

openreach

ISIS practice
For BT people

EPT/ANS/A024

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Copper Quality Standards

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Content approval

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Version History

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Issue 6	02-Aug-2019	Quality standards & Accreditation	Full document review. Links to external sources validated/updated. Author/Approver details PATD section removed, pair change section updated, flow charts updated, QBC section added and other sections updated to reflect QBC use, all sections reviewed and updated with AEC information and minor changes
Issue 5	25-Jan-2019	Quality standards & Accreditation	Change of author & approver details. BT logo replaced with Openreach logo.
Issue 4	31-Oct-2017	Quality standards & Accreditation	Document review. Links to external sources validated/updated where appropriate. Author/Approver/Publisher details amended. Section 9.4.2.5 added. Section 9.5.5 added. Section 12.2 flowchart amended. Section 13.6.1 two bullet points added. Section 17.4.1.4 added. Section 18.7.1 sentence referring to “booking Practice Wizard” deleted. Section 18.7.2 reference to provision codes deleted. Section 19 retitled.
Issue 3	09-Mar-2017	Quality standards & Accreditation	No content change – review date extended
Issue 3	06-Sep-2015	Quality standards & Accreditation	Document review. Links to external sources validated/updated. Author/Approver details amended. Section 4 & 10 amended. Section 13.3 amended and 13.4 added to reflect new joint remake rules. Tables in sections

			18.11.1, 2 & 3 amended to align with engineer.com.
Issue 2	03-Mar-2015	Document Manager T	Document migrated onto new platform with no content change
Issue 2	2-Sep-2014	Quality standards & Accreditation	Minor amendments to 6.1.4, 9.5.1, 11.2 & 14.2
Issue 1	21-Aug-2014	Quality standards & Accreditation	New specification on copper quality standards which combines 12 existing copper quality standards ISIS in the NWK/NNS/VXXXrange .Section 1 details the documents which have been replaced

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1 *Introduction*

This ISIS replaces the copper quality standards previously contained in the NWK/NNS/Vxxx range i.e.

V007	Access Network Quality Standards Policy
V008	Jointing
V010	PCP/SCP's
V011	Fault Finding in the Access Network
V012	Block Terminals
V019	Monopoly Wiring & Lead-in
V023	Underground Cabling
V025	Poling
V026	Overhead Cabling
V027	POI
V028	MDF's
V045	PATD Process

This ISIS is reviewed and updated annually. Between reviews changes are communicated using Access Engineering Communications (AEC's) and Planning Reliability Instructions (PRI's). Users should refer to the current AEC/PRI listings for latest information and change to this ISIS. AEC's/PRI's can be found at the

Network Engineering [Technical Library](#)

Quality Statement

In order to improve Quality of the Access Network, the following requirements have been set out enabling every person to do the job right first time, every time.

The procedures will establish a common approach across Openreach that will ensure a high degree of management control and a single best practice when work is carried out by both Openreach personnel and contractors in the access network.

2 **Status**

These instructions are mandatory.

3 **Scope**

These instructions cover the actions to be taken by Openreach people and contractors carrying out work in the Access network. The instruction covers the plant item/s worked on associated with the customer's circuit or the work element being undertaken.

The procedures in this document cover all types of copper/aluminium operations in the Access network.

4 **Quality Standards**

It is the responsibility of all engineers to ensure all work carried out on Network plant is to the Quality Standard.

On arrival at the worksite, the job should be surveyed using the associated work plans and any obstacles or situations that will delay the progress of the job should be reported to the Control or Manager.

5 **Safety**

All work MUST be carried out safely and in accordance with the relevant instructions and guidance given in current Openreach safety documentation.

6 **MDF Quality Standards**

To be read in conjunction with PRD/MDF/B119

6.1 **MDF Standards**

6.1.1 **Circuit Details**

Before starting work on an MDF/IDF, ensure the circuit details (e.g. Bar pair & equipment allocation) are available and correct.

Note: Always use correct cable pair identification techniques, ensuring correct test leads/connectors used at all times.

- If allocated positions are, or appear to be in use:
- Confirm circuit number.

- Verify on CSS records, (if shown as spare and no customer circuit working on line then old jumper is spare and must be recovered correctly prior to providing the new).
- If there is no jumper on your quoted bar pair and you are working on a conversion/takeover, the existing jumper will need to be traced from the nearest point towards your quoted bar pair (D side mapping/LIC/CONC)
- If the circuit being provided is a new line (not a conversion/takeover) and there is another working circuit on the quoted bar pair, then a new bar pair will be required. This can be completed via routing and records or the routing self-serve app in My Jobs.
- If cannot correct situation on site then contact control for further instructions.

6.1.2 Jumpers/jumpering

Jumper beds/troughs should be neat, tidy and not congested. Jumpers should not be higher than the jumper rings. To alleviate problems due to congestion all “dead” jumpers should be removed and any new jumpers should be run with the appropriate amounts of slack. Therefore:

- Jumpers must be run correctly for frame type.
- Correct colour, gauge and type of jumper to be used.
- Jumper to be correctly routed through frame with the appropriate amounts of slack.
- Jumper to lie correctly in the frame bed/trough.
- Ensure that the jumper when run is pushed back into the bed to prevent any trapping of the wires.

6.1.3 Terminations

All jumpers must be terminated correctly for the block type fitted using the appropriate tools and methods as detailed in the practise ISIS.

6.1.3.1 Soldered Terminations

Soldered jumper terminations must have:

- Correct polarity with good mechanical contact between wire and tag.
- The tags to be used cleaned of excess solder and any scrap wire, prior to connecting the new or renewed jumper wire.
- The insulation of the wire butted up to the tag and not burnt.
- When providing a soldered termination you must NOT:
 - Terminate a jumper over solder or scrap wire.
 - Leave dry joints

- Burn/damage jumper wire insulation.
- Leave spikes (of solder or wire ends) on tags.

Note: DRY JOINTS - Check block being worked upon and if any dry joints are visible / seen then rectify them as per section 6.1.3.1 of this ISIS.

Note: Any stray wire off cuts and/or splashed solder on the block being worked on must be removed.

6.1.3.2 Insulation Displacement Connector Terminations (IDCs)

When IDC jumper terminations are being made:

- Ensure correct polarity and run correctly within the mounting block to the IDC connection point.
- Ensure correctly connected with the right inserter tool used at all times.
- The rear of the block must be held to ensure a firm and steady pressure applied to make a good IDC connection and protect the block.
- Ensure the correct extractor tools are used when recovering jumper wires.
- Ensure debris (wire/insulation) is removed from the block when recovering jumpers.
- When providing an IDC termination you must NOT:
- Knock/strike inserter tool to force a connection.
- Use incorrect tools to make an IDC connection.

6.1.4 Protection

- It is recommended that lightning protection be provided on all lines at exchanges (100% coverage). This will ultimately be a decision of the CP who owns the terminating equipment for the particular lines. By fully protecting 100% of circuits, it avoids the need to calculate the risk due to the routing of the lines in the network.
- In most cases lightning protection will be fitted on the internal equipment side of the MDF. Exceptions to this will be on Modular frames and the few frames that have line side only protection. It will still be the CP responsibility to provide protection.
- Dispensation has been given for some types of Openreach owned exchange side equipment to be fitted without lightning protection such as:-
- Exchange side MDF blocks, where EvoTAM tie cables are terminated, no longer need lightning protection fitted.

- A risk assessment has taken place and been approved by the Chief Engineer, Service Provision and Service Delivery, which also aligns with LLU-TAM tie cable installation practice.
- Retrospective action is not required.
- Where protection is fitted on the internal side of the MDF, then this practice should continue.
- If it is agreed that protection is not fitted to CP services terminating on the MDF by Openreach, it is then the responsibility of the CP to fit protection on the HDF as they require, or the MDF termination point if HDF protection facility is not available.
- UXD5 8/40 line-cards **MUST** be protected to minimise a fire risk. It is important that the correct design of protector is used to correct the design fault of these line-cards. Consult with the UXD5 service team for more information.
- Openreach will not provide protection modules for MDFs to protect CP circuits. It is the responsibility of the CP to provide protection. On MDF Jack Test blocks, Openreach will provide the dummy link (module 1A or 1B) unless the CP provides protection for Openreach to fit.

6.1.5 Leaving Site Tidy

The frame area/work site should be left clean and tidy on completion of the work. All Openreach/Contractor rubbish must be removed. Openreach/Contractor rubbish adjacent to the work site **MUST** also be removed. There should be no scrap wire or solder splashes on the floor. Waste wire bins must be used. The MDF/IDF should be swept clean within the immediate work area after completing work.

6.1.6 Scrap Disposal

The collection of scrap wire sacks from the MDF room (or scrap wire cages from a suitable location on the site) can be arranged using the following method.

Place wire in white sack (Stores Item 237196). For full bag(s) collection, cable tie the top and attach a RIL returns label to every bag (stores item code 006878). Do not over fill the bags so BT transport drivers can safely load onto the lorry (max 20kgs). Submit your return on the eReturns system using the new item code 092605 (scrap jumper wire bag return).

This will automatically trigger a collection with BT transport to collect the bag on the next collection day. Finally, take the bag(s) to the stores collection point. Note; BT transport will only collect a maximum of 6 bags per visit

Any issues or questions direct them by email to

transport.service.desk@bt.com

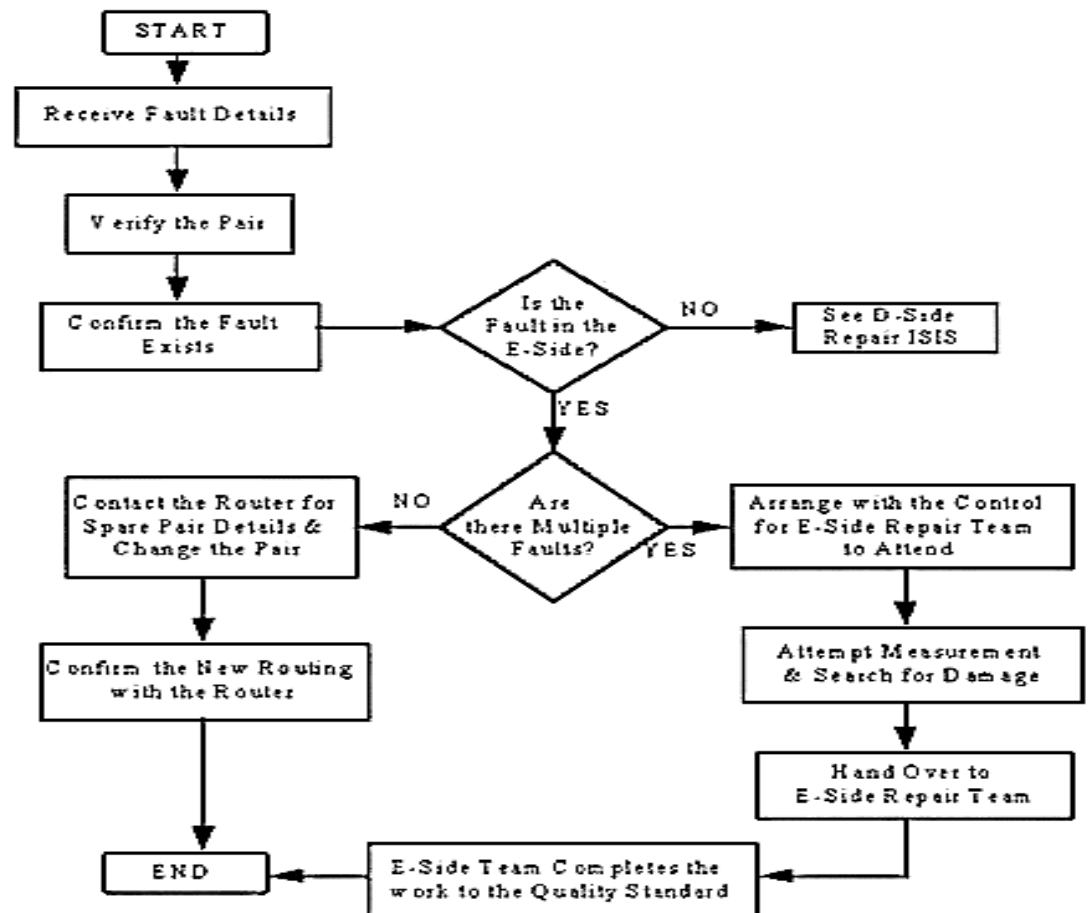
6.1.7 Circuit Testing

On completion of work carryout a functional test on circuit worked upon if possible (to ensure circuit working correctly) with relevant test equipment and complete full test on circuit (store subsequent test results using the fault number or circuit number).

After completing work ensure circuit details/frame records are correct/submitted correctly for up-date.

7 *E-Side Faulting*

E-Side Repair Fault Clearance Flow Diagram – Singleton Engineer.



7.1 Engineers with D-Side Skills Only (Non E-side skills)

Pair change out should be adopted as the first choice for service restoration (joint entry is not an option).

All pair changes must have Distance or Ohms to Fault (DTF) measurements entered in the Point of Intervention (POI) notes.

People not skilled or equipped to carry out work in the E-Side network must not attempt to clear faults in the E-Side other than by pair change.

7.2 Parties Skilled and Equipped to deal with E-Side Network Repair

Fault repair must be adopted as the first choice of service restoration in multiple pair, fault situations. Pairs may be changed for service restoration prior to locating and correcting any major damage/fault on the E side cable.

Where multiple faults exist, indicating a cable sheath or a sheath closure problem, then immediate action must be taken to limit further deterioration in service. Possibly even raising air pressure either side of fault (e.g. raise air pressure flow at exchange if near and/or fit bottled air both sides).

7.3 Service Restoration - Singleton Working

This section refers to engineer's who are skilled and equipped to work on D-Side as singletons only. However if these engineers are assisting a fully skilled and equipped E-Side engineer then section 18.5 applies.

7.3.1 Locating the Fault

When a fault is proved to be on an E side pair the engineer must measure and locate the fault position. The Distance to Fault (DTF - ohms/mtrs) must be recorded as per the POI ISIS instruction before restoring service by pair changing.

The engineer should try as many spare pairs as possible, in line with local instructions or guidance, to restore service. This must be done in consultation with the Router to reduce double handling of faults and maintain the accuracy of the records data base. The Router must be advised of the pair used to restore service.

Where a line is accessed at an Exchange the site diary/frame logbook must be completed correctly.

7.3.2 Using Spare Pairs

The Router **must** always be consulted prior to changing a faulty E-side pair for a good spare pair and details **must** be passed back to him/her after a pair change is completed. **The engineer cannot choose these themselves.**

Note: Note; PCP speaker pairs or alarm pairs must never be taken to restore service to faulty customers.

7.3.3 Multiple Faults

Where more than one fault is associated with a particular PCP (multiple faults) then it is important to ensure that a fault location is carried out quickly using the appropriate test equipment. If the faults are located to a common point then the following applies:

- The presence of several faults may be apparent initially or additional faults may be reported whilst the first fault is being cleared. Where multiple faults appear to have a common cause or there are no spare pairs available then it will be necessary to test and locate the fault.
- Always ensure that the Control is made fully aware that an E-Side cable is deteriorating and that urgent action is required.
- The engineer must ensure that where possible the customer's service is restored by changing out or re-routing pairs. Attention to customers with emergency and priority needs must be taken into account.

If possible the cable route should be checked for physical damage i.e. roadworks or evidence of recent excavations or similar activity. The engineer should remain on site until the E-Side repair team arrives, to ensure a "seamless" handover and no unnecessary duplication of effort.

