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Subsea/Subaqueous – Cable Networks - Policy

Network Policy

About this document ...

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Content approval

This is the Issue 3 of this document.
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Version History

Version No.	Date	Author	Comments
Issue 3	11-Feb-2023	Ada Hilton	Audience and Published By modified. All links checked and updated as necessary. Risk Assessment referencing now compliant. References to working near water updated. Added Stakeholder section intro.
Issue 2	07-Feb-2022	Ada Hilton	Updated reference to Bearer Capacity Management request process for use of CJ (core) fibres (sections 5.3 & 8)
Issue 1	25-Mar-2021	Ada Hilton	New document

Table of Content

1 *Openreach Policy*

Openreach network policy defines a set of requirements to guide the decisions taken when planning and building a telecommunications network. These requirements ensure we achieve the required outcomes in terms of meeting the strategic direction, architectural design, financial targets and quality standards for the respective network.

This document forms a part of the authorised portfolio of Openreach network planning policy documentation. Adherence to these standards and policy is mandatory. Any deviation presents a risk to the required outcomes and will be subject to future compliance checking. Network deployments which do not meet network policy will fail any build audit and ultimately jeopardise our ability to provide service to our customers.

Caution: Caution: Policies are liable to change. Therefore, you must ensure that this copy/material is from a controlled source e.g. The Bookstore Libraries, where you are able to register for email alerts when updates are made from within the documents you reference. ISIS NWK/LNK/C486 Network Policy and Planning Communications Guide – Policy will also provide guidance on how to use some of the bookstore functionality.

2 *Introduction*

The Openreach strategy to provide a full fibre network and the increase of the fibre product portfolio has increased the need for the provision and utilisation of subsea and subaqueous cables.

The Openreach network contains a number of legacy copper and fibre cables that have been deployed underwater since the introduction of the telephone network.

These cables fall into the following categories:

- Subsea
- Subsea (Powered)
- Subaqueous

This document details specific planning and operational requirements for providing and accessing these cables within the Openreach network. It provides guidance on how they differ from standard CJ and local access cables.

This document applies to all cables for example:

Powered fibre and copper cables.

Non–powered fibre and copper cables

Core cables

Access cables (Copper E/D side)

Access fibre (Spine distribution)

This list is not exhaustive.

2.1 Training and Guidance

The provision and maintenance of all subsea and subaqueous cables is a specialist area where severe areas of risk may be encountered.

All teams who perform either survey, planning or engineering tasks on these cables must familiarise themselves with this document and if still unsure of their responsibilities must contact;

- The subsea team at BUDE 24/7 on telephone 01288 359 176 email bude-widemouth.cable.stn@bt.com
  - Or the author of this document

> **Warning:** Generic Risk Assessments detailed within the SFY/GRA… Collection of ISIS documents and found within the Bookstore Library, **must** be completed as required, and the overall assessment outcomes compiled with, before any estimates are issued to field teams. All Completed Risk Assessments **must** be added to the completed survey return/job pack. A copy of the risk assessment **must** be kept for a minimum retention period of 3 months.

Training - Accessing Powered Cables

Further training and guidance is available for all teams who will be involved in working on powered cables (PTO's, Engineer's etc.). The sessions will provide full guidance on the safety policy and processes that will need to be followed before accessing powered cables.

Please contact the subsea team at BUDE 24/7 on telephone 01288 359 176 email bude-widemouth.cable.stn@bt.com

Or the author of this document

2.2 Definitions

The definitions in this section refer to copper and fibre cables.

2.2.1 Subsea

This term generally applies to cables that are provided undersea carrying core and access network traffic. These cables will be provided by the Subsea Engineering team.

> **Warning:** If you are not sure if a cable is powered or not please contact the subsea team at BUDE 24/7 on telephone 01288 359 176 email bude-widemouth.cable.stn@bt.com

2.2.2 Subsea (Powered)

This term generally applies to powered cables that are provided under the sea carrying core and access network traffic.

> **Warning:** A cable route that contains powered cables is considered to be "closed" network and should only be accessed after following the guidance in this document.

- Powered cables will have a 100V DC potential applied at one end of the cable at **all times**.
- This is used as a monitoring circuit of the cables to provide advanced warning of damage or aggression towards the cable.
- In extreme cases an electroding tone may be applied and this could have a potential of up to 600V DC.
- The electroding tone is used to determine the cable position at sea.
- COF27 is used for the land section of powered cables.
- COF27 is a specialist cable containing a copper element that can be used for the tracing of subsea cables.
- The Subsea engineering team will identify where this is needed and advise the Openreach planning team on a route-by-route basis.

> **Warning:** If you are not sure if a cable is powered or not please contact the subsea team at The subsea team at BUDE 24/7 on telephone 01288 359 176 email bude-widemouth.cable.stn@bt.com

Note: Appendix A of this document provides a list of known powered cables as of March 2021.

2.2.3 Subaqueous

This term generally applies to "Access" or "Core" cables that have been provided across an inland watercourse or body of water.

These cables will not normally be powered and in most cases they may have been provided using our standard portfolio of cables.

> **Caution:** Please remember inland waterways are subject to strong currents and regulatory restrictions. Please follow all of the guidance in this document before issuing a planned estimate.

3 *Scope*

This document will provide survey, planning and engineering teams with guidance on the network policy for subsea and subaqueous cables and will cover:

- Mandatory Health and Safety requirements
- The definitions of “subsea” and “subaqueous” cables
- Network architecture and components
- Planning of new cables
- Access to powered cables
- Network Rearrangement of subsea/subaqueous cables
- Miscellaneous guidance

4 *Health & Safety*

> **Warning:** The surveying, planning and engineering of subsea and subaqueous cables should be carried out by teams experienced in working with subsea/subaqueous cables.
>
> **Warning:** Before undertaking **any** planning, survey or engineering work on a subsea/subaqueous cable the policies and guidance in this document must be followed.

