

010260W02 Pipe and Conduit repair

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Summary

This document describes the work practices involved in the repair, maintenance, upgrading and alterations of pipes and conduits within Telstra's InfraCo Network.

General

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General

General

01 Purpose

This document is intended as a reference for constructors involved in maintenance, upgrading and/or alteration of the distribution network plant where:

- Damage or blockage of a short section of the conduit has been cleared.
- The conduit is in need of re-instatement to enable the provisioning of further cable, or replacement of existing cable, within the conduit.
- There is a need to extend an occupied conduit to a pit that has been moved.

This document sets out the recommended methods and practices for the installation of conduits and expanded split-conduit repair kits.

Split-conduit repair kits have been developed to repair conduits that have been cut-away to clear blockages, repair damage and to extend conduits during relocation of pits.

This document provides details on the kit and its application.

02 Scope

This document has been written for reference by constructors. The term constructor refers to both Telstra InfraCo employees and Telstra InfraCo contractors.

This document supersedes and replaces all previous documents on this topic.

This document is subject to change. Before using it, please ensure you have the latest issue.

03 Safety and Environment

3.1. Land Access

As a licensed telecommunications carrier, Telstra InfraCo has an obligation to comply fully with all relevant Commonwealth legislation, including the Telecommunications Act and its related regulations and instruments. Also, where applicable, Telstra InfraCo must comply with relevant State and Territory legislation.

Contractors engaged by Telstra InfraCo to undertake network facility activities, such as survey and inspection, maintenance which includes pit replacement on a like for like basis, and installation of low impact facilities such as pits/manholes, and who are under contract must comply fully with all relevant legislation. Contractors are also required to understand and comply with all Telstra's InfraCo policies and procedures relating to land access and environmental matters.

From time to time, Telstra InfraCo's network facilities may need to be relocated for various reasons. Where the facility relocation is at the request of another party (the "Disturber"), certain land access requirements must be satisfied before Telstra InfraCo will agree to the relocation of its facilities. This is to ensure that the relocated facilities retain full rights of tenure and accessibility at the new site or location.

It is the responsibility of all staff and contractors (including sub-contractors) to ensure that no harm comes to the environment via the activities carried out by them while acting on Telstra's behalf.

Please contact the Land Stewardship, Engagement and Compliance (LSEC) team if you have any further queries.

[InfraCo - Land Stewardship Engagement and Compliance \(unily.com\)](https://unily.com)

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3.2. Asbestos Containing Material (ACM)

All Telstra staff and contractors must follow the [Asbestos Risk Standard](#).

Prior to commencing any asbestos related works in the Access Network, workers are to consider alternative construction methods that will avoid asbestos disturbance.

Cement pits do not contain asbestos if:

- They are labelled “NON-ACM” or
- They have been confirmed by a [competent person](#) able to identify asbestos as defined by WorkSafe Australia as not containing asbestos.

Note: ACM Ducts shall not enter any new/replacement pits. Refer to 010254W02.

3.3. Excess Soil Management

Works likely to involve excess soil must follow Telstra’s [Soil Management Procedure](#). This procedure involves:

- Preliminary soil screening (desktop review) to categorise the potential for soil contamination. This will also dictate the preferred methods for excavation, or if soil sampling is required.
- Visual assessment of the site prior to and during excavation to identify potential contaminants.
- Disposal from site in accordance with known and observed contaminants (including ACM).

3.4. Locating Underground Assets

Before any excavation works are to be carried out all constructors shall comply with the [Working on or Adjacent to Underground Assets Procedure](#) and complete a [Working on or Adjacent to Underground Assets Permit](#).

3.5. Fire Ants

To prevent the spread of fire ants, the Queensland Government has implemented movement controls in areas of Queensland where this pest species has been detected. These controls apply to individuals and commercial operators and restrict the movement of materials that could carry fire ants.

It is an offence if you do not comply with movement controls within fire ant biosecurity zones. Breaches of these controls can potentially impact the community, economy and the environment.

To help prevent the spread of fire ants, you should:

- Understand what fire ants look like and what materials (i.e. fire ant carriers) they might be moved in.
- Be aware if you are living or working in a fire ant biosecurity zone.
- Take all reasonable steps to ensure you do not spread fire ants.
- If you are unsure of your obligations, contact a Biosecurity Queensland inspector on 13 25 23.