7.4 Service Restoration - 2 Man Party Working

This section refers to engineer's who are skilled and equipped to work on E-Side faulting and repair basis, and may be teamed with an engineer who is not fully equipped or skilled.

Measure the Fault

There must be minimum access and disruption to the E-Side Network, and it is essential that correct testing and localisation of the fault takes place before any joints are opened.

7.4.1 Use of Existing Working Lines for Testing

When using a good working pair the engineer must:-

- Identify the customer whose line you are going to use.
- Gain permission from the customer to work on their line (explain reasons why).
- Test the good wire for its insulation resistance and ensure it is OK.
- Restore the customer's line immediately after fault location and before carrying out any repair to the faulty line.
- Test and confirm with the customer whose line has been used that service is restored.

7.4.2 Locating and Clearing the Fault at the Point of Intervention

Before opening up a pressurised E-Side cable it is essential that those units or controls responsible for monitoring cable pressures are notified before work starts. Air pressure (using compressed air cylinders) must be applied either side of the intervention point (minimum 1 standard cable length away) to prevent any further deterioration along the cable route. All necessary tools and equipment to complete the work must be available or arrangements made to have them delivered to site.

At the point of intervention care must be taken to ensure that other pairs are not damaged in the process of locating the fault. If the insulation of other pairs has been damaged whilst opening the joint, removing tie's, or due to short circuiting good pairs when trying to identify the tones, **they should be remade/recrimped.**

Note: Before closing the joint at the point of intervention, a check must be made to ensure that all other pairs are free from damage.

8 *E - Side Quality Standards*

8.1 E - Side Definition

The E-Side network is defined as the distribution network radiating from the Exchange MDF (line-side) to the PCP (customer side), up to and including the D-Side termination, including the jumper.

In most cases the E-Side is pressurised.

It also covers the E/O part of the network for which there is no flexibility point other than the DP. It can be sub-divided into the following:

- Those parts of the E-Side network designated E/O, consisting of non-pressurised type cables of 100 pairs and less, which distribute directly from the Exchange (MDF line-side) to DP, in the same way that the D-Side cable from a PCP does, and should be dealt with as the D-Side.
- E/O cables of over 100 pairs that are normally pressurised as far as an air block should be dealt with as E-Side. The non-pressurised sections beyond the air block should be dealt with in the same way as the D-Side.
- E/O cables of over 100 pairs feeding large sites or premises will normally be pressurised and should be dealt with as for E-Side.

8.2 E - Side Repair Methodology

Engineers with D - Side Skills Only

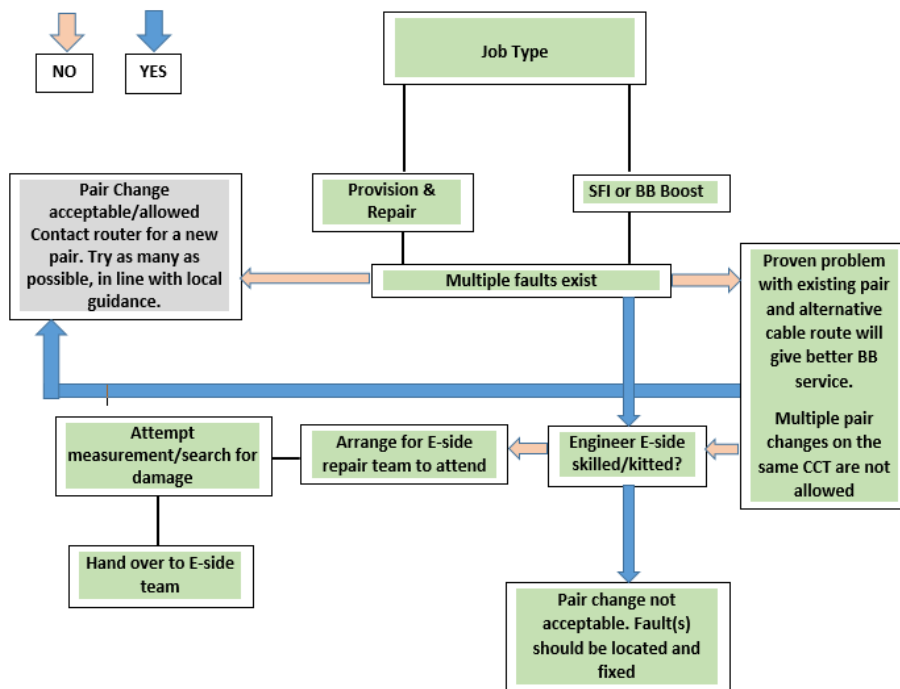
Pair change out should be adopted as the first choice for service restoration.

Working Parties Skilled & Equipped to Deal with E -Side Network Repair

Fault repair should be adopted as the first choice for service restoration. Pairs should only be changed as a last resort.

The procedures in this document will establish a common approach across the access network that will ensure a high degree of management control and a single best practice when repair work is carried out.

8.3 E-Side Pair Change Policy



8.4 Joint Remakes

Where any joint is discovered to be wet, it must be investigated and any problems rectified.

8.4.1 Conditions

Where any of the following conditions are encountered in joints being worked on, the joint must be remade or affected pairs re-crimped/modular connected as appropriate and closed with a standard approved closure.

- Wet joints/Battery contacts
- Conductors with damaged (nicked) insulation
- Paper joints with 'shiners'
- Conductors showing signs of corrosion
- Joints containing connectors No. 1 (White CWI)
- Joints containing connectors No. 1A (Blue, red, brown or any other colours)

Note: Before the joint is closed, the moisture barrier must be re-connected using the correct connectors and continuity wire.

8.5 Joint Closures

All joints/cables which are connected to the plant being worked on in the same worksite, that are not watertight must be brought up to the standard and closed using an approved closure-repair product. Only approved pressurised type closures can be used within the E side pressurised network (whether pressure exists in the pressurised type cable or not).

Note: Observed obviously open joints in the worksite. Observed open joints are those not being worked on or attached to the one being worked on, but are present in the same worksite; they should be closed on the day or reported using an A1024 with the relevant defect code. These can only be seen by a visual (hands free) check within the worksite from the current working position the criteria in 13.5 above must be adhered to.

8.5.1 Obsolete or Non-Approved Closures Include

- Injection weld
- Epoxy resin
- Old style mechanical closures
- Expanding plug joints
- Denso joints
- Kit Collar Multi-entry
- Non-approved closures
- Any incorrectly fitted or damaged joint closure.

All of which must be removed and replaced with a current approved closure every time when encountered on the plant being worked on

8.5.2 Mechanical Joint Closures

Only Mechanical joint closures approved by Chief Engineers' unit can be used in the E Side network.

Note: Sleeve 30 series are not suitable for use as E-Side sheath closures.

8.5.3 Testing Pressurised Cable Closures

When the permanent closure has been completed, and allowing a suitable cooling period, a pressure test must be made. If the closure fails it **MUST** be replaced.

8.5.4 Temporary Closures

Temporary closures are only to be used for 24 hour/overnight disruptions to the work and should not to be used as an expedient repair closure. All completed work **MUST** be closed with an approved permanent closure.

- The only approved item for temporary closure is Sheet Rubber Adhesive.
- This is the only method to be used when a permanent closure is not being fitted, it should not be considered as an alternative to a permanent closure.
- The Sheet Rubber Adhesive must be applied such that the joint is watertight and with the appropriate number of desiccant packs placed in the closure. The closure must be wrapped with tape reinforcing. The joint should be secured as high up in the jointing chamber as practicable.

Where the Quality Standard cannot be met e.g. a cable length is required to be replaced, but the joint/s can be permanently closed, an A1024 should be submitted.

In the case of large E side cables or cables with high priority customers it may not be practical to provide any temporary repair due to the number of circuits at risk. In cases such as this the control must be informed and arrangements made to complete the work as an ongoing live job without delay.

9 **PCP/SCP's**

To be read in conjunction with EPT/ANS/A006

BEFORE ANY WORK IS CARRIED OUT INSIDE A PCP, SCP, DSLAM OR STREET CABINET, A TEST MUST BE MADE USING A NON CONTACT VOLTAGE DETECTOR TO ENSURE THERE IS NO POWER PRESENT ON THE OUTSIDE METAL SHELL.

e only current non contact voltage detector to be used is the Kewtech Duo voltage detector I/C 093746 which includes a proving unit as a known proven power source is not always available in the field environment to use to prove the functionality of the voltage detector before using it.

9.1 Quality Standards

9.1.1 Protection of Plant & Customer Service

PCPs/SCP must not be opened in wet or changeable weather conditions without first providing protection from the elements.

If damage to the shell is observed it must be protected from the ingress of water and an A1024 submitted.

If damage as occurred to a powered cabinet e.g. a car has hit a DSLAM, only plastic guards/barriers must be used to protect the damaged equipment.

When construction work is being undertaken the appropriate controls should be advised.

Caution: When working in the PCP/SCPs, care must be taken to ensure damage is not caused to the structure and fixtures, or to the cable pairs, terminations and jumpers. Care must be taken to ensure further faults are not caused, particularly to High Grade circuits when handling conductors and jumpers, especially where Aluminium cable conductors exist.

9.1.2 Working Practices

All work should be undertaken in accordance with the approved Openreach manufacturer's instructions and ISIS practice.

9.1.2.1 Terminations

- All terminations in PCPs & SCPs must be made using the correct jumper wire, connectors and terminating tools.
- All jumpers must be correctly routed and supported in jumper rings or Velcro ties/bands. (DO NOT over tighten) When jumper wires are renewed the old jumper wire must be recovered.
- Before carrying out any work on other working circuits, checks must be made with the network records office for the existence of High Grade or Private circuits. If these circuits are present, your control must contact the relevant Service Centre for advice before any work or action is taken.

- A High Grade or Private circuit that requires re-jumpering or disconnection for any reason must be re-connected as soon as is practical, and checked to ensure that the circuit is operating correctly.
- When working on shelf or strip type terminations the other pairs within the bunch being worked on must be inspected for insulation damage, including corrosion. Damaged pairs should be remade, pieced out, and the jumper wire of the correct type and standard used.
- A bunch is defined as all the wires and jumpers designed to hang over the SCC support slot (normally in a SCF No. 1)
- A bunch is defined as all the wires and jumpers designed to hang over the SCC support slot (normally in a SCF No. 1) e.g. for SCC 1 check E1-10 & D1-10 and for SCC 2 check E1-20 and D1-20.
- Both ends of the circuit being worked on must have their respective bunches checked.
- Any E or D side pair worked on which is too short to hang over the SCC support slot must be extended from the rear of the SCC with equivalent U/G type wire.
- On completion, each bunch must be loosely tied (ensuring no pairs are broken within the CWI during movement) using Straps Cable Fixing No 1 (bobble type) only and carefully repositioned.
- Straps Cable Fixing 1A or 5A or any other similar straps must not be used, as they damage the insulation.

9.1.3 PCP/SCP Ventilation

PCP/SCP's should be ventilated as detailed in the following documents
EPT/ANS/A006

9.1.4 Desiccation

9.1.4.1 Cabinets

The majority of cabinets are now of the vented variety which do not need desiccant as the moisture content of the air is always changing, so a desiccant pack will have become saturated within days of installation.

It is still policy to use sealed cabinets in areas prone to flooding.

Quantities of desiccant pack No2 will still be required to service these sealed cabinets, until such time that grease/gel filled connectors are used in cabinets. In the unlikely event of paper cable terminating directly in the cabinet,

desiccant pack No2 must be used irrespective of the cable connectors all being grease filled.

9.1.4.2 Pillars

Desiccant packs should only be fitted to jointing pillars if they contain PC 100 connectors.

9.1.4.3 Desiccant usage - when required

Desiccant Packs No 2 (Non-colour variety) must always be changed before securing the PCP/SCP.

Desiccant Packs 2A (coloured blue silica-gel variety) are only changed when the colour gel indicator shows as pink and/or if all of the positions for date and initial are full.

Desiccant Packs 2A (coloured Amber (orange) silica-gel variety) are only changed when the colour gel indicator shows as white or clear or if all of the positions for date and initial are full.

Attention must be paid to providing the correct number. See relevant ISIS and mandatory tasks below.

Caution: Desiccant packs must be removed from their plastic bags and hung on the assembly, strip or module by the loop/hook provided. **Ventilated PCPs/SCPs DO NOT require desiccation.**

9.1.5 Mandatory Tasks

EPT/ANS/A006

The tasks listed below must be completed as required, at every visit to a PCP/SCP. Sufficient consumable items/spares should held in the van stock at all times.

During a construction activity such as providing a new PCP/SCP or feed cable it is expected that the engineer is fully kitted and tooled to complete all tasks. Therefore submission of A1024 for uncompleted items is not an option and no tasks should be left incomplete at time of job closure.

- Change desiccant packs as necessary on every visit in PCP / SCP that require desiccation (See Desiccation section 9.1.4 for when they are required).
- Date and Initial each desiccant pack (with 2A type if initial and date slots are full before colour change effected then change the desiccants). Non Openreach personnel must also record the name of their company.

- Check and replace PCP door seals if necessary. A perished door seal is one where rubber is hard and showing signs of being cracked.
- Check and seal duct entries if kitted, if not kitted then submit an A1024.
- Check and replace door bolts, centre bar bolts and door stays as necessary. (do not submit an A1024 as these are stores items)
- Where any of these items cannot be replaced due to damaged threads, mountings or fixings See Para 9.2.
- Remove rubbish from inside PCP/SCP and Openreach/Contractor rubbish from the surrounding area outside.
- No rubbish bag for scrap wire, CWI's or general rubbish to be let inside of the PCP/SCP.
- Correct termination methods, tools and stores must be used on every occasion.
- The PCP/SCP must be left secure. Care must be taken not to trap any conductors in the doors or covers when closing PCP/SCPs.
- Security locked PCP/SCPs must be re-locked on completion of work. Any found with broken or missing locks **MUST** be reported and replaced promptly. If the engineer has a replacement lock then it must be replaced before leaving site. If not then it must be reported via A1024 system.

Note: Where a replacement part is required, and the fixings, threads and mountings are not damaged, i.e. a door bolt, and is out of stock on the van, the engineer should contact the manager and **NOT** raise an A1024. Managers should arrange for the supply and fitting of the item at the earliest opportunity.

9.2 Observed defects (Defects to PCP/SCP Fabric)

Observed defects listed below should be reported on an A1024, using the appropriate category definition.

Caution: Where there is a safety risk i.e. a broken door/door hinge action must be taken to guard off or make the plant safe. It must be reported immediately followed by the submission of a Category "A" A1024. Detailed instructions are given in NWK/NNS/V080 - A1024 Plant Requiring Attention.

- PCP/SCP shell
- Doors & Door hinges (not door stays/door bolts as these are a stores item)
- Corroded/damaged assemblies
- Sheared door bolts including mountings and screw threads and fixings.

Note: For faulty speaker pairs, use local procedures and indicate report method used on A1024 label attached to inside of door.

Note: For faulty or damaged pressure gauges and fittings see below.

Note: Where a PCP/SCP is being constructed it is expected that all of these items are left in good working condition and fitted correctly. Submission of an A1024 is not allowed.

9.3 Cable Pressurisation Fittings & Cable Pressure

All planned work on pressure gauges, transducers and fittings must be carried out to the ISIS practice standards and work instructions.

Pressure tubing and fittings should be installed and tested in accordance with ISIS practice standards.

Cable Pressure faults including low air pressure and alarms should **NOT** be reported unless local instructions or arrangements deem otherwise. A1024s must **NOT** be raised.

Warning: Do not tamper with pressure gauge settings, unless instructed to do so as part of the work instructions.