The onland sections of the subsea/subaqueous cables must follow the policies in sections 4.1 - Survey/Planning/Working near Water onwards.

4.1 Survey/Planning/Working near Water

For more information please visit the Network Policy Briefings & Planning Communications webpage and locate Network Policy Briefings:

#746 - Planning/Surveying for Network Near Water.

> **Warning:** This guidance applies to all programmes of work FTTP, Copper, Spine, and also build, repair, rearrangement work streams.

4.2 Power

> **Warning:** If you are not sure if a cable is powered or not please contact the subsea team at BUDE 24/7 on telephone 01288 359 176 email bude-widemouth.cable.stn@bt.com
>
> **Warning:** No work should be undertaken on subsea cables unless the field engineer is confident that the powered subsea cable network sections/components have been identified and all safety requirements stated within this document are adhered to.

Note: Appendix A of this document provides a list of known powered cables as of March 2021.

4.3 Cabinet & Pole Erection

Planners should refer to network policy on the positioning of openreach street furniture (e.g. cabinets, poles etc.).

Please refer to:

ISIS: NWK/LNK/C571 - Street Cabinet Positioning & Relocation – Risk Assessment - Policy

ISIS: NWK/LNK/C319 - Copper – Access Network – Infrastructure – Policy

> **Warning:** *The Risk Assessment within ISIS: NWK/LNK/C571 - Street Cabinet Positioning & Relocation – Risk Assessment – Policy **must** be completed, as required, and the overall assessment outcomes complied with before any estimates are issued to field teams. All completed Risk Assessments **must** be added to the completed survey return/job pack. A copy of the risk assessment **must** be kept for a minimum retention period of 3 months.*

5 *Architecture*

Subsea and Subaqueous cables are used to connect various network elements of our architecture as shown in this section.

> **Warning:** Planners should remember to identify the correct guidance and arrange the appropriate agreements before planning to provide a subsea or subaqueous cable.

The sections below show some examples of where our subsea and subaqueous cables are deployed.

Note: The list of examples is not exhaustive.

Note: The reference to subsea cables in the diagrams in this section can also be applied to subaqueous cables in certain scenarios.

> **Warning:** Please consult the guidance on planning and surveying near water that can be found within this document.

5.1 Core (Powered)

An example of the “Core (Powered)” architecture is shown below.

Please remember that this network is a powered one (closed) and should not be accessed until all safety arrangements are in place as per the guidance in this document.

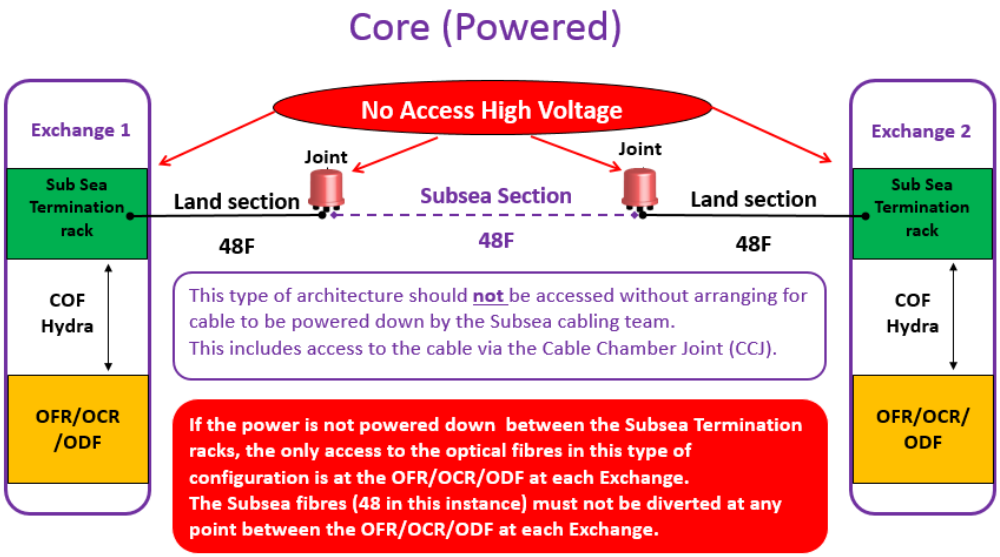

Diagram 1 - High level view of a Core (powered) network

> **Warning:** If you are not sure if a cable is powered or not please contact The subsea team at BUDE 24/7 on telephone 01288 359 176 email bude-widemouth.cable.stn@bt.com

5.2 Core/Access - Mix (Powered)

An example of the “Core/Access mixed (Powered)” architecture is shown below. A requirement for local spare fibre capacity has been incorporated into the planned scheme and auxiliary access nodes were proactively placed in strategic locations for future use.

Please remember that this network is a powered one (closed) and should not be accessed until all safety arrangements are in place as per the guidance in this document.

Warning: Interception and diversion of fibres in any exchange cable chamber joint (CCJ) is non-compliant.

Warning: When extending fibres from auxiliary access nodes engineers must be confident that they are not accessing the closed powered node (this should have been clearly labelled).