More information can be found at the [National Fire Ant Eradication Program \(fireants.org.au\)](#) website.

04 Inline Conduit Repairs

4.1. General

This instruction shall apply to the replacement/repair of a section of conduit within an existing length of installed conduit.

The constructor shall at all times exercise extreme care when cutting into and removing an existing conduit to ensure that no damage occurs to the enclosed cables.

Excavations must be sufficient to provide adequate working space and shall be properly shored in accordance with Industry Regulations.

Where the conduit is unoccupied the existing damaged section of conduit shall be replaced with a new piece of PVC having the same nominal internal diameter.

Where the section of conduit to be replaced is occupied by cable/s, rope or other plant then the section cut out shall be replaced with a length of split conduit.

All mid-section conduit repair points shall be recorded in TPNI.

4.2. Causes of Conduit Blockages

There are a number of causes for small blockages, which hinder installation or replacement of cables in existing conduits.

Some of the causes are as follows:

- Subsidence of the footpath or road verge.
- Damage caused by providers/contractors, working in close proximity to Telstra InfraCo plant.
- Tree root growth.
- Siltation within the conduit
- Insect or vermin nests.
- A combination of any of the preceding causes.

05 Methods of Conduit Repair

Three methods are available for repairing conduit.

- The preferred method uses a "Split Conduit Repair Sleeve Kit".
- The second method uses proprietary Split conduit for sections of 100 mm conduit repair longer than 900 mm or 1800 mm - Material No. 07300223.
- The third method uses conventional conduit materials.

The Telstra InfraCo Project Manager or their representative will direct which method is to be used.

5.1. Working with Occupied PVC Conduit

5.1.1. Cutting Occupied Conduit with a Cordless Multi Cutting Tool

- Using a cordless multi tool, make two cuts along the conduit as shown in Figure 2 - Area to Cut from Conduit at the position of the new pit and to the length required.

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- Carefully cut round the top of the conduit to join the two long cuts. Cut only as deep as the thickness of the conduit wall. Do not cut through the conduit as this will damage any cables occupying the conduit.
- Remove the section of the conduit to expose the cables inside the conduit.
- Now that the cable is exposed, carefully complete the end (circumferential) cuts by "ring barking" the conduit using a hack saw blade held in a pad saw or use an Eclipse all purpose or other suitable saw.
- Care should be taken to avoid damaging the cable by not cutting all the way through the PVC conduit.
- Cut around the outside, but not completely through, until the conduit is weak enough to break.
- Ensure the ends of the conduit are square and free from sharp edges and burrs.