9.4 PCP/SCP Pair Identification, Testing and Fault location

9.4.1 Pair Verification

The digital Tele 300 MUST be used to correctly identify the correct line/pair. This will identify any mains voltage present on the line, and if the routing is incorrect, identify if a digital circuit is present.

The use of remote test systems (example - Fast test 2) or frame co-operation with a colleague will reduce the risk of disconnecting the wrong pair. Local instructions will indicate what systems are available and the access numbers required.

Warning: The correct Adapter Test listed in paragraph 9.4.2 must be used. TESTING MUST NEVER BE CARRIED OUT BY NIPPING THE CONDUCTOR OR JUMPER WIRE INSULATION WITH PLIERS, KNIVES OR ANY OTHER SHARP IMPLEMENT.

9.4.2 Testing

Following verification of the correct pair, an appropriate tester must be used to test the line and confirm the existence of any fault.

Warning: No detectable working conditions on the pair does not indicate that it is a spare pair - it may be a Private Wire, alarm circuit etc. Check with network records office or at the DP.

9.4.2.1 BIX and 3Ms Modular Systems

Connect appropriate Adapter Test to pair and verify pair. The jumper wire can now be disconnected at either E or D side to allow testing both ways.

9.4.2.2 KRONE & Quante High Density Modular Systems

Modular systems have a facility for testing both E and D sides using the Adapter test 5A for Krone and the HDMCCS test lead for Quante without disconnection of the jumper wire.

9.4.2.3 PC100 Type Assembly

Disconnect the jumper on the D side and verify pair. The E side can now be tested via the jumper. To test the D side, fit Pins Bridging and test.

9.4.2.4 Strips Cross Connection (SCC) & Connectors Wire Insulated (CWI)

Verify pair by removing the CWI and removing a small amount of insulation to allow testing both ways. If the connection is made with CWI No 1, use Clips Test 23a.

9.4.2.5 Cobinet Tooless Modules

These modules have a bespoke adapter test, which is the ONLY adapter for use on these modules and MUST be used. Information on the use of the adapter can be found in the Quality Manual for Engineers.

Note: Prior to inserting the adapter, it should be ensured the correct cct is being worked on.

9.4.3 Fault Localisation and Clearance

Visually check terminations, jumper wire and conductors for damage, broken insulation, broken conductors, and contacts with other pairs, loose screw connections and corroded connections.

When the fault is considered to be found, it must not be assumed to be the sole cause of the customers fault report. Use the appropriate tester to test towards the customer to verify that no fault exists on the D side. Use remote test systems or contact control to verify that the E side is not faulty. Once E and D sides have proved clear, the jumper wire or terminations can be remade or renewed.

9.4.4 Faults Proved onto Modules

Where faults are proved onto Modular type connectors, the fault should be cleared by changing out the pair (MDF-PCP-SCP-DP). If no spares are

available then the control must either raise a **Service Affecting Fault** or allow the module to be changed (only if engineer is kitted and trained).

9.4.5 Faults Proved onto Assemblies (PC100's)

Where faults are proved onto an assembly (PC100 type) termination, the fault should be cleared by changing out the pair, MDF - PCP-SCP-DP. If no spares are available then a temporary expedient can be used to provide customer service by strapping out the assembly.

Provide a cable of size 20 pair and above, in the duct, between the PCP/SCP and the jointing chamber.

Note: The pairs must be colleted in the PCP/SCP and in the joint or cable with the number of the faulty E or D side. The joint or cable opened in the jointing chamber must be closed using an approved closure and an A1024 must be submitted. Attention **MUST** be made to ensure the duct is correctly sealed. Such work must only be carried out by appropriately skilled and equipped engineers.

9.5 PCP/SCP Terminations

Note: There are various types of systems used for PCP/SCP terminations. The termination mounting/system must be securely fastened to the fabric of the PCP/SCP. Where this cannot be achieved an A1024 should be submitted and PCP/SCP labelled accordingly.

See EPT/ANS/A006 contains all practices and standards for terminations.

9.5.1 Termination on Modular Cross Connect Systems (MCCS)

The correct methods of termination and the correct tools must be employed on MCCS type PCP/SCPs (i.e. BIX, KRONE Quante and 3Ms). Failure to use the correct insertion tool will result in damage to the termination insert.

Note: **Aluminium** conductors must not be terminated to these systems as they are only meant for copper.

9.5.2 Termination on Strips Cross Connection (SCC)

Termination in PCP/SCPs which are of Strips Cross Connection type construction **MUST** be made using Connectors Wire Insulated 8A (Dexgreen only) 8B or 11A. These have additional entry ports, which can be used for testing purposes without the need to break the circuit down.

CWI Reference Guide							
		Dropwire 10, 12 CAD55	U/G Jointing Copper conductors	U/G Jointing Aluminium conductors	PCP Copper conductors	PCP Aluminium conductors	PCP Copper to Aluminium conductors
Dexgreen	8A	YES	YES	YES	YES	YES	YES
Dexgreen	11A	YES	YES	YES	YES	YES	YES
Channell	8B	YES	YES	YES	YES	YES	YES
Channell	11A	YES	YES	YES	YES	YES	YES
3M	11A	YES	YES	YES	YES	YES	YES
Tyco	8A	YES	YES	YES	NO	NO	NO
Tyco	8B	YES	YES	YES	YES	YES	YES
Channell	8A	YES	YES	YES	NO	NO	NO
3M Orange top	8A	YES	YES	NO	NO	NO	NO
3M Red top	8B	YES	YES	NO	YES	NO	NO

Warning: DO NOT TWIST THE UG CONDUCTORS TOGETHER, OR TWIST THE UG CONDUCTORS AND THE JUMPER WIRE TOGETHER AS BOTH OF THESE PRACTISES CAUSE SHORT CIRCUITS.

9.5.3 Termination on PC100 Assemblies.

When using WC12541 (blue/yellow) on PC100 assemblies, the wire must be stripped back 20mm and folded double and inserted carefully into the screw slot and the screw tightened gently.

Care must also be taken not to over tighten the assembly screws, as they are designed to "shear off" to prevent over tightening.

9.5.4 Termination on Shelf Type Strips

EPT/ANS/A006

Extreme care must be exercised where **Aluminium** cable pairs exist.

9.5.5 Cobinet connectors (Tool-less)

As the name suggests, no tools are required on this type of connector module, however, if you are struggling to open the slider it's OK to use a small screwdriver or your fine nosed pliers in the slot beneath the lower knuckle.

Note: Only minimal force should be used to avoid damaging the slider.

Note: Aluminium cable can be terminated into Tool-less connectors on fresh cable and the pair must not be wrapped around the integrated strain relief termination posts.

For full details, refer to AEI/BPG/G007 the Next Generation PCP Connector System.

9.6 PCP inserters

The correct inserter must be used for each specific type of terminating system. Failure to do so will result in irreparable damage to the connector.

10 *Underground Cabling*

To be read in conjunction with EPT/ANS/A003

The following precautions **must** be observed during rodding and cabling operations at all workpoints

10.1 Site Set-up and Inspection

- A visual check of the new cable must be performed before and during cabling operations. If the cable sheath is damaged, advice must be sought from Control/Manager.
- Existing cables and joints must be examined for signs of fracture or damage prior to setting up. Any damage not capable of being repaired by the engineer/Working party must be reported or advice sought from Control/Manager.
- Ducts should be tested and cleaned as required.
- The duct bore designated in the Works Instruction must be used to install the cable. Any departures from this must be agreed with the planner before cabling commences, and all changes recorded on the appropriate line plant records.
- Where there is a likelihood of damage to existing cables, all affected cables in the work area must be protected.
- If existing cables and joints obstruct the cabling job they should be moved with care.
- Existing cables must be adequately supported at all times.

Caution: Fragile cables are clearly marked as such, Fibre Optic, Co-ax and other cables so marked **Must Not** be moved.

10.2 General Cabling Operations

- Restraints must be fitted on the winch side of any joints.
- Cable bending radii must not be exceeded.
- Cable guides and Bellmouths must be used in all cases.
- Loose cable ends and draw rope must be secured and kept clear of the work area before cabling commences.
- Cables must be lubricated to reduce pulling tensions.
- For cable recovery, the correct cable must be identified before starting work.
- All joints on the cable to be recovered will be cut out prior to cable recovery.
- Other cables not being recovered must be adequately restrained before recovery operations start.

Note: It is important with some types of cable that they are installed in the correct direction, taking into account the cable core rotation as specified on the cabling diagrams and Works Instruction (WI).

10.3 Completion of Cabling & Site Close Down

- All joints and cables that have been moved (at all workpoints) must be replaced in satisfactory positions, supported / restrained correctly.
- Newly installed cables must be supported/restrained at all cabling access points.
- Any anti-creepage devices that have been removed for cabling must be replaced.
- Sufficient cable must be left for both testing and jointing purposes.
- Cables should be sealed against the ingress of moisture at all stages of the cabling operations and on completion
- Cables should be identified (coded) and restrained within structures.
- On completion of cabling operations, any excess lubricant will be removed.
- All equipment used should be removed from site.
- Ducts must be sealed where required.
- Existing cables and joints must be examined for signs of fracture or damage after cabling. Any damage not capable of being repaired by the engineer/Working party must be reported or advice sought from Control/Manager.

- The work site will be left tidy - rubbish removed.

10.4 Cable Identification

Cables must be collated/labelled with identification coding to ensure that plant can be identified during future network operations at;

- ALL positions for fibre including through boxes
- Both ends for copper (while it is not mandatory to label copper cables in through boxes, it is good practice when there are multiple cables present)

10.5 D Side Cables

D-Side is defined as the distribution network radiating from the Primary Cross Connection Point (PCP) on the customer side to the distribution points (DP). This includes all UG and aerial cable. In some networks this may include Secondary Cross Connection Points (SCP). DP's include all pole and wall mounted block terminals connected directly to the UG cable network and the termination in a customer premises of the direct feed UG cable on a Network Terminating Point (NTP).

Cables MUST be standard grease-filled polyethylene type.

No pressurised type or other non- grease filled cable should be used in the D-Side.

10.6 E Side Cables

The E-Side of the Local Access network is between the exchange MDF and PCP.

E-Side cables provided must be of the pressurised type with a foil moisture barrier.

Grease filled D-Side type cable must not be used in pressurised systems.

10.7 E/O Cables

E/O cables feed direct MDF to DP and are generally considered part of the D-Side network.

E/O cable networks can vary in their makeup, with both pressurised and non-pressurised cable layouts. Combinations of both can exist with the pressurised system separated from the non - pressurised or grease filled cables by air blocks.

Pressurised cable should be treated as for E-Side cables and non-pressurised as for D-Side.

10.8 Support and Restraint of Joints and Cables

When the job is completed all joints and cables must be correctly supported and restrained (at all workpoints). EPT/ANS/A003 refers

An exception to this exists on greenfield/brownfield developments where it is the responsibility of the developer to provide fixings. These may not be present at the time of the jointing/cabling work being undertaken. In this situation the DLO's responsible for the site will ensure all restraints are provided.

10.9 Line Plant Records

- All line plant records associated with the job, ordnance survey prints, cable diagrams, and duct space records will be updated and amended on completion of the work and will accurately reflect the state of the network.
- Completed line plant records will be sent to the appropriate controls, records offices and planners.
- All work will be booked against the correct job or estimate number.
- All records, prints and A154 legible, clean, updated, certified and forwarded.
- Correct booking practices used.

10.10 Observed Defects

Observed poor quality plant, which is not associated with the plant being worked on, can be dealt with by the engineer or working party whilst on site, providing they are equipped and skilled to undertake the work. The control should be contacted and agreement should be sought to undertake the work, before the work is started.

If permission is not given the appropriate category A1024 must be submitted.

11 *Overhead Cabling*

To be read in conjunction with EPT/ANS/A012

11.1 Route Survey

On arrival at the worksite, the job should be surveyed using the associated work plans. Any perceived obstacles to the progression of the job must be reported at an early stage.

11.2 Site Set-Up and Inspection

- A visual check of the new cable **must** be performed before and during cabling operations - If the cable sheath is damaged, advice must be sought from the Control/Manager.
- Where there is a likelihood of damage to existing cables, all affected cables in the work area **must** be protected.
- If existing cables and joints obstruct the cabling job they should be moved with care.
- Existing cables **must** be adequately supported at all times.
- Pole sizes must be to the correct standard - or reported.
- Pull on pole must be within limits.
- All pole stays/stability devices must be fitted where required in accordance with planned route stability or minimum route strengthening requirements.
- Insulators to be fitted where required.
- Minimum height clearances are to be assessed.
- A check must be made that all wayleaves/ permissions are available as necessary.
- Vehicle / trailer correctly positioned for cabling.
- All stores, tools and equipment required to complete work positioned on site.
- Poles must be tested before climbing or adding new cables. Test to include no more than 15 degrees of lean measured at 3M mark.
- Adequate road works guarding available and correct layout observed.

<p>Caution: Fragile cables are clearly marked as such, Fibre Optic, Coax and other cables, must not be moved unless indicated in the Works Instruction and should be treated carefully.</p>
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11.3 General Cabling Operations

- Loose cable ends and rope must be secured and kept clear of the work area before cabling commences.

For cable recovery the correct cable must be identified before starting work.

11.4 Aerial Cable Erection / Renewal

- Cable tensioned correctly.

- Anti - Oscillation twists inserted as required.
- Sufficient cable left for testing and jointing.
- Ends of cables properly sealed where left for jointing.
- Clamps and fittings to the required standard.
- Cables secured and terminated at poles correctly.
- Correct attachment method used according to pull on pole.
- Suspension wire provided where required.
- Maximum planned length of spans should not be exceeded. Where this is not possible due to on-site conditions the local planning department should be consulted - Aerial cable span distances on existing constructed routes should be considered as being planned when completing a "like for like" change.
- Minimum power clearances maintained.
- Statutory Notices fitted as required.
- Joint user requirements observed.
- Cable provided as per Works Instruction. Any departure from estimate correctly agreed and recorded at planning.
- Redundant cable recovered.
- Customers fixing provided correctly and replaced where faulty or fault prone.
- Customer's lead-in routed and cleared neatly.
- Cable entry through wall agreed with customer (drip loop provided and entry sealed correctly).
- All existing DACS/WB remote units should be positioned correctly.
- Pole loadings not exceeded.
- Cable feeds correctly run and cleated. Capping correctly sited.
- Correct Insulator should be fitted to stays and cables as required.
- The correct type of stay used and fitted correctly for the on site conditions, pole and loadings, should be used.
- The correct type of stay anchor should be used.
- The stay wire should be fitted with yellow spiral hazard marker's to create a chevron effect (for visibility/safety), or in heavy cattle situations a split stake wooden guard may be used.
- The stay should be correctly tensioned.
- Earth wire should be fitted where appropriate to the correct standard.

11.5 Low Wires/Cables

Where a new or replacement wire/cable has been provided, overhead clearances must conform to the minimum height requirements when the job is completed as per ISIS EPT/ANS/A013.

If an existing wire/cable is low at the pole worked on and it does not require renewal an attempt to bring it up to the minimum height standard should be made. If this is not possible an A1024 should be submitted.

11.6 Completion of Cabling and Site Close Down

- Redundant pole furniture recovered, holes plugged correctly.
- The worksite will be left tidy - rubbish removed.
- All equipment should be removed from the site.
- All joints and cables that have been moved must be replaced in satisfactory positions, supported / restrained correctly.
- Cables should be identified (coded) and restrained.
- Plant Network Security Checks and Reporting procedures should be observed.