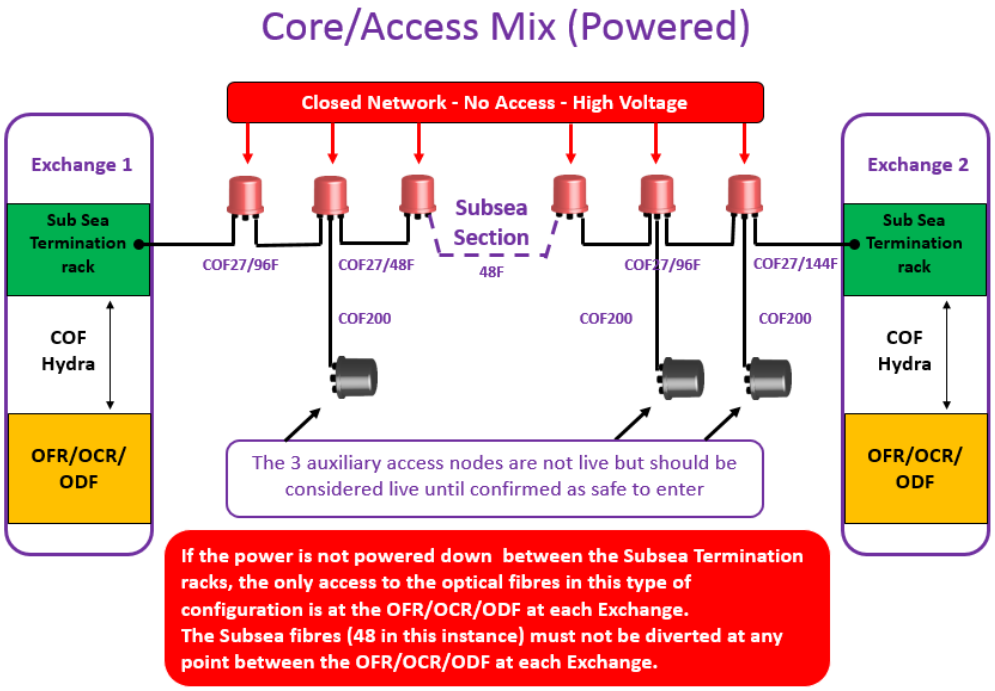

Diagram 2 - A High level view of a Core/Access mixed (Powered) network

If you are not sure if a cable is powered or not please contact the subsea team at BUDE 24/7 on telephone 01288 359 176 email bude-widemouth.cable.stn@bt.com

5.3 Core/Access Mix (Non-Powered)

The example below shows a mixed network (Core and Access).

Please note that the network is not powered and therefore does not need to be terminated on a Subsea Termination Rack.

Access to the spine cable is available, however diversion or interception of any fibres designated for the subsea cable should not take place.

Diversion or interception of fibres at the “Beach Joint” is not allowed.

If spare fibres are required for Access network requirements, a request should be made to the Bearer Capacity Management team. Please visit the Network Policy Briefings & Planning Communications webpage and locate and reference Network Policy Briefing: #804 - Using CJ (Core) Fibres to provide FTTP for further guidance.

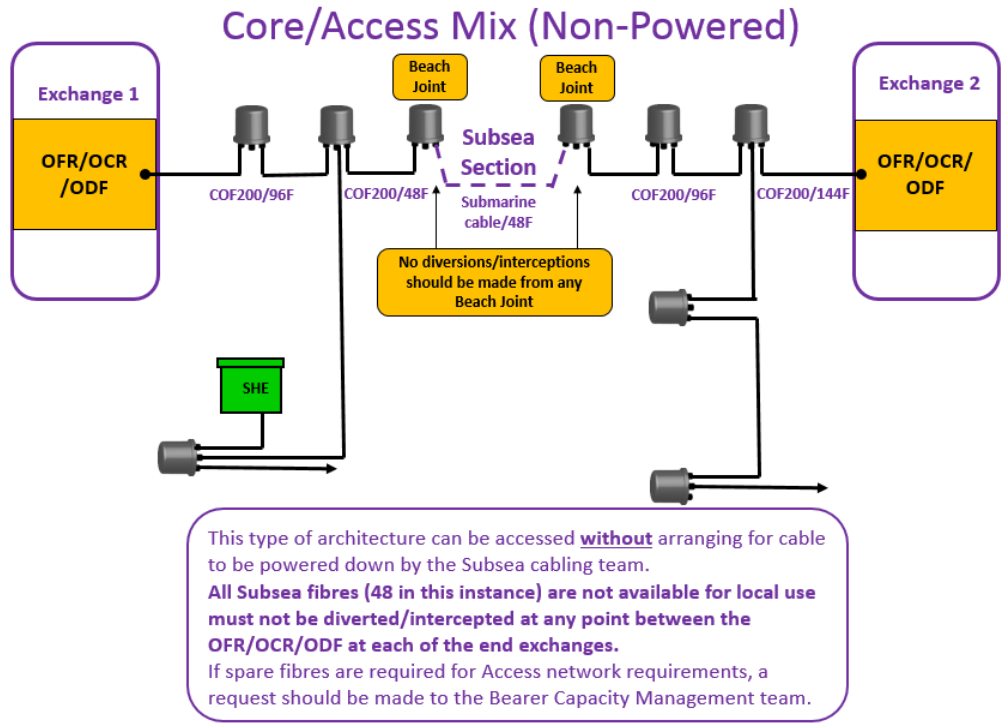

Diagram 3 - High level view of a mixed non–powered network

5.4 Core (Non-Powered)

A non-powered core network is constructed as per a normal core network with COF200 used to for the land sections of the subsea crossing.

Diversion or interception of fibres at the “Beach Joint” is not allowed.

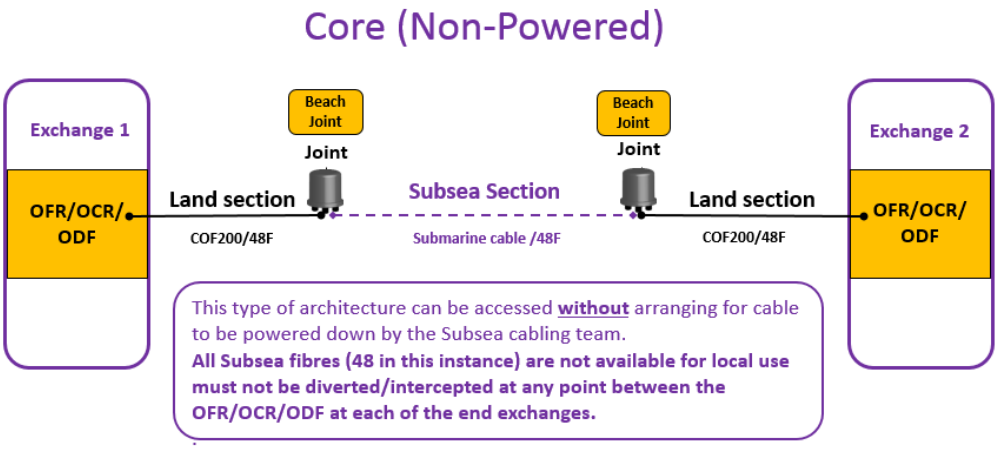

Diagram 4 - High level view of a non-powered Core network

5.5 Access for SHE/FTTP/FTTC/Ethernet (Non-Powered)

The example below shows a subsea access network which can provide all fibre deployments.