Figure 1 - Cordless Multi Cutting Tool

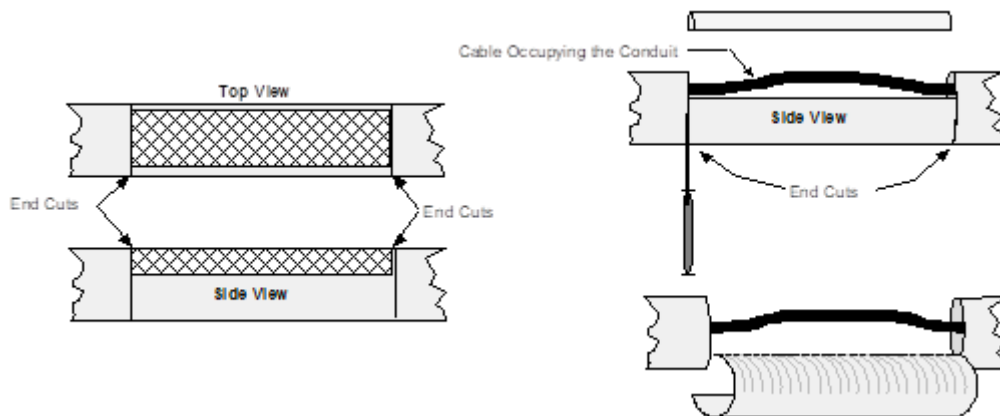


Figure 2 - Area to Cut from Conduit

5.1.2. Cutting Occupied Conduit without a Cordless Multi Cutting Tool

- Carefully cut round the conduit ("ring barking", the conduit) with a Pad, Eclipse all purpose or other suitable hand saw. Do not cut deeper than the thickness of the conduit wall, and do not cut all the way through the conduit but deep enough to allow the conduit to break easily. Care must be exercised not to damage any cables within the conduit.
- When both cuts are complete break the section of conduit free.
- Gently lift the free section and place suitable pieces of wood into the ends to raise the section of conduit above the remaining conduit and to secure it to prevent it moving.
- With a suitable hand saw cut the conduit along its length. Do not cut through the conduit but cut deep enough to allow the conduit to break easily. Care must be exercised not to damage any cables within the conduit.
- Do not remove the section of conduit by forcing it open and over the cable as this will damage the cable.
- Rotate the section of conduit and replace the pieces of wood.
- Make a second cut on the opposite side of the conduit then remove the unwanted pieces.

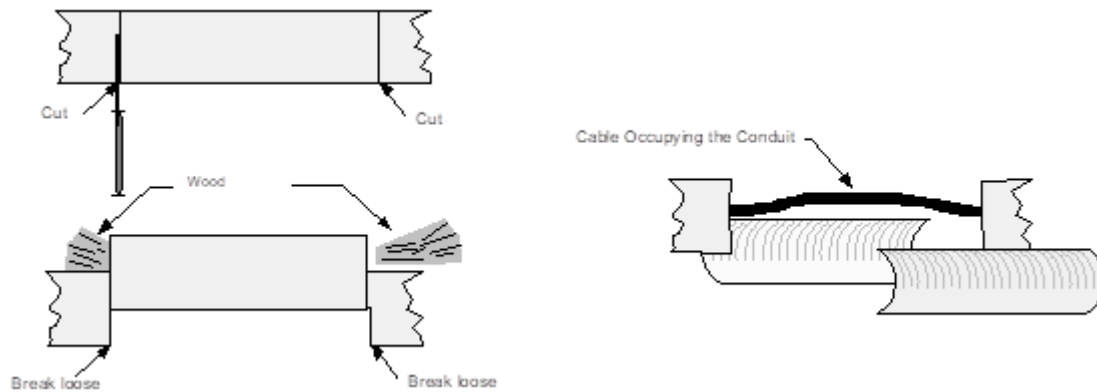


Figure 3 - Cutting Occupied Conduit without a Cordless Saw

5.2. Method 1 - Split Conduit Repair Sleeve Kit

5.2.1. Split Conduit Repair Sleeve Kit Description

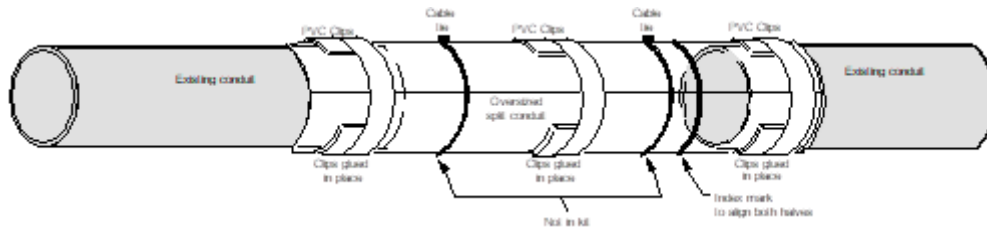


Figure 4 - Installed split-conduit repair kit

Kits are available to fit over the outside of standard Telstra InfraCo PVC conduit, in the following sizes: 20, 35, 50, 80 and 100 mm.

The split-conduit repair kit is a length of oversized diameter PVC conduit, approximately one metre long, which has been finely cut through longitudinally, into two halves. The halves have indexing marks, that when matched together enable the correct orientation and union of the cut.

The kit is designed, so that the two halves fit together snugly over the existing conduit, leaving very little or no gap where the halves join.

The kit is glued where it overlaps the original conduit, and the kit halves are held in place with the PVC clips provided. These are also glued in place.

Plastic cable ties may be used to further clamp or secure the two halves together until the glued clips dry in place.