11.7 Aerial Cable Recovery

During the recovery process correct equipment and materials must be used.

When changing over an existing aerial cable the old aerial cable **MUST** be recovered as part of the job.

11.8 Line Plant Records

See 10.9

11.9 Observed Defects

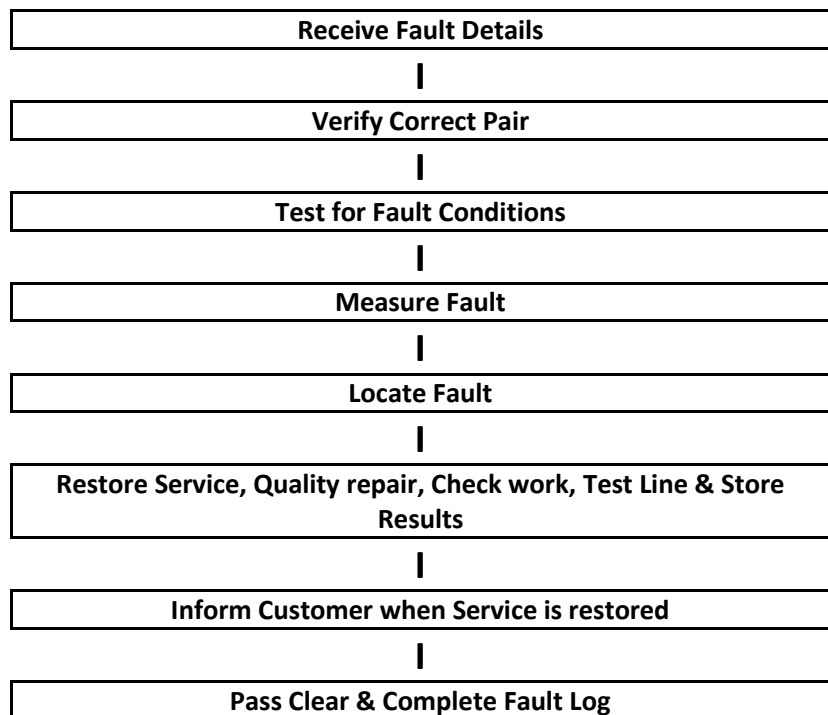
See 10.10

11.10 Statutory Notices

Statutory notices must be correctly completed and fitted, if required.

12 *D - Side Faulting*

12.1 D-Side Repair Activity Map



Note: If an appointment has been made, the end user must be visited during the appointment period.

12.2 Pair Identification, Testing and Fault Location

12.2.1 Current Approved Test and Identification Equipment for "E and D" Sides

JDSU (tester)

EXFO (tester)

Tele300

12.2.2 Verifying Correct Pair

Initial pair verification/identification must not be carried out within joints. This should be started at a node point i.e. MDF, PCP, DP or NTE.

Work must be planned to ensure a minimum number of entries into the network.

The digital Tele 300 **MUST** be used to identify the correct line/pair. This will identify any mains voltage present on the line and identify if a digital circuit is present. If done at MDF or PCP it will confirm routing details are correct.

The use of remote pair identification equipment, such as 17070, TAM (test access matrix) will reduce the risk of disconnecting the wrong pair.

Local instructions will indicate which systems are available and the access numbers required.

Varying circumstances will dictate where the first point of access into the network will be. If the work has been appointed the end user must be visited.

For multi-line business end users and private circuit faults it is often convenient to work from the end user's DP. Otherwise the starting point should be the MDF or Primary Connection Point (PCP).

Caution: DO NOT OPEN ANY JOINTS AT THIS STAGE.

12.2.3 Testing for Fault Conditions

Following verification of the right pair, an approved tester should be used to test for fault conditions and to confirm that a fault exists. If at PCP or DP you should always test both ways. (E.g. towards exchange and end user, confirming conditions)

12.2.4 Measuring Distance to Fault

A measurement should always be obtained using the approved testers to provide the location of the fault. The cut and prove method must not be used to find the position of the fault. Disruption and interventions to the network must be kept to a minimum at all times.

All measurements taken for a fault are to be recorded within the POI screens. (E.g. metres to fault or Ohms to fault)

12.2.5 Use of Existing Working Lines for Testing

See 7.5.1

12.2.6 Locating and Clearing the Fault at Point of Intervention

At the point of intervention, care must be taken to ensure that other pairs are not damaged when locating the faulty pair. If the insulation of other pairs have been damaged whilst opening a joint, removing tie backs, tracing a pair at a PCP, DP etc. or accidentally shorting out a good pair when trying to identify the tone on the faulty pair -- **the pairs must be remade/reconnected**. Joint and closure or other plant should then be brought up to the current quality standards.

12.3 Faults identified in Length

The first choice must not be a pair changed where the engineer has the skills to localise and clear the fault in accordance with these instructions.

The expectation is to make every reasonable effort to find and fix on the day prior to any pair change.

12.3.1 Ducted or Aerial Cable lengths

Where pairs have to be changed, they must only be changed node to node (e.g. MDF- PCP; PCP - D. P.) then only after the spare has been allocated by Routing and Records (RRTC or any other approved record up-date system) to the engineer for the job in hand. Where pairs are changed node to node engineers must supply distance to fault in ohms/metres as well as old/new routings in POI.

Changing of pair's node (PCP) to joint or joint to node (DP) is not allowed as this will corrupt routing and records data. If assembly fault refer to sections 9.4.4 & 9.4.5 of this document.

If a joint to joint pair change (in ducted length only) is the last option then the following must be observed:-

- The allocated pair must be identified in both joints by toning from the PCP.
- The pair must be changed in both joints to maintain the PCP D-side records.
- When a spare stumped pair is allocated, the e-records Office must be informed using form A55.
- After restoration of service, the faulty pair must be jointed through in both joints. If the last available spare has been used either between flexibility points or joint to joint, an A1024 must be submitted after an approved closure is fitted requesting renewal of the relevant length. If the fault is still outstanding and there are no fault free pairs left then further the job via control for a new cable length.

If the Router is unable to allocate a recorded spare, but the faultsman is aware of 'dead' spare pairs in the cable length, he may use one of these to restore service. This situation could arise where the cable length had previously been renewed with a larger cable. The e-records Office must be informed using form A55.

12.3.2 Directly Buried Cables (DIG)

Where initial line test result has shown a disconnection fault that is subsequently proven into a buried cable length the Engineer may change the pair for a good spare within the buried cable length.

Where no good spare pair exists or the fault is other than a simple disconnection fault proven into a buried cable length the Engineer must locate the fault using accurate measurement and cable track location. Excavate or arrange for excavation in accordance with the New Roads and Street Works Act plus any local procedures.

Then complete the repair as per these instructions.

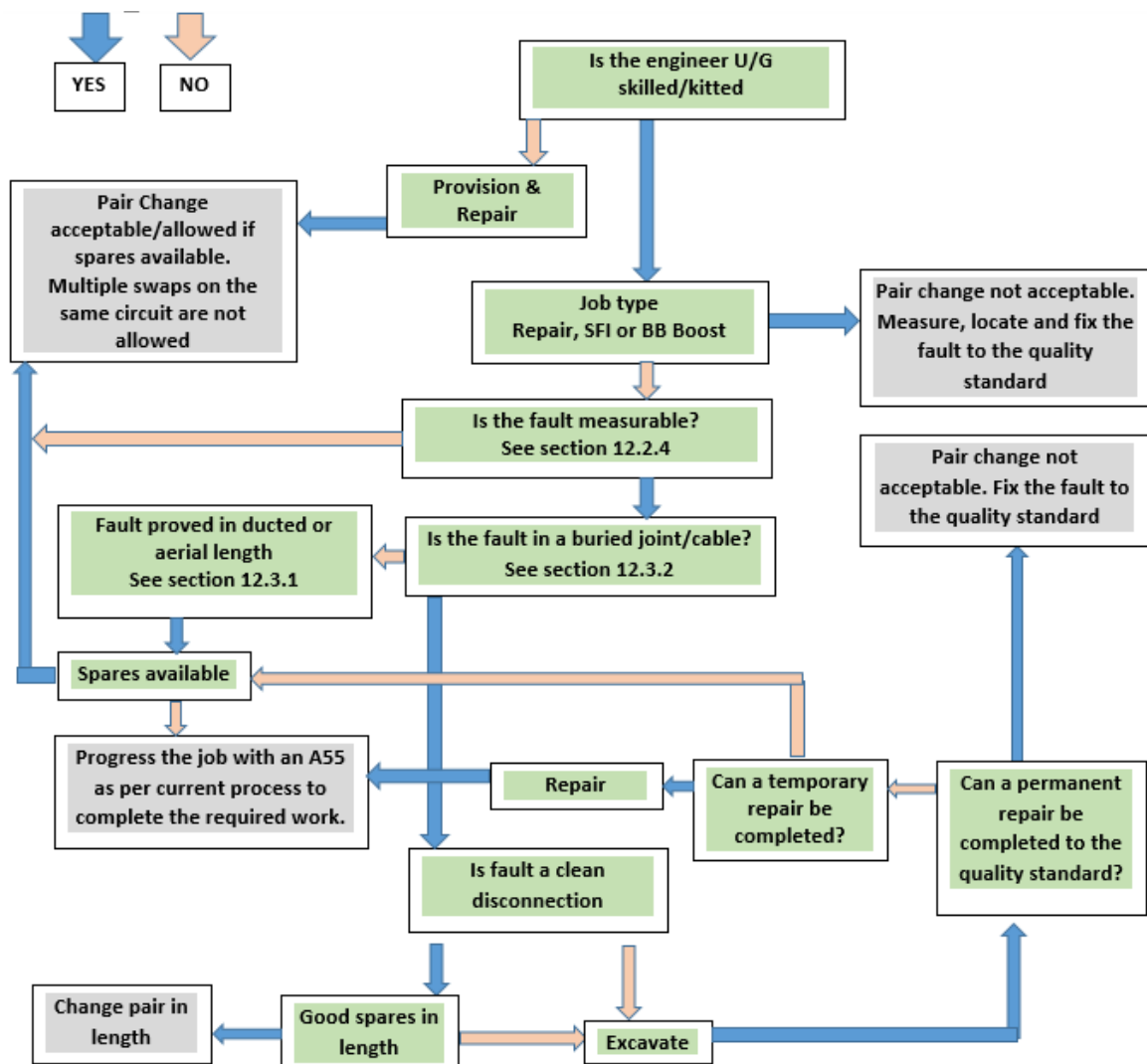
For in-length faults on DIGs estates fed via frontage Tee distribution, "dead pairs" can be used to restore service.

If support activities are required or you do not have the skills to complete the excavation / quality repair see local procedures.

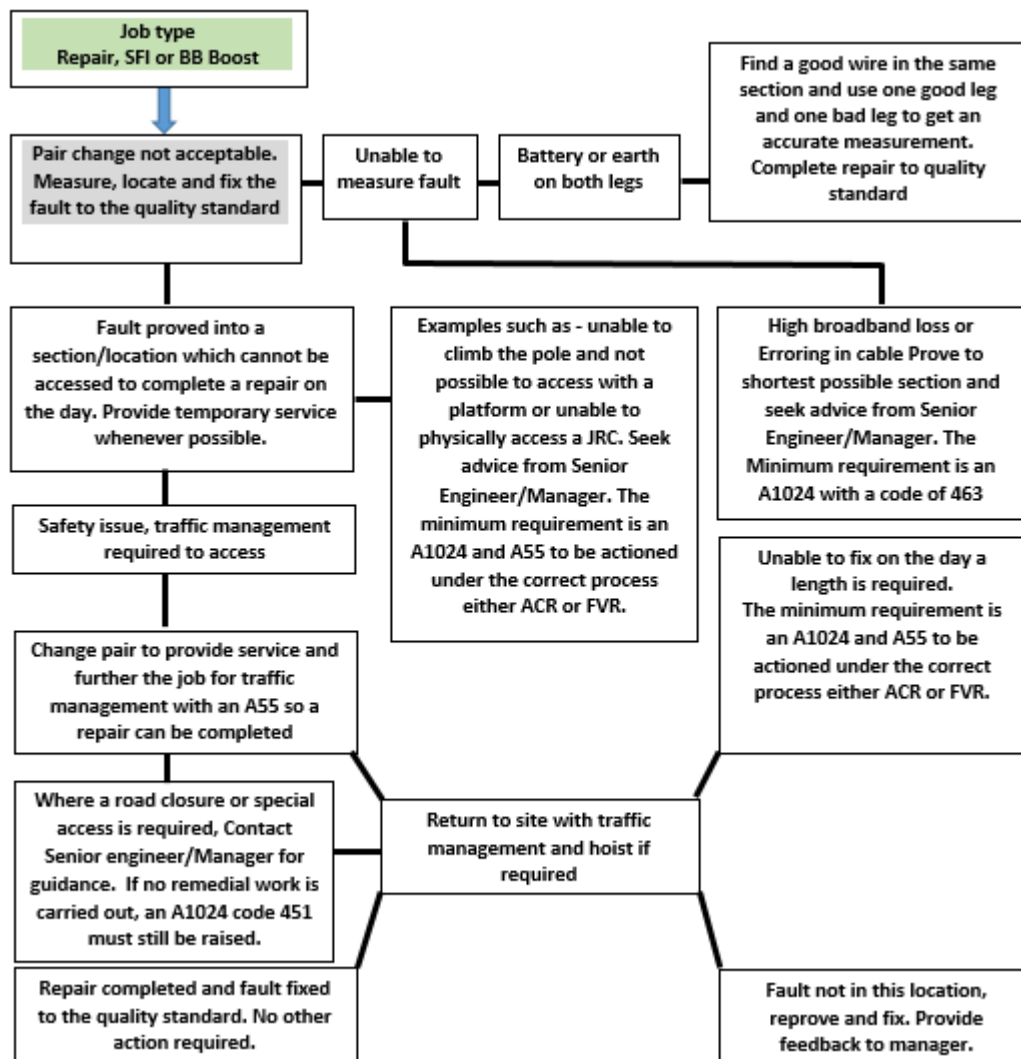
When changing pairs PCP to DP the engineer must use the fast route telephone line or RRTC on the CSS database or contact routing and records for a new D- Side

For in length faults on DIG estates fed by frontage Tee distribution, 'dead' pairs can be used to restore service. If spare dead pairs are not available then the engineer must locate and clear the fault.

12.4 D-Side Pair Change Policy



Repair, SFI, BB Boost Pair Change Policy Flow Chart



12.4.1 A Faulty Length that needs Replacing Urgently.

Unable to provide full contractual service or customer is out of service.

Substantial damage which cannot be repaired to the correct quality standards.

Temporary Repair - when cutting back on a joint and piecing out to clear the fault, but the jointing gap is too wide and will only take a temporary closure.

Temporary service has been provided but there is a high probability that a repeat report or additional faults are likely to occur in the next week if the cable is not replaced.

Temporary service has been provided but it is not to quality standard i.e. a cable across the ground, Dropwire used to provide service in place of Aerial cable.

If it is a repeat report for the same customer proved into the same cable length in the last 28 days.

In cases where the renewal is urgent, the job should not be closed as complete.

An attempt should be made on the day to provide temporary service, the job should then be progressed appropriately via CER/Triage.

A quality A55 will be required to progress the required work.

(CPE/NNS/V006 the Requirements of the A55b).

It is important to clearly explain in your job notes and conversation with CER/Triage why the work is urgent and not FVR.

12.4.2 Pair changes and A1024's

Reference

NWK/NNS/V018 A1024 Defect & Remedy Codes

If a pair change is the final option then an A1024 must be raised (in all cases) with the defect code of

451 - "Cable length where faulty pairs have been proven in the length".