Please note that the network is not powered and therefore does not need to be terminated on a Subsea Termination Rack.

Access to the spine cable is available, however diversion or interception of any fibres designated for the subsea cable should not take place.

Diversion or interception of fibres at the “Beach Joint” is not allowed.

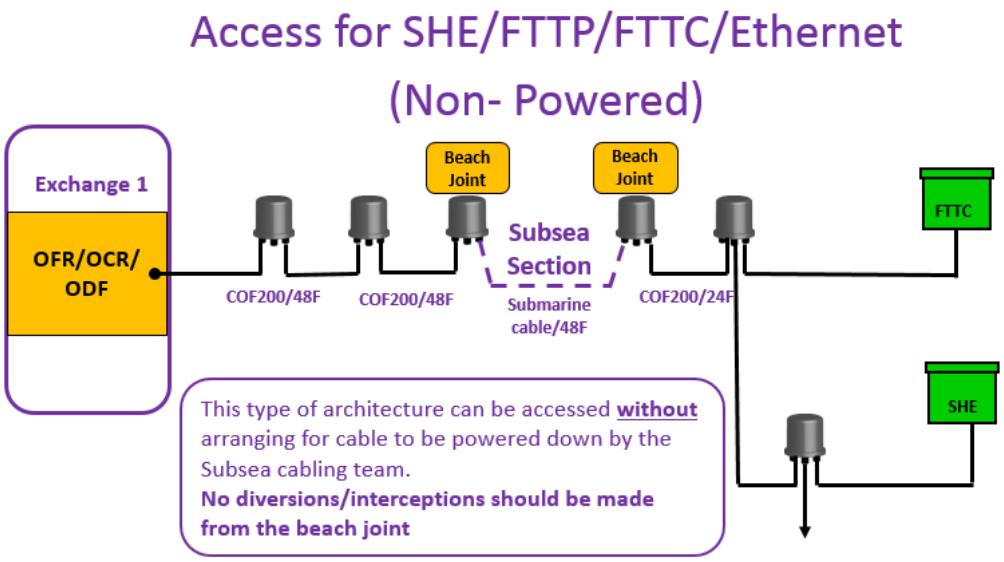

Diagram 5 – Non-powered network for SHE/FTTP/FTTC/Ethernet etc.

5.6 Access for SHE/FTTC/FTTP/Ethernet (with power facility)

The example below shows a powered access network architecture. A requirement for local spare fibre capacity has been incorporated into the planned scheme and auxiliary access nodes were proactively placed in strategic locations for future use.

Please remember that this network is a powered one (closed) and should not be accessed until all safety arrangements are in place as per the guidance in this document.

Warning: Interception and diversion of fibres in any exchange cable chamber joint (CCJ) is non-compliant

Warning: When extending fibres from auxiliary access nodes engineers must be confident that they are not accessing the closed powered node (this should have been clearly labelled).

