall be either watertight or suitably drained.

All conduit connections to cable pits shall be neatly made and the ends of the conduits trimmed off and fitted with a conduit bush. The area between the conduit bush and pit wall shall be stopped with a suitable sealant that bonds to the pit wall and the conduit.

The maximum spacing between cable pits shall not be greater than 100 m.

(b) Asbestos pits

Where an existing site is being upgraded and asbestos pits exist on site, the pits shall be removed by a qualified asbestos removalist, and replaced by the Contractor.

HP Asbestos or suspected asbestos found on site that is not identified in the Project Specification shall be immediately reported to the Superintendent. The Contractor shall not disturb any asbestos or suspected asbestos unless approved by the Superintendent in writing."

(c) Pit lid surrounds

Cable pit lids and frames, where required, shall be installed with an approved surround. The approved types of pit lid surround are:

- (i) a poured 'in situ' concrete apron (typically used where two or more pits are co-located)
- (ii) a steel pre-formed collar that requires concrete in-filling 'in situ'
- (iii) a pre-formed composite material collar.

All surrounds shall be installed in accordance with the appropriate Department of State Growth standard drawing and shall ensure that no load is placed on the cable pit former.

For pre-formed collars, concrete or composite material, the collar shall be bedded into a base of cement to ensure it remains level with the surrounding surface and that no load is placed on the pit former. The cement bedding shall be a minimum of 200 mm thick and extend a minimum of 100 mm past the outer diameter of the collar.

HP Before the pit lid surround or pre-formed collar is cemented into position an inspection by Department of State Growth Superintendent or representative must be carried out.

- (d) Cable pits and lids for traffic signals and other on-road electrical installations

Cable pits shall be constructed and installed as shown in the drawings detailed in Table 733.071 below.

Table 733.071 List of standard drawings for pits for traffic signals and general works

Drawing Number	Title
Traffic Operation Standard Drawings	
SD-103-001	51 Core for Intersections (Cable Connections)
SD-103-002	19 & 29 Core Cable Connections for Pedestrian operated signals
SD-103-003	Diamond Operation
SD-103-004	Double Diamond Operation
Traffic Signal Standard Drawings	
SD-101-001	RAG Bolts assembly
SD-101-002	Foundation for pedestals
SD-101-003	Bored Pile for MA, JUP and JUMA
SD-101-004	MA, JUMA, JUP and RSLP Baseplate detail
SD-101-005	Traffic Signal Post - Types 2T & 3
SD-101-006	JUP Base section
SD-101-007	JUMA Base section
SD-101-008	MA Base section
SD-101-009	JUMA, JUP and RSLP street light extension sections
SD-101-010	MA and JUMA outreach sections
SD-101-011	Typical 5.5M mast arm installation (2.5M outreach)
SD-101-012	Traffic Signal MA and JUMA Mast arm outreach clamping detail
SD-101-013	Traffic Signal MA and JUMA Overhead lantern mounting assembly
SD-101-014	MA, JUMA and JUP lantern support detail
SD-101-015	Spread Footing
SD-101-016	Traffic Signal MA, JUMA and JUP column conduit entry detail
SD-101-017	Weather Cap
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SD-101-023	Detector pit installation details
SD-101-024	RAG Bolt assembly for cabinet
SD-101-025	Mini Mast Arm (Type 2D)

SD-101-026	Components for standard traffic signal and street lighting poles
SD-101-027	JUMA and JUP Street Lighting extension spigot detail and spigot cap
SD-101-028	Detector pit (Extra Small) details
SD-101-029	Small pit details
SD-101-030	Large Pit Details
SD-101-031	Extra Large Pit Details
SD-101-032	Signfix Pole, Ground Sleeve & Foundation Layout
SD-101-101	Traffic Signal Mounting Brackets
SD-101-102	Lantern and Mounting bracket orientation
SD-101-103	2T Lantern mounting details
SD-101-104	Visor dimensions
SD-101-106	Door Openings and Cable Termination block mounting details
SD-101-107	Site Identification encoder
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SD-101-302	Preformed loop pattern and installation details (EZY Loop)
SD-101-401	Traffic Signal Fault sticker
SD-101-402	Walk with Care sticker
SD-101-403	Not in Use sign
ITS Standard Drawings	
note the ITS Standard Drawings set is currently under review - October 2022	
SD-102-001	Highway Camera Site Typical Layout
SD-102-002	Camera column 8/10/12 M Mid Hinge
SD-102-003	Camera Column Bored Pile Foundation Installation Details
SD-102-004	Camera on Traffic Signal Post Typica mounting arrangement