Full information must be provided when inputting the A1024 including DP/CP, joint box type, cable & conductor size, speed limits, accurate location of both ends of cable and good notes to assist with fixing the faulty length.

The faulty cable should be marked at both ends with either a label or tape to help identify the correct cable which requires to be changed over.

A1024 reference number should be recorded on the job closure screen.

If it is deemed the cable length to be a high priority but not urgent, you could speed the renewal process up by sending an A55 and the A1024 number to your Manager or Senior Engineer so it can either investigate further or pass this information onto the local FVR planner.

13 *D - Side Quality Standards*

13.1 D - Side Definition

The D-Side network is defined as the distribution network radiating from the PCP on the customer side, via the Distribution Points (DP's) being block terminals or customer's Network terminating points (NTP's) to the customers NTE. This includes all Underground, Aerial cable and dropwire.

- DP's include all pole and wall mounted block terminals connected directly to the underground cable network.
- NTP's are a termination in the customer's premises of the direct feed underground cable or dropwire.
- "D" side also includes any part of the network designated E/O consisting of non-pressurised cables - 100 pair or less - which distribute from the Exchange (MDF line-side) to the customers DP/NTE/NTP/UG lead-in.

13.2 D - Side Repair Methodology

Repair must be adopted as the first choice of service restoration. Quality clears should be undertaken at the same time as service restoration. Pairs should only be changed as a last resort.

13.3 Joint Remakes (Construction and Build activities)

Where any of the following conditions (13.3.1) are encountered in joints being worked on, the joint must be remade or affected pairs re-crimped/modular connected as necessary and closed with a standard approved closure.

A joint is a physical connection between 2 wires (pairs in a closure/Joining Post/Block connection (BC20)/Block terminal 41/41A, it does NOT refer to a joint closure.

13.3.1 Conditions

Joint remake;

- Wet joints/battery contacts
 - Conductors showing signs of corrosion.
 - Conductors that are too short (cable butt cut too far back) and connectors cannot be re-connected.
- Pair's re-crimped or joint remade; (dependent on situation)
- Conductors with damaged (nicked) insulation
 - Paper joints with 'shiners'
 - Joints containing connectors No. 1 (White CWI)
 - Joints containing connectors No. 1A (Blue, red, brown or any other colours)
 - Conductors showing signs of corrosion.

13.3.2 The Standard (Construction and Build activities)

The agreed standard for dealing with joint remakes is as follows:-

- For joint remakes of 100 pairs or less, the engineer does not need permission to complete the work. However the engineer must advise the control before starting the work.
- For joint remakes of 100 pairs or less If there is insufficient cable length to remake the joint an A1024 for a length renewal can be submitted
- For joint remakes greater than 100 pairs, defined as the number of jointed pairs within the closure and not the size of the cables entering the joint (e.g. 200 pair cable jointed to 2 x 50 & 1 x 20 pair cables = total 120 pairs jointed), agreement must be obtained from the control before proceeding with the work. If permission is denied then the A1024 procedure must be followed.
- If an A1024 is submitted, the joint must be made watertight with a permanent approved closure or if this is not possible with a temporary closure. This includes providing Sealant 10B in 30 series joints and bringing defective or open joints up to the quality standard.

A1024 defect codes 459 (permanent closure) or 460 (approved temporary closure) would be used depending on the type of job closure left.

13.4 Joint Remakes (Provision and Repair activities)

Where any of the following conditions are encountered in joints being worked on, the joint must be remade or affected pairs re-crimped/modular connected as necessary and closed with a standard approved closure, using no break crimps on pairs other than the circuit being worked on - Connector Wire 11A (CWI11A).

For repair and provision activities, if there are 50 pairs or less jointed pairs then all the pairs must be brought up to the quality standards before the job is completed and A1024s are not applicable (unless there was insufficient length or space to remake the joint).

Pair jointing situations are not just in joint closures but also include jointing posts, jointing bricks, jointing kerbs, block terminal 71A's (for hollow pole use), universal clip joints (UCJ), mechanical & heat shrink closures.

13.4.1 Conditions

Joint remake;

- Wet joints/battery contacts
- Conductors showing signs of corrosion.
- Conductors that are too short (cable butt cut too far back) and connectors cannot be re-connected.

Pair's re-crimped or joint remake; (dependent on situation)

- Conductors with damaged (nicked) insulation
- Paper joints with 'shiners'
- Joints containing connectors No. 1 (White CWI)
- Joints containing connectors No. 1A (Blue, red, brown or any other colours)
- Conductors showing signs of corrosion.

13.4.2 The Standard (Provision and repair activities)

The agreed standard for dealing with joint remakes on customer repair and provision activities is as follows:

- For joint remakes of 50 pairs or less the engineer does not need permission to complete the work. However the engineer must advise the control before starting the work.
- For joint remakes of 50 pairs or less If there is insufficient cable length to remake the joint an A1024 for a length renewal can be submitted
- For joint remakes greater than 50 pairs, defined as the number of jointed pairs within the closure and not the size of the cables entering the joint, agreement

must be obtained from the control before proceeding with the work. If permission is denied then the A1024 procedure must be followed.

- If an A1024 is submitted, the joint must be made watertight with a permanent approved closure or if this is not possible with a temporary closure. This includes providing Sealant 10B in 30 series joints and bringing defective or open joints up to the quality standard.

13.5 Joint Closures

Quality standards to be applied when working on current, obsolete and non-approved closures can be found in the reference documents listed below.

13.5.1 Obsolete or Non Approved Closures

EPT/ANS/A008 Section 6 Refers.

13.5.2 Mechanical Joint Closures

EPT/ANS/A008 Section 3 refers.

13.5.3 Temporary Closures

EPT/ANS/A008 Section 3 refers

13.5.4 Provision/Build work NOT Repair - Temporary Closures

Overnight or Suspension of Work

EPT/ANS/A008 Section 3 refers

There is no requirement for A1024 or any other action under these circumstances.

13.5.5 Jointing Posts/Bricks/Kerbs

Jointing Post

If the jointing post lid is damaged, plastic plate/coating to protect the wires is missing or damaged then the first choice is to fit a new plastic lid. (Not an A1024)



If the cable butt(s) are below ground level or the main joining post housing is beyond repair then protect the jointing post e.g. with sheet rubber if required and submit an A1024/A55 to have the jointing post excavated and replaced with a suitable joint box.

Jointing Brick

Metal Jointing brick covers go missing, leaving the fabric of the premises and our network open to the elements and interference. A plastic version has been made available as a replacement and an initial 500 are available from the Chief Engineers Office. Once all stock has been issued, future supply can be obtained on iBuy from Tatra Plastics.



Jointing Kerb

A jointing kerb has a channel with a metal lid with two PCP bolts at each end. It was designed to house a joint for customer leads. The joint has no closure around it under the metal lid so will require an A1024/A55 to be raised to provide a suitable joint box to ensure customer service is not at risk.



13.5.5.1 Defect Handling

Where damage has breached the weatherproofing of a casing, it must be reported using the A1024 process. Other scenarios/product faults are covered below.

13.6 Observed Obviously Open Joints in Worksite

Observed open joints are those not being worked on, but are present in the same worksite as the jointing repair/provision work in hand; they should be closed on the day or reported using an A1024 with a defect code of 461. These can only be seen by a visual (hands free) check within the worksite from the current working position.

13.6.1 Definition of an Open Joint is, where it can be seen that:-

- Wires/conductors are visible.
- Plastic bag or other unapproved method has been used as a closure.
- A pedcap or heat-shrink closure that has been re-closed using adhesive tape.
- An expanding plug joint with defective collars, missing or broken plugs or bolts.
- 30, 31 or 32 series closures that have missing domes or clamps, broken clamps, clamp faces do not meet / touch at some point in their length or unsealed entry ports, including resin closures without resin.
- 34 series and 0.9 closures that have missing bolts, closure faces that do not meet as per instructions, or unsealed entry ports.

- Any non–standard strap between joints, e.g. jumper wire, dropwire or internal cable.
- Closures with damage to the external fabric that allow the ingress of moisture.
- Denso tape or tape sealing, except where it is provided as a protective wrap on some lead sheathed cables and joints.
- Adhesive tape closures, without tape.
- Sheet Rubber Adhesive closures with plastic straps and no evidence of orange “Tape Temporary Closure” having been used.
- Sheet Rubber Adhesive closures with no clips, strips or tape fitted.
- Sheet Rubber Adhesive which is open allowing ingress of moisture.
- Stumped cable ends that have not been sealed using caps sealing.
- Armoured cable into closure
- Split sheath that would allow ingress of water

13.6.2 Items that are NOT classed as – Obviously Open

- A correctly sealed, but obsolete closure.
- Closure with incorrectly positioned/or no SCOPs/foils visible.
- Excess cable diameters on closures.
- Excess cables in port or joint end.
- Missing branch clips.
- Cables in joints that can only be deemed loose by pulling them.

13.7 Sealant 10B

The correct use and application of sealant 10B must be undertaken when working on 30 series closures heatshrink and resin mechanical closures can be found in.

EPT/ANS/A008 Refers

13.8 General Jointing Standards

D Side Joints

- Pairs must be jointed using approved methods and materials.
- Under no circumstances must E side pressurised type cable be jointed in new construction work in the D-Side access network, unless correctly planned and

executed as part of E/O work when connecting between E & D type distribution.

- If E side pressurised type cable is encountered in the D-Side, as part of the job in hand, the control must be contacted and further guidance sought.
- All spare pairs in joints to be put through to the furthest point possible in the network unless instructed by planning to stump them at a particular location.

13.9 Joint Remake

Remake criteria applies to an unforeseen poor quality joint condition, identified during the course of work on the network, in other words it was not planned or previously identified as in the case of an FVR re-construction job, which would be the task in hand.

13.10 Desiccation – Joints

Desiccant packs are no longer required in joints.

When there is no desiccation in a joint any paper or poly sleeved connectors must be remade with IDC connectors.

See EPT/ANS/A008

13.11 Marking of Joints/Cables

Upon fitting a new or replacement joint closure (including re-closure bands) the following is a mandatory requirement.

13.11.1 All Closures

Print on the body of the closure (with a Pen Marker Number 2) the following:-

- The engineering CSS ID/Contractor ID. (Including CSS database e.g. STSJB04)
- The date.
- The full job, fault or estimate number.
- If fitted by an Openreach contractor then also print the name of the contract company.
- DP number if joint serves as an underground DP.

All information recorded on the joint must be completed in BLOCK CAPITALS.

13.11.2 30 Series Closures

- Information must be printed on the Heat-shrinkable body of the closure (Not the dome)
- Where a new cable has been provided into an existing joint, the Port must carry the relevant information or if the port is too small to accommodate the details then attach a white label and mark the label accordingly.
- On an existing joint, where no work, other than reconnecting of wires has taken place, joint marking is not required.
- If the joint is an underground radial DP then add the DP number.

13.11.2.1 34 Series and 0.9 Closures

- Information must be printed on the top half of the body of the closure in any available space where all of the required details will fit.
- Where a new cable has been provided into an existing joint, the new cable must have the relevant information on the correct attached label (e.g. CSS ID, Date Job/fault number & Contractor etc.).
- On an existing joint, where no work, other than reconnecting wires has taken place, joint marking is not required.
- If the joint is an underground radial DP then add the DP number.

13.11.3 Cable Marking

All newly provided cables entering joints should be marked according to current instructions. The joiner must add to the label fitted by the cablers the E or D side range used, Cable code if applicable (e.g. MDF H1 - 100 or PCP6 D301 - 400).

13.11.4 POI Information in joints

See section 19.4

13.12 Complex Joint Closure Process

This is NOT for use with/during planned work activities as any issues with these will be referred back to the planner. This process will provide an additional alternative to costly "D" side cable length renewals and jointing

programmes that are not covered by the correct application of current existing closures.

13.12.1 History

Historic planning, cable additions, removal of SCPs etc. have accounted for a number of multiple end joints that do not fit the guidelines for the standard Closures. In many of these situations the correct use of the Complex Joint Closure process would have saved a lot of time and money.

13.12.2 Process

On identifying a Complex joint closure requirement contact the Regional Network Reliability and Quality Manager (RNRQM) responsible for its geographical location.

The RNRQM will require the following information.

Joint Location

Joint box size

Volume of cables to be incorporated within the joint, cable diameters, size and conductor type

Urgency of solution (reactive – proactive)

If a suitable solution is identified by the RNRQM they will pass back the information for the enquirer to order through normal channels (it is the responsibility of the enquirer to liaise with the relevant parties for the appropriate activity to install the joint).

If no suitable solution is identified the RNRQM will liaise with the Chief engineers In Life team to obtain and make the bespoke joint available. (It is the responsibility of the enquirer to liaise with the relevant parties for the appropriate activity to install the joint.)

The RNRQM will attend a site meeting with the joiner(s) and cover the relevant quality issues for the chosen solution.

On joint completion the RNRQM is to be contacted whereby he will inspect the closure to the Quality Standards, photograph it and record it in the Bespoke Joint Register.

Joints recorded on the register are open to Audit at any time.

Please see the following URL for the Bespoke Register Link and further information on the uses of joint closures,

[Bespoke Joint Register](#)

This does not detract from the current Quality and Planning Standards. It is intended to resolve existing network problems and should not be used as an aid to extend the network through other activities.

Bespoke closures must only be installed through strict compliance with this process.

13.13 Support and Restraint of Joints and Cables

When the job is completed all joints and cables must be correctly supported and restrained.

An exception to this exists on greenfield/brownfield developments where it is the responsibility of the developer to provide fixings. These may not be present at the time of the jointing/cabling work being undertaken. In this situation there is no need to submit an A1024 as the Newsites Field Based Co-Ord/DLO responsible for the site will ensure all restraints are provided.

13.14 Support of Aerial Cable/Cables on Pole and/or Wall

Such cables must be adequately supported and restrained.

14 Poling

To be read in conjunction with EPT/ANS/A010

14.1 Route Survey

See section 11.1

14.2 Site Set-Up and Inspection

- A visual check of the new or existing pole must be performed before commencing poling operations - If damaged, advice must be sought from the Control/Manager
- Where there is a likelihood of damage to existing cables, all affected cables in the work area must be protected
- Existing cables must be adequately supported at all times
- All pole stays must be fitted when required
- Minimum height clearances are to be assessed
- A check must be made that all wayleaves / permissions are available as necessary
- Vehicle correctly positioned for poling operations

- All stores, tools and equipment required to complete work positioned on site
- Poles must be tested before climbing or adding new cables. Test to include no more than 15 degrees of lean measured at 3M mark.
- Adequate road works guarding available and correct layout observed
- Where replacing a pole to alleviate low wires it should be established before commencing work that the proposed solution will eradicate the low wire problem - If not refer back to control
- Identify a safe area to dress the pole before erection
- Identify a safe area to rest the pole after pole recovery

Caution: Fragile cables are clearly marked. As such, Fibre Optic, Coax and other cables must not be moved unless indicated in the Works Instruction and should be treated carefully.

14.3 Creosoted Poles - Restricted Use

EPT/ANS/A010 refers

It is imperative that the correct poles are used in the restricted circumstances, and auditors will check to ensure compliance. Use of ordinary creosoted poles will be a 10pt CD, and it will be necessary to return to remove and replace any poles incorrectly installed.

14.4 Bleeding Poles

EPT/ANS/A010 refers

In situations where bleeding poles are found to be existing in the network they must be protected with Battens and Hessian as stated in appendix 2 of the above ISIS.