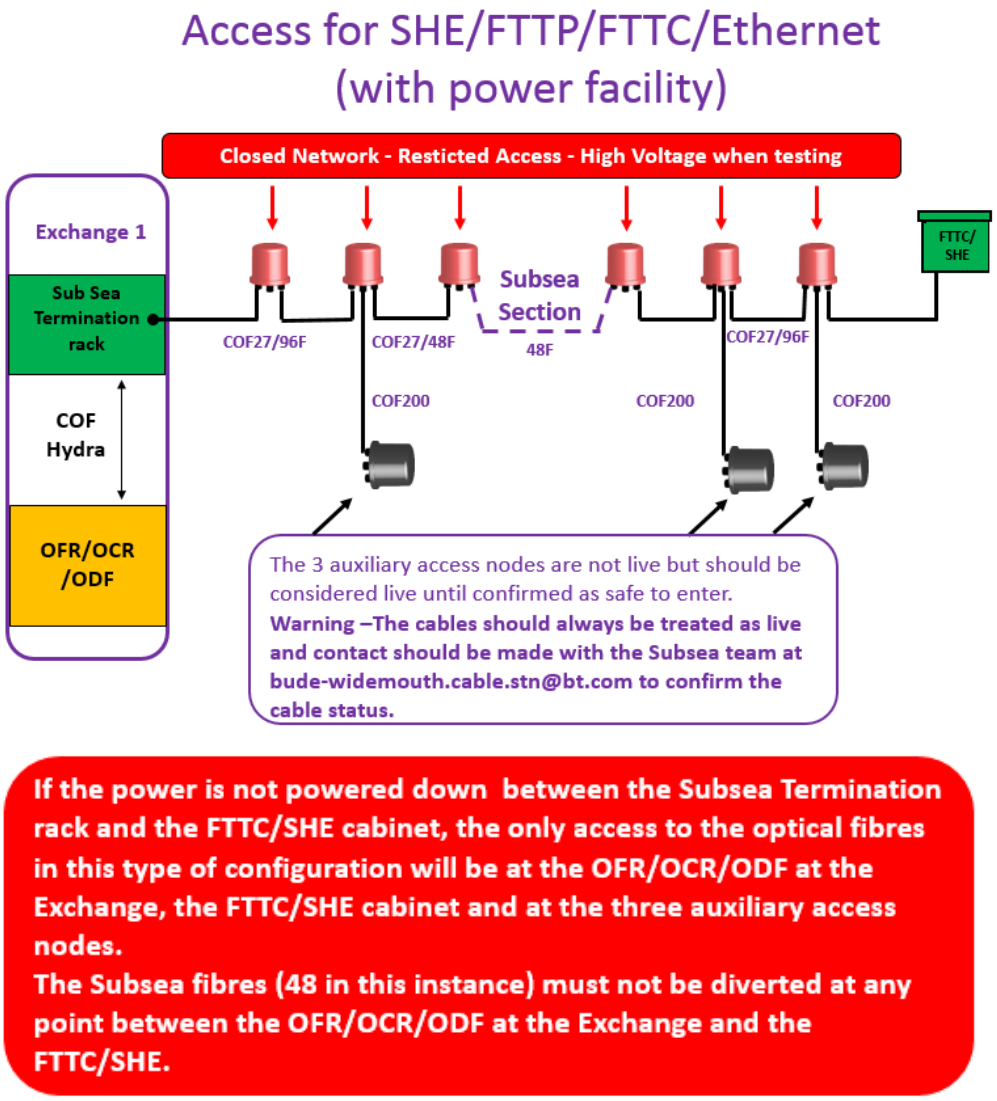

Diagram 6 - Powered network for SHE/FTTP/FTTC/Ethernet etc.

5.7 Copper E-Side

Copper local access cables can be provided across water.

Caution: Guidance should be obtained from the SMEs in the subsea engineering team as the decision on what cable type should be required to cross a river, lake etc. may be dependant on water currents, possible damage etc.

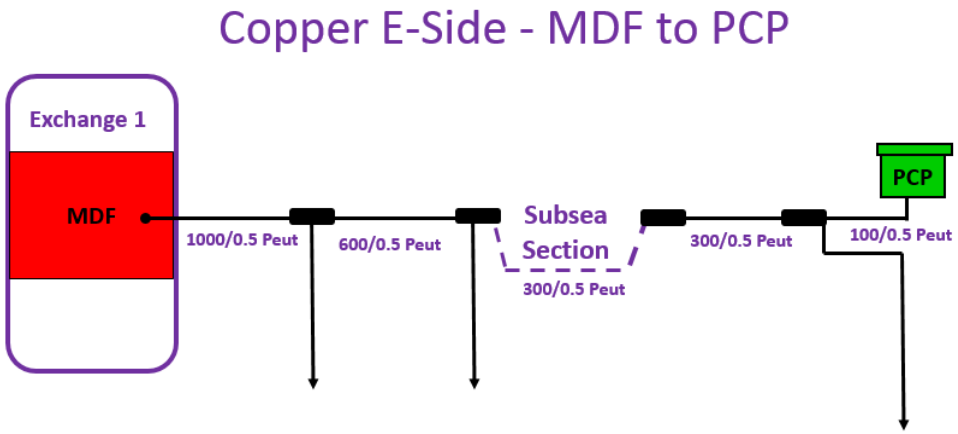

Diagram 7 - High level view of an MDF to PCP E-Side scheme.

5.8 Copper D-Side

Copper local access cables can still be provided across water from a PCP to a DP in the example below.

Caution: Guidance should be obtained from the SME's in the subsea team as the decision on what cable type should be required across a river, lake etc. may be dependant on water currents, possible damage etc.

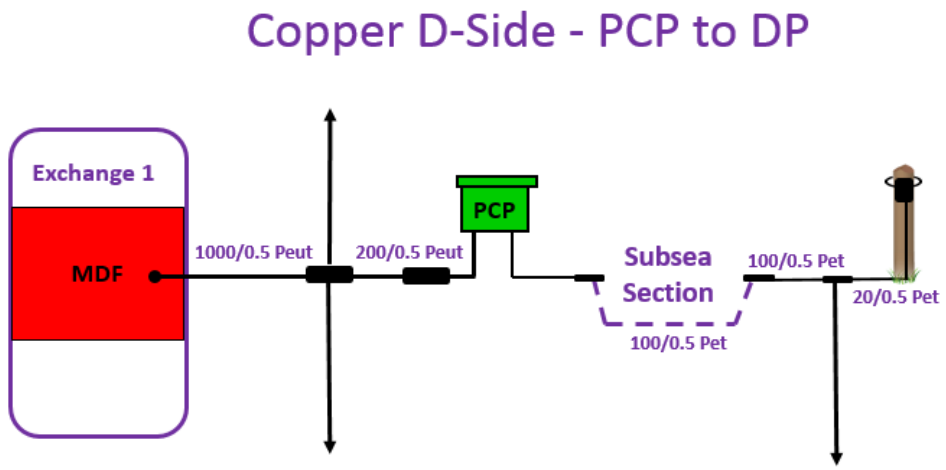

Diagram 8 - High level PCP to DP layout

6 *Exchange*

6.1 Subsea Racks

Powered Subsea cables will always terminate on subsea termination racks as per the diagrams below and these will be provided as part of the planned scheme.

Planners and engineers will need to be aware of the differing termination types within the exchange and how to safely gain access to the subsea fibres.

- A powered subsea cable will terminate in the exchange onto the subsea termination rack.
- All optical interconnects (jumpers/hydras) needing to use a subsea cable, must present themselves at the subsea terminating rack location.
- All interconnects are made with FC/PC connectors (Highlands & Islands Enterprise programme) or FC/SC connectors (later programmes); no provision for splicing is available at the subsea rack.
- There are 6 variants of rack (shown below) used depending upon the number of subsea fibres used in the subsea segments of the cable and if the cables contain electrical conductors for testing purposes.
- The Cable Terminating Unit (CTU) as shown in diagram 9 (below) is a device which safely terminates the electrical path of the subsea cables, so is only found on the cables that are “powered”.
- From the CTU we can test or use the power path as needed. The fibres do not pass through the CTU.
- Any planned exchange work must include the correct termination points for the field teams to access the cables safely.
- Planners should advise engineers to follow all onsite instructions when accessing the subsea rack.
- Non–powered subsea or subaqueous cables may terminate directly onto standard ODFs, OFRs, OCRs or MDFs.