Table 730.064 List of Department of State Growth Standard Drawings... continued

Drawing Number	Title
Public information labels	
SD-102-005	Highway Data Station Site - Typical Layout
SD-102-006	Highway Data Station Site - Loop Layout
SD-102-007	Cantilever Variable Message Sign - General Arrangement
SD-102-008	RC3 / TT4 Pole - Typical Arrangement
SD-102-009	Non-Accessible LUMS Gantry - Typical Arrangement
SD-102-010	Accessible VMS and LUMS Gantry - Typical Arrangement
SD-102-011	Pit and Conduit Arrangements at Gantries
SD-102-012	VLS Pole and Base Plate
SD-102-013	ITS Roadside Cabinet - General Arrangement
SD-102-014	ITS Field Cabinet and Post Foundations
SD-102-015	Active Ice Warning Sign
SD-102-016	Advance Active Warning Sign - Typical Layout Traffic Signals
SD-102-017	Vehicle Activated Sign - General Arrangement
SD-102-018	Bluetooth Detector Installation

- (e) Communication pits and lids for arterial roads

Communications pits shall be an Extra-large pit.

- (f) Maximum number of conduits per pit type

The number of conduits terminating in a pit shall be dependent on the individual contract requirements and the electrical/communications network designs.

Under no circumstances shall the maximum number of conduits into each pit recommended by the pit manufacturer be exceeded.

733.08 DETECTOR PITS

Detector pits are typically used to enable the connection of loop cables to detector feeder cables.

Detector pits for traffic signals shall be installed as shown on the traffic signal plans and as detailed in individual contract documents.

Detector pits for freeway data stations or other required purposes shall be installed as detailed in individual contract documents.

Detector pits and detector pit covers shall be constructed and installed in accordance with Department of State Growth Standard Drawings SD-101-028 to SD-101-031 and SD-101-023.

Where a detector pit is installed within a grassed area with no kerbing, a round concrete collar shall be installed around the pit. The collar shall be a minimum of 200 mm wide at the narrowest point and a minimum of 100 mm thick.

The pit cover shall be securely fixed to the pit using the fixing device supplied.

Detector pits shall be located to ensure adequate separation between pits and other features such as expansion joints, drainage, electrical or communication pits, culverts etc.

733.09 CLEANING OF SITE

Surplus excavated material shall be removed from the road reserve. Areas affected by the work shall be restored to a similar condition to that which existed prior to the commencement of the work.

733.10 IDENTIFICATION AND RECORDING

All conduit locations not identified by pits immediately installed at the ends shall be marked with 75 x 38 mm stakes projecting 0.4 m above the ground, with the top 150 mm painted orange, or as otherwise agreed by the Superintendent. Conduits under road pavement shall be marked with stakes clear of the road pavement. Conduits not under road pavement shall be marked with stakes at the ends, at changes of direction, and at intervals of not more than 30 m. This staking will be additional to any marker pegs to which draw cords are tied.

Unless otherwise specified, the actual installed location and depth of conduits, and location of pits, shall be accurately recorded on as-constructed drawings in a format agreed by the Superintendent.

733.11 DOCUMENTATION

All documentation relating to conduit and pit installation required under the contract specific requirements shall be provided. Notwithstanding the contract specific documentation requirements, the Contractor shall provide, as a minimum, the following:

- (a) 'as-constructed' drawings showing the complete conduit network including conduit types, sizes and depths
- (b) the above 'as-constructed' drawings shall also show all pits, pit types and pit sizes
- (c) certificates of electrical safety for all conduits and pits installed
- (d) documentation demonstrating that all pits and conduits have been installed in accordance with the requirements of this specification.