The kit may also be used (apart from repairing blockages) to extend a conduit to a pit that has been repositioned and needs re-connecting to the existing conduit. For these cases, split conduit-bushes need to be made on site as shown in *Figure 7*.

5.2.2. Repair Kit Application

5.2.2.1. Conduit Repairs and Extensions

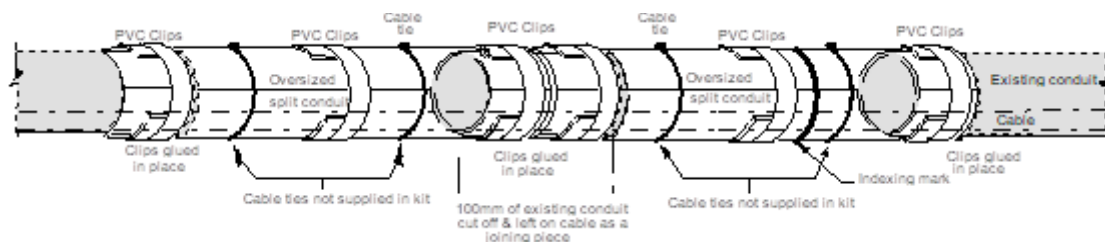


Figure 5 - Repairing using two kits

A blocked or damaged conduit section having been cleared, needs reinstating. Observe the following points:

- The repair section ideally should be no longer than 900 mm, as the repair kit is only 1 metre long and requires about 50 mm overlap at each end. This is to facilitate gluing and securing with clips and cable ties.

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- When opening a conduit to clear a blockage, keep in mind the kit length and mark the conduit opening accordingly.
- If the section of duct needing re-instatement is longer than one kit, then it may be necessary to fit a short length of nominal sized conduit between two kits.
- This should be assessed at the time the original conduit is being cut-away, a small amount (100 mm length) of the conduit can be cut through but left on the cable to later be centred and used as a joiner or bridging piece for the two kits. See Figure 2.
- PVC clips are supplied in the kit to encircle the two halves and bridge the join line. The clips spring easily over the conduit and are glued in place alongside and opposing each other - ie.180 degrees apart.
- Further support may be applied by using suitably sized cable ties.

Note:

1. Cable ties must NOT be used alone, the locking clips provided shall be used.
2. Ensure soil surrounding the repair is compacted properly, to support the repair. Refer to 010260W01 section on Backfilling.

5.2.3. Conduit Preparation

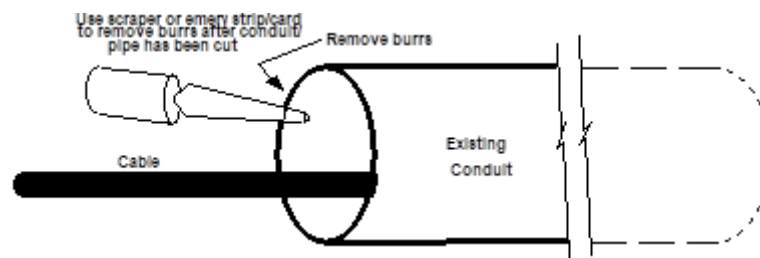


Figure 6 - Preparation for Glueing

Prepare the cut conduit as follows:

- Carefully remove any burrs etc. on the lip with a scraper. An emery strip/card could be used instead to safeguard the cable.
- Clean soil, etc. from the remaining conduit to prepare the surface for glueing.

Leave a floating piece of the original conduit 100 mm long on the cable when:

- a) Extending the conduit to a pit. Refer to Figure 9.
- b) More than one repair kit is to be used.

Note: Removing burrs will ensure good bedding of the repair sleeve and help to reduce any lip, which might block the travel of a rodding device. Most rodding devices have a smooth rounded head which easily skips over a small ledge.

The floating piece of conduit is required to bridge between the split conduit kit and the split conduit-bush which is fitted through the pit wall. See section 5.2.5.3. Join multiple repair kits.

5.2.4. Split Conduit-Bush

The conduit repair kit must attach to a piece of nominal size conduit. The 100 mm long floating conduit-piece (refer Figure 9) serves this purpose and bridges between the repair kit and a split conduit-bush fitted to a pit. See Figure 9.