Diagram 9 - Subsea Termination Rack variants used on subsea cables

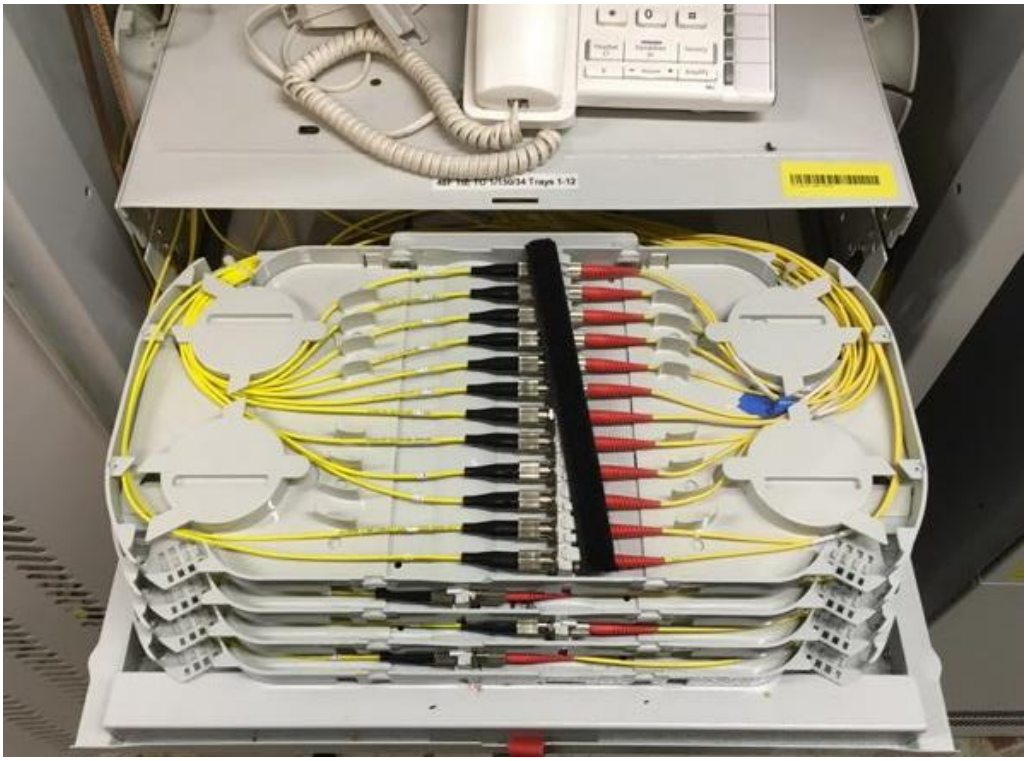

Diagram 10 - Inland patch panel

6.2 Frame Connectivity (Hydra Cables)

Connectivity between frames must follow policy guidance with the correct cables being

- All optical interconnects (jumpers/hydras) needing to use a subsea cable that is terminated on a subsea rack must present themselves at the correct subsea terminating rack location.
- All interconnects at the subsea rack inland patch panel are made with FC/PC connectors and no provision for splicing is available.
- All hydra's to be used for connectivity should follow the guidance in:
  - OFR to ODF/OFR/OCR – ISIS: NWK/LNK/C553 - Fibre – Optical Distribution Frame -ODF – Policy
  - Subsea inland patch to ODF/OFR/OCR – See section 6.2.1 - Subsea inland patch to ODF/OFR/OCR below.

6.2.1 Subsea inland patch to ODF/OFR/OCR

As part of the Highlands & Islands Enterprise programme bespoke Hydra cables were manufactured to provide interconnection between the inland patch panel and the Openreach OFR, ODF etc.

The hydra cable is not available from eASC and spares are in short supply. Please contact the author this document if you require one these hydras for a repair task.

The details of the bespoke hydra are as follows:

- COF201
- 24 Fibres
- Lengths 15 metres – 30 metres
- 1 end connectorised (FC/UPC) with 1500mm breakout lengths

Further information is shown in the pictures below

Note: Please note new variants of hydra's may be produced for future subsea deployments.