14.5 General Poling Operations

- Location of other plant and services should be undertaken
- For pole recovery the correct pole must be identified before starting work

14.6 Pole Erection / Renewal

- All Poles should be erected vertically
- The correct class and size of pole should be used
- The pole should be erected at the correct depth with due consideration being taken for a change in ground level adjacent to the pole
- Correct tools and methods must be used for backfill compaction
- Pole loadings should not be exceeded
- Poles must not be erected within 1 metre of a known hazard
- The pole must be erected in a position such that a standard pole test can be carried out
- Hollow poles should be erected so that the door is positioned correctly and pole/s at the correct height
- All pole Steps and Rings should be correctly dimensioned / orientated and fitted correctly
- Earth wire should be fitted where appropriate to the correct standard
- The pole should be correctly numbered before leaving site
- Where required on hollow poles the correct Collars and Caps should be fitted
- Minimum power clearances maintained
- Joint user requirements observed
- Insulators to be fitted when required
- Pole provided as per Works Instruction. Any departure from estimate correctly agreed and recorded at planning
- Correct Insulator should be fitted to stays as required
- The correct type of stay used and fitted correctly for the onsite conditions where required
- The correct type of stay anchor should be used
- The stay wire should be fitted with either a yellow plastic helical strips/hazard marker's to create a chevron effect (safety/visibility reasons) or a solid yellow split tube. In heavy cattle situations a split stake wooden stayguard can be used
- The stay should be correctly tensioned
- The stay should not be in contact with, or obstruct pole fittings, Block terminals or cables
- Where required the pole should be blocked correctly

14.7 Poles at Restricted Depth

EPT/ANS/A010 refers

A national process for erecting a pole with a restricted depth (minimum 1.2m) is run by the Poling test Control Office (PTCO) and is monitored regularly through the year. The restricted depth register is ONLY for wooden poles that are being erected in rock and it is impossible due to the nature of the rock to achieve the full installation planting depth for that particular pole size. The definitions of rock and restricted depth are in EPT/ANS/A010. However the pole MUST be registered with the PTCO using the relevant [web form](#) (once completed, click the send button or email to [Poleupdate G](#)) and accepted as truly eligible by the PTCO (note a certain proportion will be checked on site). Upon finding a newly erected pole that has been erected less than the minimum planting depth for a new or replacement pole. The quality checker/quality assessor/engineer must identify whether it has been accepted as a legitimate restricted depth pole by the PTCO by ringing on 08000778935.

If it is not registered then the quality checker/Quality assessor will award a CD for incorrect depth. Concerned engineers must raise this as a safety issue with their manager.

14.8 Low Wires

Wires and cables should be erected in accordance with EPT/ANS/A013

See EPT/ANS/A010 for revisions to the permitted low wire policy and standards.

14.9 Completion of Poling and Site Close Down

- Redundant pole furniture recovered, holes plugged correctly
- The worksite will be left tidy - rubbish removed
- All equipment should be removed from the site
- Cables should be identified (coded) and restrained within the structure
- Plant Network Security Checks and Reporting procedures should be observed
- Where a pole is observed to be bleeding it should be properly protected before leaving the worksite

14.10 Pole Recovery

- During the recovery process the correct equipment and materials must be used
- All excavations should be correctly re-instated

- Consideration should be given to colleagues and members of the public during the pole recovery operation

14.11 Line Plant Records

See section 10.9

14.12 Observed Defects

See section 10.10

14.13 Statutory Notices

See section 11.10

15 *Block Terminals*

EPT/ANS/A006 Section 5 refers in more detail

15.1 Quality Standards

The following should always be carried out on the Block Terminal being worked on:

- Reterminate all connections that are incorrectly terminated.
- Reterminate all block terminal connections that are displaying signs of corrosion.
- Replace all corroded inserts.
- Brush and clean all non-IDC block terminals.
- Spray all external non-IDC block terminals with AC90 spray.

Caution: External block terminals that are mounted internally, such as stairwells or risers and other confined spaces should not be sprayed.

- To ensure weatherproofing the BT lid should be securely fixed/fastened/clipped to the Block Terminal.
- All BT 41/41As worked upon that have CWI 1As must be reported via the A1024 process using the new defect code of 443 to ensure corrective action is taken.

- All BT41s must have a slide on lid. All BT41A series snap on covers where the lid allows the ingress of moisture due to bad fit will be replaced with slide or new clip-on type lids.
- Ensure all other external BT lids at the worksite are in good condition and are securely fastened on the BT (i.e.: BTs at the worksite additional to the BT worked on).
- If you encounter any cracked or broken BTs (this does not include broken horizontal restraining bars on the old BT 40 series blocks), ask control for permission to replace them. If you cannot do this whilst on site, raise an A1024 defect code 443 for a new BT & Tail or 724 for BT head only replacement
- If unable to fit lid then raise a PAT fault/A1024 as appropriate.
- Ensure BT worked on is securely fixed.
- Where inserts are corroded and need changing and the existing underground cable is too short to re-terminate. The pairs should be pieced out within the block using the correct underground cable pair type and CWIs. Change the inserts and re-terminate. Clean and spray the B/T. Raise an A1024.
- A Tool Bass containing the required items must be taken up the pole/DP
- BT71s in hollow poles should be protected from environmental damage by fitting a breathable bag Item Code 237195 over the BT. Bottom of the bag MUST remain open to allow ventilation.

Note: 'Work site' - is defined as the DP/Pole worked on, or that area that can be reached safely without having to move to a new working position.

15.1.1 Providing New DPs

- All BT's/BCs must be fitted according to the ISIS and manufacturer's instructions.
- Where a back plate is not built into a new BT/BC, one must be provided where appropriate

15.1.2 Block Terminal Inserts - Definition of Corrosion

Corrosion takes the form of white powdery deposits on the screw type terminal blocks, and cannot be removed by cleaning. If not dealt with, it will accumulate across the terminals and eventually lead to the breakdown of the block insulation resulting in subsequent service failure.

All corroded screw type connection blocks with white powdery deposits should be removed, and replaced (if required) with new items, re-terminating the U/G pair and the customer connections.

Note: For further detailed information see NWK/NNS/V046 – Guidance Notes.

15.2 Key Tasks

There are a number of tasks that must always be undertaken during the provision or repair of a Lead-in/dropwire or CAD55M/DW15 at the Block Terminal/Box Connection. They are:

- When a BT is fitted to a mounting block, the dropwire/ CAD55M/DW15/Lead-in' should be, restrained by routing behind the back plate and fixed with Straps Cable Fixing 12A pinned directly to the pole or wall.
- Where no mounting block exists, the dropwire/ CAD55M/DW15/Lead-in' should be restrained with Straps Cable Fixing 12A pinned directly to the pole or wall.
- Dropwire/CAD55M CAD55M/DW15/Lead-in's should be correctly routed behind mounting block of BT76, BT86 and Box Connection 18 (where fitted).
- Dropwire/ CAD55M/DW15/Lead-in's should enter Block Terminal/Box Connection/Above Ground Dropwire Closure correctly and be terminated using correct method for block / box connection.

16 *Dropwires/Dropwire work*

EPT/ANS/A011 refers in detail

This information, details the performance requirements for the Provision, Replacement and Recovery of Overhead Wires within the Openreach Network. Practices and items of plant are only detailed where necessary to ensure that Openreach Network & Plant are not compromised.

16.1 Site Survey

On arrival at the worksite the job should be surveyed. Any perceived obstacles to the progression of the job must be reported at an early stage.

16.2 Low Wires/Cables

Where a new or replacement wire/cable has been provided, overhead clearances must conform to the minimum height requirements when the job is completed as per ISIS EPT/ANS/A013.

If an existing wire/cable is low at the pole worked on and it does not require renewal an attempt to bring it up to the minimum height standard should be made. If this is not possible an A1024 should be submitted.

16.3 Wire Erection/Renewal

- Wire tensioned correctly

- Clamps and fittings to the required standard.
- Minimum power clearances maintained.
- Joint user requirements observed.
- Redundant wire recovered.
- Customers fixing provided correctly and replaced where faulty or fault prone.
- Customer's lead-in routed and cleared neatly.
- Cable entry through wall agreed with customer (drip loop provided and entry sealed correctly).
- Pole loadings not exceeded.

16.4 Observed Defects

See 10.10

17 *Monopoly Wiring & Lead-in Including FNF/RWT Quality Standards*

17.1 Monopoly Wiring & Lead-in Including FNF/RWT Quality Standards

Openreach's internal network consists of the cable or cables which are wholly Openreach owned and only contain Openreach's network services and no other services whatsoever i.e. dedicated cable or cables for Openreach's network. Include all faults on non-liberalised internal distribution cabling and apparatus between the point lead-in terminates and the network terminating equipment i.e. equipment that could not have been provided by anyone other than Openreach.

17.2 Monopoly Wiring, Provision & Repair

The current standard types of cable used by Openreach in customers' premises are described specifications EPT/ANS/A016 (Copper) and EPT/ANS/A017 (Fibre)

On sites where the Lead-in is terminated on a Frame or Large Box Connection external monopoly wiring may exist or be provided. In these

situations the appropriate external closures must be correctly fitted to the quality standard as defined by the appropriate ISIS.

Note: The above are referred to in this ISIS as Monopoly Wiring Cables.

- Monopoly wiring cables should enter Block Terminals correctly and be terminated using correct method for block, box connection or network terminating device.
- All non-terminated pairs in the Lead-in's should be formed correctly.
- Monopoly wiring cables should be routed and cleated neatly.
- Any new monopoly wiring cable entry to the customer's premises should be drilled through wall, from inside at correct angle (unless customer permission refused)
- Monopoly wiring cable entry to the customer's premises should be sealed with an approved sealant.
- Drip loops must be provided at the entry points on external walls.

17.3 Terminating Equipment

The current standard types of terminating equipment (Internal Block Terminals, Box Connection and Network Terminating Equipment) for use in customers premises is described in ISIS EPT/ANS/A016 - Internal Wiring.

On sites where the Lead-in is terminated on a Frame or Large Box Connection, external monopoly wiring may exist or be provided. In these situations the appropriate external Block Terminal / Box Connection must be correctly fitted to the quality standard as defined by the appropriate ISIS.

Note: The above are referred to in this ISIS as Internal Block Terminals (IBT).

The following should always be carried out on the Internal Block Terminal or Internal Filter being worked on;

- Reterminate all connections that are incorrectly terminated.
- Reterminate all block terminal connections that are displaying signs of corrosion. (See Block Terminal ISIS & Guidance notes for Quality Checkers ISIS for definition of corrosion).
- Replace all corroded inserts.
- Brush and clean all IBT's.
- If IBT is not in a secure environment the IBT lid should be securely fastened to IBT.
- Replace all missing or broken IBT lids. If you are unable to fit an IBT lid because it is obsolete replace the IBT.
- All newly provided IBT's should be fitted vertically in damp free position.

17.4 NTE's & Openreach's Interconnect Obligations

Note: Any references to NTE5A, B or C apply to the External NTE (XNTE) when fitted in lieu.

17.4.1 Segregation Policy

All wiring and connection boxes forming part of Openreach's network are supplied, owned and maintained by Openreach. Spare wires within these cables must not be used to provide extensions.

Wiring and associated connection boxes provided for extensions may be supplied and installed competitively by Openreach or others. Because of this it is essential that all wiring for extensions is separated from that providing Openreach network service.

Note: This means that in the case of NTE5A, B or C the Openreach maintained cable must be terminated on the screw terminals provided for the incoming line.

The incoming line must not be terminated on the IDC connectors that are provided to segregate the Openreach network from the customer wiring or equipment. Similarly capacitance loops for extensions should not be fed back through the Openreach owned wiring from the IDC connector.

17.4.1.1 Regularisation of Customer Wiring, Provision of New Service & Maintenance rewires

Where wiring system is being converted from Hard Wire System or LJU2/1A to NTE5 the segregation rules should always be followed.

- LJU2/1A's should not be fitted in lieu of NTE5A/B/C.
- No More than 1 NTE5 should be fitted per exchange line.
- No extension wiring should be teed in before the NTE5.
- Extension sockets should not be fitted before the screw terminals/IDC connections on the Openreach side of the NTE5.
- Extension wiring and sockets should be left working after the visit unless wiring is proved beyond doubt to be customer's responsibility to extend or connect.

17.4.1.2 Maintenance Renewal of Customer Lead In / Dropwire to existing NTE5

Where a renewed Lead In or Dropwire is provided to an existing NTP the wiring must be provided or upgraded and regularised in line with the segregation policy. Any subsequent regularisation required by the customer or competitor will be undertaken in accordance with a regularisation order. Where a correctly wired system exists the Lead In / Dropwire should be terminated on the screw terminals and not the IDC connectors.

17.4.1.3 NTE upgrades

Openreach Branded NTE5C must be fitted on new provides or to replace any existing faulty NTE5. NTE lite must be changed to NTE5C Ref Quality Manual page 87

17.4.1.4 External NTE

The External NTE (XNTE) has been used on Newsites developments since 2007. Due to it being incompatible with FTTC and FTTP it is being withdrawn. The internal NTE5C must be fitted instead.

17.4.1.5 Telecom Red

Telecom Red circuits should be wired in accordance with instructions.

17.4.1.6 Quality Inspection

All Quality Inspections carried out will include an inspection of the line and NTE5 to ensure that the above segregation rules have been applied correctly.

Sub Standard wiring discovered by Quality Inspection should be escalated to the appropriate line management through the corrective action process to ensure that engineers are rebriefed. Where a defect is discovered on a chargeable regularisation then a field revisit will be required to correct the problem.

17.5 U/G Cable/Aerial Cable fed Customers

These instructions cover the actions to be taken by Openreach people carrying out either repair or provision work on the monopoly wiring or customer lead-in from an underground / Aerial cable fed external block terminal (excludes overhead lead-in which is covered by ISIS EPT/ANS/A011)

17.5.1 Lead-in / Monopoly Wiring Cable Exists

If the engineer is required to visit the site and an existing Lead-in is used to provide service to a customer, a physical examination of the Lead-in or monopoly wiring cable must be carried out (from ground level). If any defects are observed then the cable must be renewed or repaired.

If an approved cable exists (see section 17.5.2, e.g. Polyethylene [PE] externally), inspect as above. If any defects are observed then the cable can be either renewed or repaired.

If non-approved cable exists (see section 17.5.2, e.g. Poly Vinyl Chloride (PVC) externally), inspect as above. If any defects are observed then the cable must be renewed with an approved cable.

17.5.2 Lead-in / Monopoly Wiring Cable Exists

The current standard lead-in, for new and replacement work are:

Cable down lead (2 pair)

Dropwire 10 or 10B

Dropwire 11

Dropwire 12 (where a larger conductor size is required)

Where more than 2 lines are provided or required the following may be used.

External Underground Cable

Aerial Cable

CAD55M

Cable Drop wiring 15

- The above are referred to as 'Lead-in' in this ISIS.

17.5.3 Definition of the term “Defective”

A cable is defective if it:

- Has damaged insulation/sheathing.
- Has signs of corrosion in length.
- Is a Dropwire with more than the approved joint (one only) (housed in either a BC16A, Above Ground dropwire closure or BT66B) between the DP and customer's NTP, within the lead-in of less than 200M apart.

17.5.4 Approved Joints in Dropwire 10/10B/11/12 or Cable Downlead

Where a defect free dropwire 10/10B/11/12 or cable downlead exists between a wall-mounted Distribution Point (block terminal) and the customers NTP, a maximum of one approved joint may be provided.