Prepare a split conduit-bush by cutting a standard bush, along its length and this can then be glued in place with the cut positioned at either 3 o'clock or 9 o'clock.

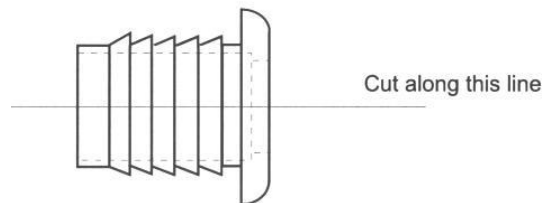


Figure 7 - Split conduit bush

Note: Firmly secure the bush when cutting. Wear leather gloves for hand protection, and protective goggles for eye protection. Observe safe practices at all times.

5.2.5. Split Conduit Repair Sleeve Kit Installation

5.2.5.1. Small Repairs

Small repairs are one that require only one kit.

- Cut the split-conduit kit to the required length, allowing a minimum 50 mm extra for each overlap of the original conduit.
- Apply a coating of PVC glue to the overlap area.

Note: Use disposable gloves for hand protection when handling PVC glue.

- Fit both halves of the kit around the original conduit. Make sure indexing marks correspond on the kit.
- Apply PVC glue (Material No.07300279) to the inner surface of the PVC clips.
- Place the clips supplied, over the ends of the repair kit, at the overlap point. Additional cable ties may also be used to stabilise the repair.
- Tape around the kit at each extremity, this will stop the kit moving out of place until the glue has set as shown in Figure 8.
- Apply the other clips and cable ties to the intervening area, to keep the two halves together and solid.
- Wrap entire repair section with Duct tape (Material No. 4300038) to avoid separation and siltation.
- Carefully back-fill around the repair making sure the fill is packed down solidly, below, around and above the conduit, to reduce the conduit flexing or separating. Refer to 010260W01 section on Backfilling.

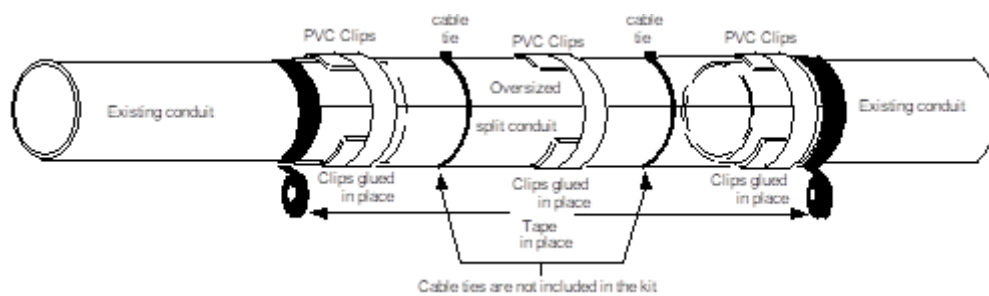


Figure 8 - Assembled kit taped in place.

5.2.5.2. Repairs Using More Than One Kit

- Cut a piece of the original conduit (longer than 100 mm) to serve as a bridge piece, between adjacent repair kits.
- Follow the process in section 5.2.5.1.
- Assemble the kits as shown in Figure 5.

5.2.5.3. Conduit Extensions to a Pit

- Cut a piece of the original conduit, as in section 5.2.5.2 above.
- Insert the piece into the split conduit-bush. This will act as a bridging piece between the conduit-bush and the repair kit.
- Assemble the repair kit around the bridging piece, as in section 5.2.2.1 and Figure 5 - Repairing using two kits.

5.3. Method 2 - For Repair of 100 mm Conduits - Split Conduit

The following specifications shall apply where the constructor has been directed to repair a section of conduit around an existing cable using the 100 mm proprietary Split Conduit (Material No. 07100223). This method is particularly useful when moving or replacing long lengths of 100 mm ACM conduit.

- The constructor shall prepare the existing conduit ends as set out in section 5.4.2 or 5.4.3 of this Work Instruction.
- It is essential that the internal edges of the existing conduit be chamfered as the split conduit fits over the existing conduit.