Diagram 11 - 24 Fibre Hydra cable with connectorised tail

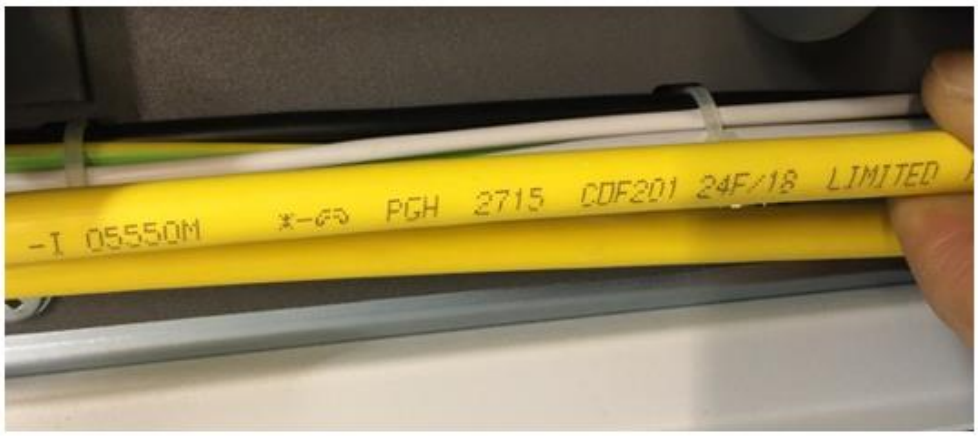

Diagram 12 - Hydra cable for HIE project

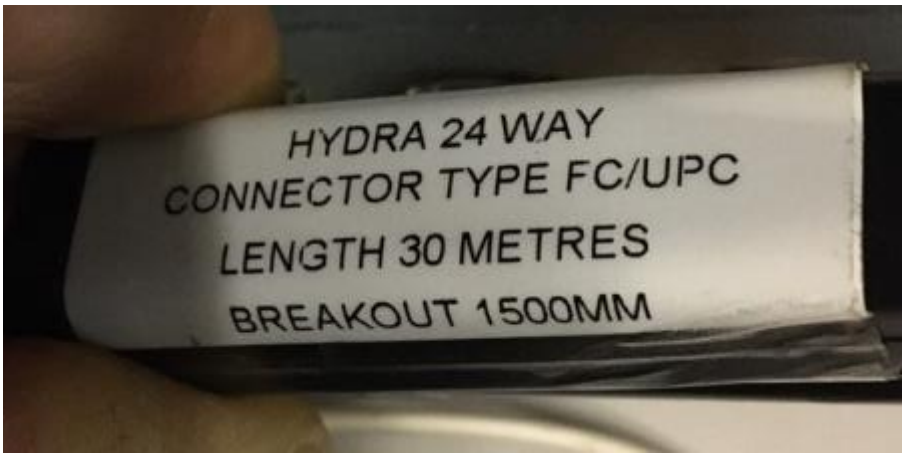

Diagram 13 - Bespoke Hydra label

6.3 Exchange Policy Guidance

Further guidance on exchange terminations and hydra cables can be found in the following ISIS documents:

- ISIS: NWK/LNK/C553 - Fibre – Optical Distribution Frame - ODF - Policy
- ISIS: NWK/LNK/C213 - NGA - Optical Consolidation Rack (OCR) – Policy
- ISIS: EPT/CFP/A008 - Cable Fire Performance: COF950

7 *Beach Joints*

Subsea cables are to be terminated on the beach in a Beach Jointing chamber. This is used to interface between the Subsea cable and the land sections of a route.

Warning: The “Beach Joint” should never be used as an interception or diversion point for fibres or pairs. The “Beach Joint” should be a straight transition from submarine cable to the land cable.

8 *Cable Chamber Joints (CCJs)*

The diversion of fibres in a powered Cable Chamber Joint (CCJ) is strictly forbidden. Diversion of fibres in a CCJ can only be achieved by the planning of an auxiliary node. The planning of an auxiliary node in the CCJ will require policy sign off unless it is part of the original planned scheme to provide the cable.

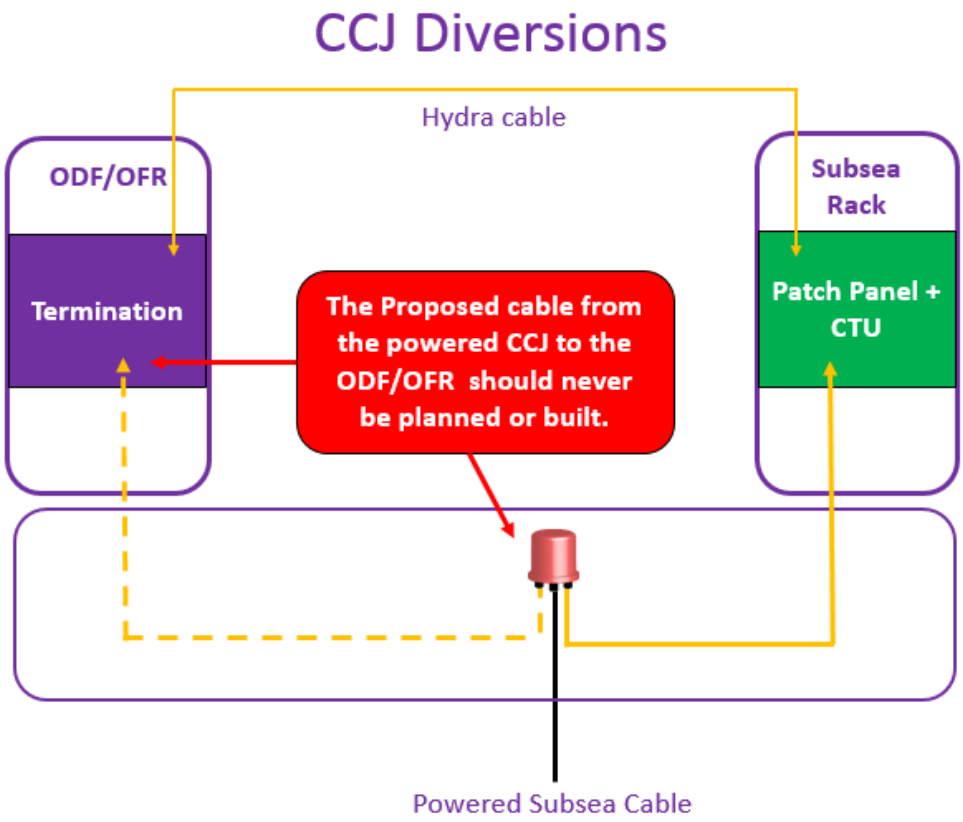

Diagram 14 - Non compliant CCJ diversion

> **Warning:** Powered cables must **never** be accessed in the CCJ without contacting the subsea team to arrange access via the **"De-Powering process"** stated within this document.

Diversion of any spare core cable capacity must be agreed with the Bearer Capacity Management team. To obtain permission please visit the Network Policy Briefings & Planning Communications webpage and locate and reference Network Policy Briefing: #804 - Using CJ (Core) Fibres to provide FTTP for further guidance.

When access is required to divert fibres in a non-powered Cable Chamber Joint (CCJ) the guidance provided in ISIS: NWK/LNK/C212 - Fibre – Spine Planning – Policy must be followed.

9 *Subsea/Subaqueous cables*

> **Warning:** No work should be undertaken on subsea/subaqueous cables unless the field engineer is confident that subsea cable network elements have been identified and all safety requirements stated within this document are adhered to.

There are two fundamentally different subsea cable types installed in the network. The choice of cable to be used will be decided at the planning stage by the subsea cable engineering team.

9.1 Subsea Powered cables

Powered cables have a 100V DC potential applied at one end of the cable at all times which is used as a monitoring circuit. When the cable's position needs to be determined at sea, an electroding tone may be applied.