Note: The above only refers to customers/cables fed directly from wall mounted DP's, cables fed from any other types of block terminals on the customer's premises are excluded, these should be fed by one continuous cable from the external Block Terminal to the NTP as per the Quality Standard requirements.

When it is necessary to provide an approved joint in a dropwire 10/10B/11/12 or Cable downlead, it should be made using the correct connectors housed in an Above Ground Dropwire Closure or BT66B (which must be correctly screwed to the wall/fascia of the customers' premises) at the customer fixing position.

17.5.5 Approved joints in a No Access situation in dropwire types 1 to 9 fed from a wall mounted DP

Where a dropwire type 1 to 9 exists between a wall-mounted DP and the customers NTP and is less than 200 metres. In a no access situation a maximum of one approved joint may be provided to replace a defective section from the DP to a repair point where it would leave the remaining section into the customers NTP defect free, thereby bringing the lead-in up to the Quality Standard.

Note: Both of the above refers to cables fed directly from wall mounted DP's, cables fed from any other types of block terminals on the customer's premises are excluded, these should be fed by one continuous cable from the external BT to the NTP as per the quality standard requirements.

When it is necessary to provide an approved joint in a dropwire, it should be made using the correct connectors housed in an above ground dropwire closure or BT66B, which must be correctly fixed to the wall/fascia of the customers' premises at the customer fixing position.

17.6 Additional Lines

If customer requires additional lines from DP to same NTP and a multi-pair Lead-in exists, it must be inspected (from ground level), if any defects are observed then the dropwire/cable must be renewed or repaired as per ISIS requirements. The additional lines can then be provided using any spare pairs in the existing Lead-in.

If customer requires additional lines to a different location a new Lead-in should be provided.

17.7 RWT

Right When Tested (Visited)

Where an engineer visits site and the circuit is RWT and a good Test on Completion is obtained:

- An inspection from ground level must be carried out on the dropwire and lead-in in accordance with the 3 span & lead-in rules (at the customer end of the line if more than 3 spans) as detailed in EPT/ANS/A011. If any defects are observed then the dropwire/cable must be renewed or repaired as per ISIS requirements.
- External Wall DP's where a Lead-in (see section 17.5.2) or cabling exists, a physical examination of the cable must be carried out (from ground level), if any defects are observed then the Lead-in must be either renewed or repaired as per ISIS requirements.

17.8 FNF

Where an engineer visits site and is unable to find the cause of the fault report i.e. FNF:

- A physical inspection of the external BT (at the DP) and its connections must be carried out and the BT must be brought up to the relevant quality standards.
- An inspection from ground level must also be carried out on the dropwire and lead-in in accordance with the 3 span & lead-in rules (at the customer end of the line if more than 3 spans) as detailed in EPT/ANS/A011. If any defects are observed then the dropwire/cable must be renewed or repaired as per ISIS requirements.

External Wall DP's where a Lead-in (see section 17.5.2) or cabling exists, a physical examination of the cable must be carried out (from ground level), if any defects are observed then the Lead-in must be either renewed or repaired as per ISIS requirements.

18 *Point of Intervention (POI) Data*

Point of Intervention (POI) information is vital to ensure that network black spots are identified and Quality Standards are maintained. It is essential engineers in the field and control environments use the POI entry methods to capture what has been left on completion of the work not what was found on arrival.

Entry of POI data is mandatory for all underground faults completed on both the Work Manager System (WMS), My Jobs app and the Customer Service System (CSS) screens.

POI is also mandatory on Provision Work

Since this information is used in conjunction with the FVR, PDR, QBS and safety programme of work it is essential that the information supplied by the engineers is accurate and meaningful.

Where engineers are using job packs, extra information should be provided if the POI given by the planner differs from what was found onsite.

18.1 Mandatory Data Entry

A structured entry of Point of Intervention data is a mandatory requirement for all faults cleared (Clear Codes 81.1 to 81.8 and 82.1 to 82.8), it is also mandatory to provide a POI on Provision. (Work Completion Codes (WCC) 31-33, 41-43, 51-53 and 70).

With a status of COM, the user is required to complete a POI screen which, dependant on clear code, will have different fields requiring data input both of which are mandatory:

Other fields in the POI screen will require data input which is vetted against specific POI tables. Once data has been accepted in the fields the Enter key will close the Fault Report.

POI information is not required when using the K Indicator to clear multiple faults.

Any faults which are common and the K indicator applies except for the first fault all others do not require the POI.

Note: The requirement is to record what has been left on completion of the work, not what was found on arrival.

When closing a provision or repair task on MyJobs with network intervention, ensure to enter the correct information on the Point of interventions screen.

If you try to close the task without the POI information, the POI tab will automatically come up on your screen for the details to be entered.

For further information on the options available when supplying POI details refer to the [Repair Clear Code Definitions](#).

It is the responsibility of the person closing the job to provide all POI details.

19 *Question Based Closure (QBC)*

Question Based Closure is now the main process used by engineers when closing a completed repair or provision task.

There is currently no guidance available on its usage as there are so many combinations, however, each screen allows the engineer to choose what work has been carried out.

Data from this is fed into many systems such as Artisan for high faulting node analyst

The next three screenshots show the choices made when closing a Dropwire re-termination, customer lead-in on a wall and underground clears

Dropwires and connections at the DP or premises (7 clears) openreach

The following table summarizes the clear codes generated by the actions shown in the screenshots:

Action	Clear Code
Renewed drop wire to customer fixing	7.2 C
Renewed drop wire pole to pole	7.2 C
Re-terminated drop wire at DP / external block	7.5 R (DW terminations)
Renewed drop wire through to NTE	7.1 C
Resolved line concentrator (DACs / WB900) issue	7.9 C

7.5 R (DW terminations)
This option should be followed for any faults where you have re-terminated the drop wire connections at a pole mounted DP.

Dropwire clears sit within the **Overhead** option

Select the Overhead option

Each of the options above generates the indicated clear

Customer end including Lead ins - Dropwire & U/G (82 clears)

All clears relating to the customers lead in, either UG fed or via dropwire from a wall box or the wall spike.

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82.6 C (Dropwires)

82.5 R (for UG terminations)

82.1 C (UG cables)

82.5 R (for UG terminations)

82.1 R

82.6 C (Dropwires)
This is the option to take when replacing the dropwire from a wall box or the wall spike to the customer's termination.

You need to select the D Side option again.

To get to the correct menu you now must select **Yes** for the **End Customer Curtilage** option above.

Each of the options above generates the indicated clear

All UG clears not including lead ins (82 clears)

All clears in the D Side of the network up to and including the DP

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82.7 P

82.1 P

82.2 R

82.5 R

82.1 C

82.1 R

The initial closure screen is shown above

All clears beginning With an 82 sit within the D Side section so this should be chosen here. For these clears you need to select **NO** for the **Customer Curtilage** question

Each of the options above generates the indicated clear

Pair Changes

When a circuit routing is changed, both the old and new routings must be shown. This is to enable analysis of fault prone plant to be highlighted for remedial work. The old routing information will be utilised to indicate relevant problems, pairs, cables or range of terminations involved.

The pair change data will relate to E or D side, or in length. Examples of the required format are shown in section 19.3.2. The information shown is applicable to pair change data within the 'from' and 'to' work point and address fields.

19.1 Location/Address Field (including old and new routings)

Where it is necessary to change a Circuit Routing, details of the old and new routings must be shown in the Address Field against the appropriate Work Point.

Remember once any routing has been changed, Information on repaired faulty pairs must be changed via laptop or passed to Network Records Office.

The location field will accept a maximum of 30 characters, use should be made of the following abbreviations for opposite, outside, behind, adjacent, rear of house: (OPP, OS, BEH, ADJ, ROH). With the restriction of 30 characters enter the old & new routing first, then wherever possible a precise work point location should be given, e.g. House Name/Number, Street Name etc.

A more comprehensive list of abbreviations can be found in Appendix.

The example below shows a repair POI fitted into the 30 character address field.

The pair at the DP has been changed from pair 11 to pair 12. And DP location is outside number 123 Swallowcliffe Gardens

Location/Address field Example.

1	1	/	1	2	O	S		1	2	3		S	W	A	L	L	O	W	C	L	I	F	F	E		G	D	N	S
---	---	---	---	---	---	---	--	---	---	---	--	---	---	---	---	---	---	---	---	---	---	---	---	---	--	---	---	---	---

Note: Exchange address is not required when completing the work point. However, the exchange name or exchange short code must be supplied.

Note: When inputting a carrier pole into the work point, the field will not take a letter, e.g. 2a. Input 2 in work point and add 2a into the address field

19.2 Examples of Changed Routing Detail

This section gives examples of details to be entered for U/G Repair clears requiring POI.

Clear codes found in brackets have been added to help when completing analysis work.

19.2.1 Single Location Field Clear Codes Examples

Re-Connected in PCP/SCP (81.4R)

Location:	O/s 1 Ash meads way
Work Point:	PCP19
Plant affected:	PC100, SCC, Krone, Bix, TLESS (use OTP for Quante or 3M)
Plant type:	CAB or JMP (Jumper)

Lead-in Replaced (82.6C)

Location:	46 Parkside Road
Work Point:	COW (cable on wall)
Plant affected:	LI (lead-in)
Plant type:	2pr (Select PR then enter number of pairs contained in new cable)

Note: Clear Code for new UG leadin e.g. JB23 to NTE use 82.1

Fibre PCP 83.9C - Any fault within the FTTC RDSLAM

- This includes any [Port Swap out \(Lift & Shift\)](#) to resolve faults.
 - With the exception of a limited number of engineers who are trained to enter the DSLAM this will always be completed from the PCP. This includes faults in the link cable or a faulty port, the engineer has to complete a lift & shift to clear.
- For any fault in the PCP Copper such as re-terminating the pair then use the normal PCP closure. (81.4) (Not for Lift & Shift)
 - If a GEA service is “Dis” on the link cable block and this can be fixed by simply re-terminating in the PCP (without having to complete a lift & shift) then this is still an 81.4 clear even though it is on a GEA service.

83.9C POI example

Location:	O/s 18 main Street
Work Point:	PCP94
Plant affected:	PC100, SCC, Krone, Bix, TLESS (use OTP for Quante or 3M)
Plant type:	CAB

Note: The old and new routings refer to the RDSLAM tie cable routings

Note: Due to the address field restriction of 30 characters, the old/new routings and an abbreviation of the PCP address is acceptable.

19.2.2 Double Location Field Clear Codes e.g. Pair Changes

When closing a pair change, the location and work point for both ends of the pair change is required.

E-Side Pair Change (81.7P)

Location:	Bournemouth TE
Work Point 1:	MDF
Location:	Sweet St/Marshall St
Work Point 2:	PCP5
Plant affected:	PC (pair change)
Plant type:	PCG for grease filled or PCD Dry cable

D-Side Pair Change (82.7P)

Location:	OS 26 Veering ave
Work Point 1:	DP1388
Location:	OS 26 Herbert ave
Work Point 2:	PCP26
Plant affected:	PC (pair change)
Plant type:	PCG for grease filled PCD Dry cable

PCP to UG Joint example (82.1P)

Location:	OS 14 Willow Ave
Work Point 1:	JB23
Location:	243/237 OS 2 Burnham Rd
Work Point 2:	PCP4
Plant affected:	PC (pair change)
Plant type:	ARM

Note: The following items:

Pair change PCP/SCP to intermediate Joint or intermediate Joint to DP should only be carried out with guidance from routing and records

PCP or DP old & new routing required

Common provision clear codes currently generated by QBC.

	Overhead
7.1	Dropwire Pole to Customer NTP
7.2	Dropwire Pole to Customer, Excluding Lead In
7.5	Block Terminal (dropwire connections)
	E side
81.4	Primary Cross- Connection Point (E & D side)
81.7	Pair Changed from MDF to PCP.
	D side
82.1	In Length Aerial Cable / Underground
82.2	In Joint Aerial Cable / Underground
82.5	Block Terminal (U/G pairs reterminated in external BT/BC)
82.7	Pair Changed from Node to Node
16.2	Non Openreach Maintained Equipment and/or EU given advice when visited.
	MDF
4.2	Jumpers & Terminations
	Other Common Clears
51.2	Visited FNF
51.3	Remote Clear FNF
151	Customer Premises RWT
172	External Damage -(Non-Service Affecting)

A full list of Clear Code Definitions and Action codes can be found here

[Clear Code Definitions](#)

19.3 Point of Intervention in Joints

As well as a clear code, action code C and R are needed when the fault is cleared in joint as it is important to indicate what has happened within the joint and what has been left upon completion.

With the removal of signed desiccant packs in joints, identification of which joint an engineer has worked in at the POI given, especially when multiple joints are in the same jointing structure would be difficult. In order to maintain this facility, information must be provided on either a pre climb label or the rear of an A1024 label and placed within the joint. The POI label can be used several times to record subsequent interventions.

19.3.1 POI labels for Newly Provided Closures.

When a new closure is provided, the outside body is marked with the full engineers ID, date and job number so a POI label is not required to be provided inside of the closure. (But is still good practice if the pen marker number 2/gold pen leaves the writing illegible on the outside of the body)

19.3.2 POI label when entering an existing closure.

- Where no POI A1024 label already exists, provide a new label, write POI on the front of the A1024 label (to differentiate from reported A1024s) and add engineer ID, job number and date of entry on the rear of the label and place POI label back into in the closure.
- Where an existing POI A1024 label already exists inside of the closure, add the full engineer ID, job number and date of entry on the rear of the existing label and place POI label back into in the closure.
- If there is no space for further POI details, provide a new label.

19.3.3 Use of a pre climb label

- If an engineer has run out of A1024 labels, a pre climb label can be used instead. Four entries could be made with the full engineer ID, job number and date of entry (Two entries on each side). Previous entries can be crossed out.

19.4 Cable Labelling

Another important source of identifying the correct POI is cable labelling

With the rollout of pre-labelled cables within the network we now have new cable being installed with size, type and pair count on the outer sheath at 1 metre intervals therefore the requirements within the cable labelling specification have now changed.

19.4.1 Cabler

The cabler must attach a label to the cable end and add CSS ID, Job or Fault Number and Date. The contractor to add Contract Company's name.

The requirement to add cable type/size (e.g. 100 pr 0.5 PET) is not required if the cable being provided is already marked with this information on the outer sheath. However if it is an old stock cable without the information then this must still be added to the label.

19.4.2 Jointer

Where a cable is incorporated into a joint and the pre-labelled outer sheath has been removed and no visible cable marking is visible (due to cable going into duct) then the jointer must add the cable type/size (e.g. 100 pr 0.5 PET) to the label.

19.4.3 Marking of Joints/Cables

Upon fitting a new or replacement joint closure (including re-closure bands) the following is a mandatory requirement.

19.4.3.1 All Closures

Print on the body of the closure (with a Pen Marker Number 2) the following:

- The engineering full CSS ID/Contractor ID.
- The date.
- The Job/Fault number.
- If fitted by an Openreach contractor then also print the name of the contract company.
- DP number if joint serves as an underground DP.

Note: All information recorded on the joint must be completed in BLOCK CAPITALS.

19.4.3.2 30 Series Closures

- Information must be printed on the Heat-shrinkable body of the closure (Not the dome)
- Where a new cable has been provided into an existing joint, the Port must carry the relevant information or if the port is too small to accommodate the details then attach a white label and mark the label accordingly.
- On an existing joint, where no work, other than reconnecting of wires has taken place, joint marking is not required. However, a POI label must be provided inside as required and signed / dated every time the joint is entered.
- If the joint is an underground radial DP then add the DP number.