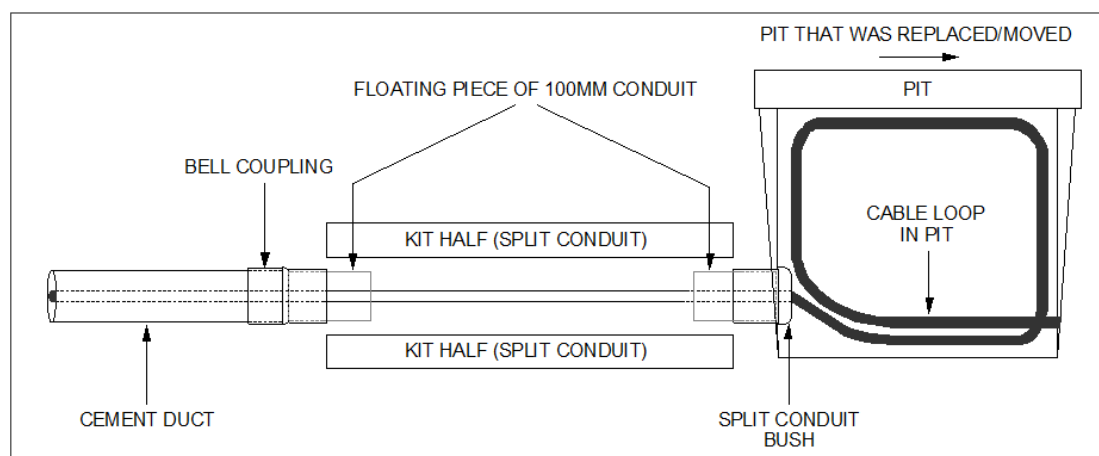


Figure 9 - Conduit extension to Pit.

General

- The contractor shall prepare the split-conduit as set out in of this Work Instruction section 5.4.2.
- Install the split-conduit over the existing conduits as set out in section 12 of this Work Instruction but ensuring the split conduit fits over the existing conduits (split collars are not required).

5.4. Method 3 - For Repair of Conduits - Use of Conventional Conduit.

Unless otherwise directed by the Telstra InfraCo project manager or their representative the following specifications apply to the repair of a conduit where this method has been directed.

5.4.1. PVC to PVC Unoccupied Conduit

- The constructor shall cut the ends of existing and replacement conduit square, chamfer the inside edges and remove all burrs and roughness.
- The length of the replacement conduit shall occupy the full distance between remaining sections of the existing pipe with no more than a 2 mm gap at either end of the replacement section.
- The socket end of the PVC replacement pipe or a standard PVC coupling shall be utilised. If this is not possible then the socket will be cut off and split collars used.
- Split collars shall be made of PVC conduit the same diameter as that used for the repair, 100 mm long with one or two splits longitudinally as required.
- When the replacement section of conduit is in position fit split collars to each end with an equal overlap of the new and existing conduits.
- Glue the split collars to both conduits, at each end of the replacement section, using PVC conduit adhesive applied as specified for a conduit joint.
- The split collars shall be held firmly in contact with both the existing and the new conduit ends for a minimum of two hours. Use self-locking cable tie to hold each split collar firmly in contact with both conduit ends.
- Seal any opening that is visible, where the collar splits pass the gap between the conduit ends, with adhesive or duct tape.

5.4.2. PVC to PE or ACM Conduits

Where the existing conduit consists of a different material to the standard PVC conduit such as PE or ACM cement conduit, then the following specifications for joining these conduits apply.

- Except where an existing conduit is a plastic type or clearly one not containing asbestos, the contractor will, where required to break-out existing plant, proceed on the assumption that it contains asbestos.
- Contractors shall dispose of all asbestos removed in this operation in accordance with Statutory Regulations and Telstra InfraCo's procedures.
- For PE and PVC conduits the contractor shall cut the ends of existing and replacement conduit square, chamfer the inside edges and remove all burrs and roughness.
- The contractor shall finish the end of asbestos conduits as close as reasonably possible to a square end, following all safe working procedures for asbestos.

Note: The ACM exposed ends shall be sealed with a coating of bondcrete, or similar bonding agent applied with disposable brush or non-pressurised hand spray pump bottle, before attaching the ACM to PVC adapter coupling.