19.4.3.3 34 Series, 0.9 and Universal Clip Closures

- Information must be printed on the outside of closure body
- Where a new cable has been provided into an existing joint, the new cable must have the relevant information on the correct attached label (e.g. CSS ID, Date Job/fault number & Contractor etc.).
- On an existing joint, where no work, other than reconnecting of wires has taken place, joint marking is not required. However, a POI label must be provided inside as required and signed / dated every time the joint is entered.
- If the joint is an underground radial DP then add the DP number.

19.5 Provision Codes & POI

19.5.1 Provision code guidance

This section is intended to clarify the correct booking practice for completed fulfilment tasks and applies to provision of service orders for PSTN, WLR 2 & 3 LLU and Private Circuits.

Closing a provision job is currently by QBC and provision closure codes are currently not used, however, the following explains how each is recorded.

When an engineer visits a customer and finds no external wiring exists s/he will provide the required cable and claim Code 11 for overhead provide or Code 31 for underground provide.

When an engineer attends an in-situ fulfilment order and there is a need to replace some or all of the external cables for engineering reasons claim code 11.

When providing a new or an additional line to a property using an existing overhead dropwire or underground cable with no changes to the existing network claim code 21.

Overhead	If any <u>new</u> (or altered) external wire is
----------	---

Single line Overhead Installation -Book 11 in the following situations	provided 1 Span & Lead-in D/W Renewed From DP to NTP D/W Renewed From DP to EU Fixing D/W/Lead Renewed From EU Fixing to NTP O/H Route or 2 Spans or More D/W Renewed From DP to CP D/W Renewed From CP to CP D/W Renewed From CP to NTP
Overhead Single line Overhead installation -- Wires Exists - Book 21 in Following Situations	If existing wires are used and are not changed in anyway If no external wire provided or altered Wires In-Situ
Underground Single line underground installation - Book 31 in The Following Situations	If any new (or altered) external wire is provided D/W/Lead Renewed From Wall BC/BT to NTP
Underground Single line underground installation - Wires Exists - Book 21 in The Following Situations	If existing wires are used and are not changed in anyway (no external wire provided or altered) Wires In-Situ

Note: A wires exist provide (21) includes any work carried out at the PCP/SCP, re-termination at pole/EU fix and Includes NTE Changed.

19.5.2 POI

POI is also mandatory on Provision Work Completion Codes (WCC) 31-33, 41-43, 51-53 and 70. The POI recorded must be at the location of where work has actually been carried out.

19.6 Quality Check Requirements

- POI(s) must be recorded correctly
- All Points of Intervention must be included when engaged in E & D Side Repair work included in the job/estimate in association with the work site identified for check.
- The POI should be able to be found and the plant item worked on be identified by an onsite inspection from the information supplied by the engineer is there sufficient accurate information available to carry out inspection?

Note: Each POI should include - Work point, Plant affected & Size, Plant type, Work point Address, CSS ID/engineering ID and company name.

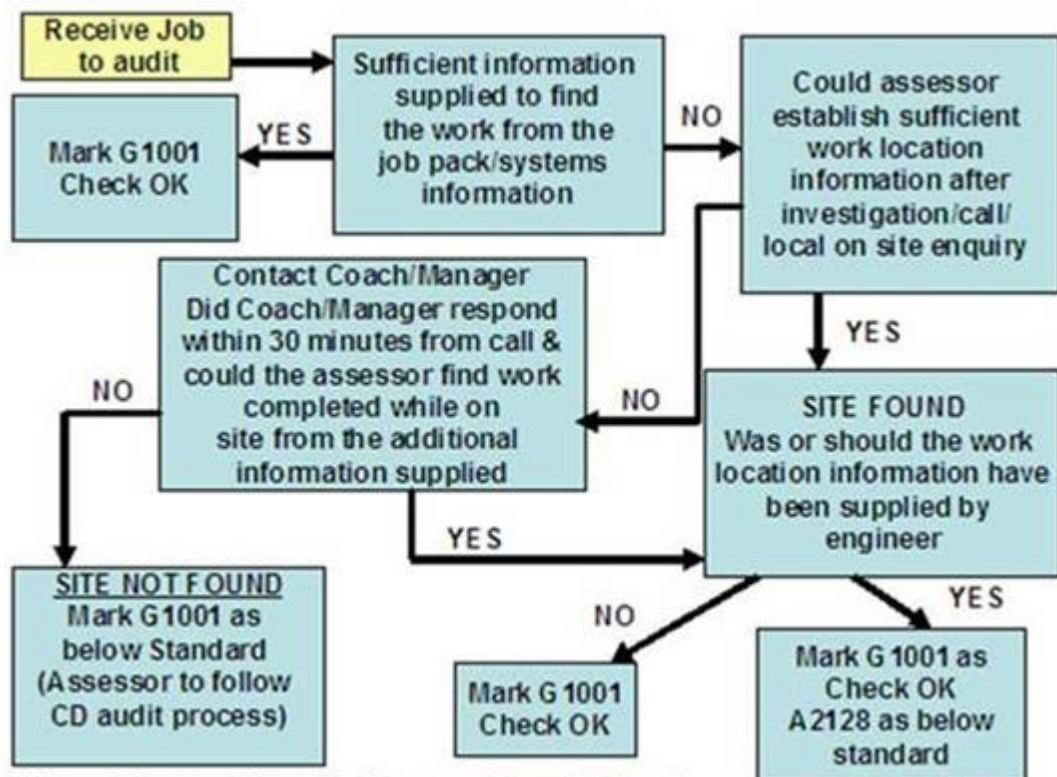
- All records, prints and A154s legible, clean, updated, certified and forwarded should be completed as per documented process
- When a completed job is open for inspection and it is not possible to identify the location from details supplied the quality checker must attempt to ring/contact either the engineer's coach/manager/co-ordination office as applicable for any additional information that may assist in identifying the site.

Note: CD applies if sufficient information is not obtainable within 30 mins period onsite.

Note: Minor clerical errors should be recorded under booking practices and not lead to a CD being applied.

For a more comprehensive description on the auditing process, quality check requirements can be found in the following ISIS NWK/NNS/V046

Work location Information chart



Work Location Information Chart Issue 3a Dated 12/7/2007 : BEA B1

19.7 Non-Openreach people working on repair

Non-Openreach people working on repair would normally work to a manual control.

Once a repair has been completed, fault details and clear codes must be given to the manual control using the information and guidance within this document.

19.8 Contractor Job Packs

All job packs must be updated with any changes to the original information. This must include pairs worked on in PCP/SCPs, type of joint and size of cable.

For more information on contractor POI please refer to OQP audit Pack Requirements Section 4.4 which can be found on the [CANDID](#) Website

20 PAT Process

This section details the process to follow for work that cannot be completed on a customer reported service affecting fault to meet the Quality Standard due to individual's skill level or job content. It clarifies the term 'Temporary Work' and details the authorisation required to leave Temporary Work and the process to be adopted for the monitoring and control of such work.

Note: If the outstanding work is within the capability of an engineer but he/she does not have sufficient time, stores or equipment to complete the work, the fault will be uploaded on the Work Manager (WM), My Jobs app or laptop using the code Temporary Clear Line Working (TCLW). The fault should be re-distributed, or made Part Complete rest Delayed (PCD) if the outstanding work is not completed, as soon as possible on the next day.

Note: In all cases where TCLW is entered the engineer should also mark the task incomplete and do not retain.

Note: In cases where strategic faults are temporary cleared, the system will generate a PAT fault that will need to be re-distributed by controls and will not automatically return to the original engineer without intervention.

Note: All interruption cable or dropwire/alternative route work must be provided/left in a safe situation/condition and the engineer(s) completing this work MUST confirm all work carried out/completed on site is safe in full consultation with their manager or their managers delegated representative

20.1 Definitions

20.1.1 Temporary work

A temporary clear is defined as follows:

Where full service and facilities have been restored but further work is required to complete (e.g. - extra time, assistance, mech aids, platform), and it is within the capability of an engineer/s to complete that work but, due to circumstances beyond their control, this is not possible.

Engineers should make every attempt to temp clear and give temporary service to enable customers to access their service even if only temporary, and record this correctly in our systems.

20.1.2 A Patrol Fault

A Patrol fault is defined as follows:

PAT (PAT fault) can be raised when Openreach plant has been reported to Openreach and is deemed to require attention but is non-service affecting. Requiring a visit to the site by engineer(s) to enable action to investigate or rectify.

PAT faults are also raised for all temporary cleared strategic faults, both LLU and Voice. These temp clears are subject to the CP reject clear process

20.2 Audit/Review

Both the original customer fault and the 'PAT' fault will be subject to check by Independent Audit to ensure that all work completed by an engineer is to the Quality Standard and any PAT fault raised has been done so legitimately.

Also completed PAT work will be audited to confirm the final solution has met the required Quality Standards.

21 *Appendix*

21.1 Standard Abbreviations

21.1.1 Standard Abbreviations for Affected Plant

The following tables are examples of data to be used when using 8 type Repair clear codes and Provision codes.

Code	Description
BFJNT	Blown fibre joint
BFTUBE	Blown fibre tube
BIX	BIX Connection
BT41	Block Terminal Type 41
BT41	Block Terminal Type 41
BT42	Block Terminal Type 66
BT76	Block Terminal Type 76
BT86	Block Terminal Type 86
BT99	Block Terminal Type Other
CF	Customer fit
COF	Cable optical fibre
FDC	Fibre Drop Cable
FDCMJ	Fibre Drop Cable Maintenance Joint
GDT	Gas discharge tube
JNT10	10 Pair Joint
JNT100	100 Pair Joint
JNT20	20 Pair Joint
JNT200	200 Pair Joint
JNT300	300 Pair Joint
JNT5	5 Pair Joint
JNT50	50 Pair Joint
JNT999	Joint (Other)
KRONE	KRONE Connection
MID	MID / Shelf
NODE	Fibre node
NTP	Network Terminating Point
OTP	Other Terminating Point
PC	Pair Change
PC100	Pair Connection 100 (Assembly)
PR	nnnnPR cable size
PU	Protection Unit
SCC	Strips Cross Connection
TLESS	Tool less connection
xxxxPR	Cable and number of Pairs
DC	Dropwire change

21.1.2 Standard Abbreviations for BT Plant

Code	Description
AEC	Aerial cable
ALI	Aluminium cable
ARM	Armoured cable
BC18	Box Conn (BT18 & BT19)
BF1A	Blown fibre KJC no.1a
BF3A	Blown fibre KJC no.3a
BF4A	Blown fibre KJC no.4a
BF4B	Blown fibre KJC no.4b
BT41	Block Terminal
BT42	Block Terminal
BT66	Block Terminal
BT76	Block Terminal (BT76 & BT78)
BT99	Block Terminal (Other)
CAB	Cabinet Terminations (PCP & SCP)
CAD	CAD55 Dropwire
DW10	Dropwire (DW10 & DW12)
DW99	Dropwire other no.
ECLI	External customer lead in
EX	Exchange
FDC	Fibre Drop Cable
FDMJ	Fibre Drop Cable Maintenance Joint
FKJC	Fibre kit joint closure
FUS	Fuse
HS	Heat shrink closure
ICLI	Internal customer lead in
JMP	Jumper
LI	Lead-in
MC31	Mechanical Closure (Sleeve 30 & 31)
MC32	Mechanical Closure (Sleeve 32)
MC34	Mechanical Closure (Sleeve 34A & 34B)
MC99	Mechanical Closure (Other) No.
OBSJ	Obsolete Plant Type
PC	Pair Change (Problem plant unknown)
PCD	Polythene Cable Dry
PCG	Polythene Cable Grease Filled
POLE	All pole type work
PRxx	Cable ties
PTO	Precision testing officer
PU	Protection Unit/Protector
TC	Temporary Closure
UCJ	Universal Clip Joint

21.1.3 Standard Abbreviations for Work Point

Full Name	Abbreviation
Adjacent	ADJ
Alley	ALY
Annex	ANX
Approach	APP
Apartment	APT
Arcade	ARC
Avenue	AVE
Basement	BSMT
Behind	BEH
Bottom	BTM
Boulevard	BLVD
Broadway	BWY
Building	BLDG
By-Pass	BY-PS
Causeway	CSWY
Centre	CNTR
Cliff	CLF
Cliffs	CLFS
Close	CL
Circle	CIR
Common	COMM
Cottage	COTT
Corner	CNR
Court	CT
Cove	CV
Crescent	CRES
Crossroads	XRD
Drive	DR
Drove	DRO
Estate	EST
Field	FLD
Fields	FLDS
Flat	FL
Forest	FRST
Gardens	GDNS
Grange	GRNG
Green	GRN
Grove	GR
Heights	HTS
Industrial	IND
Junction	JCN

Lane	LA
Left hand	LH
Lodge	LDG
Lower	LWR
Manor	MNR
Market	MKT
Meadow	MDW
Meadows	MDWS
Mews	MEWS
Mount	MT
Near	NR
Opposite	OPP
Orchard	ORCH
Outside	OS
Parade	PAR
Park	PK
Parkway	PKWY
Place	PL
Plot	PLT
Precinct	PREC
Promenade	PROM
Rear of	RO
Recreation	RECN
Right hand	RH
Road	RD
Square	SQ
Station	STA
Street	ST
Tower	TWR
Terrace	TER
Upper	UPPR
Valley	VLY
Village	VLG
Walk	WK
Way	WY
Yard	YD

21.1.4 Standard Abbreviations for Plant Type

Code	Description
BJ	Buried Joint
CBCHMB	Cable Chamber
COW	Cable on Wall
CP	CPxxx carrying pole (Pole Number)
CUSTRM	Customer Termination
DIG	Direct In Ground
DP	Dpxxxx distribution point (Number)
DUC	Duct Section Number, Exchange side of Work Point
HCCP	Buffer cabinet
JB21	Jointbox 21
JB22	Jointbox 22
JB23	Jointbox 23
JB26	Jointbox 26
JBK	Jointing Brick
JF10	Jointbox Footway Type 10
JF11	Jointbox Footway Type 11
JF2	Jointbox Footway Type 2
JF3	Jointbox Footway Type 3
JF4	Jointbox Footway Type 4
JF6	Jointbox Footway Type 6
JF99	Jointbox Footway Type Other
JP	Jointing Post
JRC11	Jointbox Carriageway Type 11
JRC12	Jointbox Carriageway Type 12
JRC14	Jointbox Carriageway Type 14
JRC99	Jointbox Carriageway Type Other
MDF	Main Distribution Frame
MH	Manhole
NTP	Network Terminating Point
PCP	PCPxxx Primary Cross Connection Point (Number)
PU	Protection Unit
S	Sxxxxx Secondary cross connection point (Number)
SC	Joint split coupling

21.1.5 Standard Abbreviations for Line Conditions

Line Condition Abbreviation	Diagnostic Message
ACA	Volts AC on A
ACB	Volts AC on B
ACL	Volts AC on Loop
BA	Volt contact on A
BB	Volt contact on B
DCA	Cap imbalance CA }
DEX	Cap imbalance EX }
DUG	Cap imbalance UG } DIS
EA	Ohms earth / contact on A
EB	Ohms earth / contact on A
HV	Dangerous Voltage
LP	Ohms loop
NST	Non standard termination
OK	Line tests OK
RLP	Rectified Loop
UCC	Unbalanced cable capacitance } overhearing
XBM	No batt from Exch
XEM	No earth from Exch

22 References

Further information available at the Network Engineering

[Technical Library](#)

All craft practises are contained in the appropriate ISIS documents that are available from your Manager or Openreach representative.

23 Enquiries

Enquiries and document change request should be made with, or sent to the author of this document. Details on page 2

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