- Use ACM to PVC adapter coupling (material number 7300052) to join ACM duct to 100 mm PVC conduit.
- Place PVC conduit in position with split collars glued in place to the new section of conduit.

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- The split collars shall be held firmly in contact with both conduit ends. Use self-locking cable ties to hold each split collar firmly in place.
- Seal any opening that is visible, where the collar splits pass the gap between the conduit ends, with adhesive or duct tape.
- Cast a concrete surround of 100 mm thick by 200 long (minimum size) over each joint of the conduit, completely encasing each joint, using a 3:2:1 site-mix. Refer to 010254W06 for details of onsite mix or ready-mix concrete requirements.

5.4.3. Occupied Conduit Repair Using Split Conduit.

Where an existing conduit is occupied a split standard conduit shall be used to repair the conduit.

- Take care not to damage or unnecessarily move cables within the conduit.
- The contractor shall prepare the existing conduit ends as set out in sections 5.2 or 5.3 of this Work Instruction.
- The contractor shall cut standard PVC conduit of the required diameter to serve as split conduit.
- Where there is a risk of damaging the cable occupying the conduit, the split conduit is to be cut a second time on opposite sides to produce two half sections.
- All burrs and rough edges shall be removed before installation.
- H-section PVC joining strips of the appropriate wall thickness shall be used to seal the full length of the split (or splits) on assembly of the replacement section.
- The H section shall have PVC glue applied the full length of both outer edges of the joining strip after assembly of the split section.
- Self-locking cable ties, spaced no more than 500 mm apart, shall be used to secure the split conduit.
- Seal any opening that is visible, where the collar splits pass the gap between the conduit ends, with adhesive or duct tape.
- Attach the split conduit to the existing conduit using procedures set out in sections 5.2 or 5.3 of this Work Instruction.

5.4.3.1. Riser Pipe Repairs

Unless directed otherwise by Telstra InfraCo project manager or representative, the following specifications apply where repair work has been directed on a riser pipe (a pipe attached to a pole or fence or other structure).

- The constructor shall repair riser pipes with conduit of the same diameter as the original conduit, if such conduit is available.
- If no pipe of the same diameter is available, the pipe must be replaced with Telstra InfraCo approved 50 mm white PVC conduit.
- The constructor shall avoid damaging cables and wires during the repair procedure.
- The constructor shall report to the Telstra InfraCo Project Manager or their representative any damage observed to cables and wires within the riser pipe.
- Cut ends of conduit shall be trimmed square and all burrs and sharp edges removed.
- Replacement sections shall be cut to the exact length of the damaged section and split longitudinally to permit installation around the cables and wires.
- End and split joints shall be sealed with a “weld” of PVC adhesive.
- Saddles shall be positioned over the replacement section at or as close as reasonably possible to 500 mm spacing's.

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- Additional saddles will be fixed in position to cover the joint at both ends of all sections of replacement conduit.
- Galvanised nails shall be used in timber poles.
- The galvanised mower guard shall be re-fixed to the pole with galvanised nails and formed to fit snugly around the riser pipe.

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06 Materials

All material shall be approved by Telstra InfraCo and obtained from Telstra's InfraCo suppliers unless otherwise directed by the Telstra InfraCo project manager or representative.

The following is a list of the main components that are referred to in this document. This list is specific to the currently contracted material and may be subject to change:

Material Description	Material No.
Sleeve, Pvc Pipe Repair Split 20 mmx1 m LG	7300305
Sleeve, Pvc Pipe Repair Split 35 mmx1 m LG	7300306
Sleeve, Pvc Pipe Repair Split 50 mmx1 m LG	7300307
Sleeve, Pvc Pipe Repair Split 80 mmx1 m LG	7300308
Sleeve, Pvc Pipe Repair Split 100 mmx1 m LG	7300285
Conduit, Split Lockable 100 mmx3 m 2 Halves	7300223
20 mm Rubber Duct Plug	7300216
35 mm Rubber Duct Plug	7300217
50 mm Rubber Duct Plug	7300218
100 mm Tapered Polyethylene Plug	7300044
Black Butyl Rubber	43300009
TDUX Installation Tool	7300160
CO ² Gas Cylinders (Pack of 10)	7300229
TDUX 45 Duct Sealing Kit	7300193
TDUX 60 Duct Sealing Kit	7300194
TDUX 100 Duct Sealing Kit	7300196
TDUX 20 Duct Seal Clip (Seals 3 or more cables)	7300199
TDUX 60 Duct Seal Clip (Seals 3 or more cables)	7300227
20 mm PVC Conduit	7300091
50 mm PVC Conduit	7300095
63 mm PE Conduit (63 mm OD)	7300124
100 mm PVC Conduit	7300207
100 mm PE Conduit	7300126
150 mm PVC Conduit (150 mm ID)	7300063

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Material Description	Material No.
20 mm 90° 305mm Bend	7300271
50 mm 90° 305mm Bend	7300276
50 mm 90° 0.8 metre Bend	7300110
100 mm 90° 0.8 metre Bend	7300109
100 mm 22° 5 metre Bend	7300222
20 mm PVC coupling for joining 20 mm PVC pipe	7300037
50 mm PVC Coupling	7300048
63 mm PE to 50 mm PVC Coupling	7300176
100 mm PVC coupling for joining 100 mm PVC pipe	7300185
20 mm PVC Conduit Bush	7300100
35 mm PVC Conduit Bush	7300069
50 mm PVC Conduit Bush	7300070
80 mm PVC Conduit Bush	7300101
100 mm PVC Conduit Bush	7300102
63 mm PE Conduit Bush	7300143
Adhesive, PVC 250 ml Blue	7300279
Tape, Adh Duct Sealing Pvc 50 mmx30 m Silv	4300038

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07 References

Document number	Title
010260W01	Conduit Installation
010260W03	Clearance of Pipe and Conduit Blockages
010260W04	Installation of P20 conduits under road crossings in Standard Urban Residential Estates
010264W01	Rural Copper Underground Cable Installation – Conduit Installation and Maintenance
010257W06	Distribution Cable Jointing – Tags and Labelling
010254W02	Installation of Jointing Pits & Manholes Installation of Pits
TPH0055LC	Linemen's handbook

01 Definitions

Term	Definition
ACM	Asbestos Containing Material
Distribution Cable	Distribution cables are cables installed between the Cross Connection Cabinet or Pillar and the customer. Typically cables sizes range from 2 pairs to 100 pairs.
ID	Internal Diameter
Manholes	Manholes are underground chambers constructed on cable/conduit routes to provide access to conduits for cable hauling and cables for jointing.
OD	Outside Diameter
PE	Polyethylene
Pits	Pits are small underground chambers constructed on cable/conduit routes to provide access to conduits for cable hauling and cables for jointing.
PVC	Polyvinyl Chloride

08 Attachments

Document number	Title
Nil	

09 Document control sheet

This document has been formally approved by the person identified below:

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If you have a suggestion for improving this document, please contact the people listed above.

010 Record of Issue

Issue number	Issue date	Details on the change
1	27 March, 1999	First issue
2	10 November, 1999	
3	20 July, 2000	
3	31 July, 2002	Document Type name change to Technical Standard.
5	9 June 2004	Changed to Work Instruction. Template 8.6.8
6	21 April 2016	Updated Material Numbers and added list. Update drawings. ACM containing material. Excess Soil management.

General

Issue number	Issue date	Details on the change
7	02 March 2021	Updated Template Updated Purpose New Section Land Access New Section Locating Underground Assets New Section Fire Ants New Section Material Specification Updated Conduit Repair kits Updated Material List Updated References Updated Definitions Updated Document Control list
8	10 August 2023	Section 3.1 – Updated link to LANDS team. Section 3.3 – Reworded and linked to new document that replaced the “Asbestos Management in Telstra” and “Contractor Asbestos Management Guide” documents. Section 6 – Remove redundant section “Material Specification”. Moved the text to Section 8 - “Materials”. Minor wording changes, typo corrections.
9	31 October 2023	Section 6.1 – Added requirement for repair points to be recorded in TPNI.
10	16 February 2024	Section 3 – Updated links in subsections. Section 5.1 – new section on how to cut into occupied conduit. Renumbered pictures and headings.

General