In extreme cases, this could have a potential of up to 600V DC.

Should a powered joint be opened up then visibility of the conductor wires should confirm this is a powered cable.

Diagram 15 – Powered joint conductor wires

All powered subsea CJ cables are COF27 cable on land, although COF201/950 and a separate 4 pair cable may be used within the Telephone exchange.

Warning: All joints should have 600V warning labels on or close to the joint.

Diagram 16 – 600V warning label fitted near joint

9.2 Unpowered cables

The cables used for “non-powered” cable routes will be constructed from cables decided by the subsea engineering tea, this may include cables from our standard portfolio.

9.3 Subsea Sections and Spine interfacing

Subsea cables terminate on the beach in a Beach Jointing chamber. Please see section 7 – Beach joints, above.

The beach jointing chamber is where the used to interface between the subsea cable and the on-land spine cable.

9.4 COF27 or COF200

The general principles of which cables are to be used as part of a planned solution are shown below. The Subsea engineering team will always make the final decision on the choice of cables.

9.5 Long Routes

For long subsea cable route sections, if a fault develops the cable will be repaired.

- For long routes COF27 terrestrial cable is used as the link cable between the beach jointing chamber and the exchange.
- The copper pairs in the COF27 cable will be used as a path to carry the test tone for the subsea cable.
- The COF27 is routed from the exchange to the beach jointing chamber in SDMB4 installed in Duct 54.

> **Warning:** There is not a direct in ground sub-duct for COF27

9.6 Short Routes

For short sub-sea cable route sections, if a fault develops the cable will be replaced entirely between beach jointing chambers.

- For these short routes COF200 is used as the link cable between the beach jointing chambers and the exchanges.
- The COF200 can be is routed to the beach jointing chamber in 32/20mm flexible duct installed by mole plough or in SDMB5 installed in Duct 54.

> **Warning:** There is not a direct in ground sub-duct for COF27

10 *Subsea (powered) Network Design*

> **Warning:** The powered subsea network design has been designed as a closed network and should only be accessed at the allocated termination points or pre-built auxiliary on-land joints.

A number of safety and operational issues were considered when the subsea cable network was designed. In order to manage the risks and reduce potential interventions into this “live” network there are 2 designs that are currently deployed.

1. End to End Network see section as per section 5
2. End to End with onland auxiliary access nodes see section 5

Both designs are classed as closed network designs

10.1 Powered End to End Network

The diagram below shows an end-to-end closed network. This network can only be accessed in the exchange via the subsea termination rack.

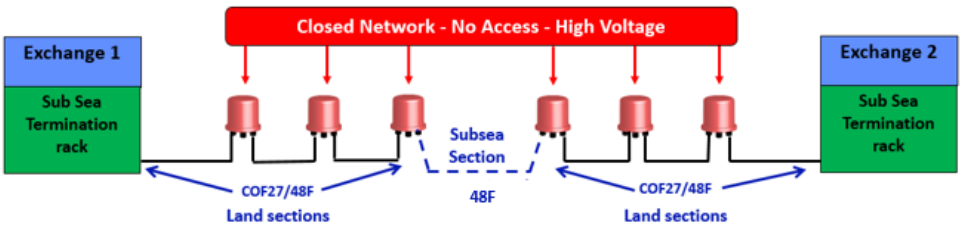

Diagram 17 - Example of a closed subsea network

The conventional design was adopted whereby the end-to-end link is considered a closed system. Access to the closed network can only be made at the allocated termination points at each end of the network from the in the subsea termination rack.

> **Warning:** Powered cables must never be accessed in the CCJ without contacting the subsea team to arrange access via the “De-Powering process” stated within this document.

10.2 Powered End to End network with auxiliary access points

The diagram below shows an end-to-end closed network with pre-built auxiliary access nodes for local capacity.

This network can only be accessed as follows:

- In the exchange via the subsea Termination Rack.
- Via a pre-built auxiliary node

> **Warning:** Powered cables must never be accessed in the network without contacting the subsea team to arrange access.

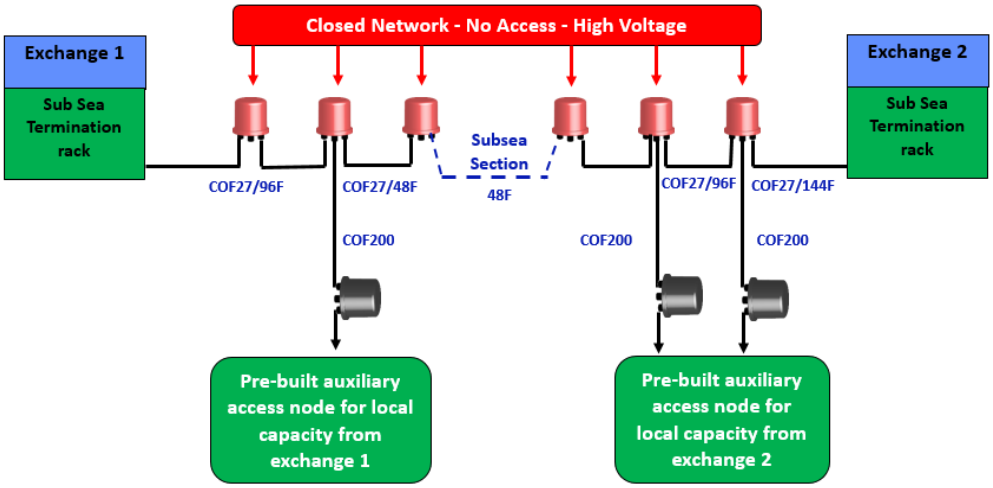

Diagram 18 - Example of a closed powered network with pre-built auxiliary access nodes for local capacity

> **Warning:** When extending fibres from auxiliary access nodes engineers must be confident that they are not accessing the closed powered node (this should have been clearly labelled).

11 *Planning for a Subsea/Subaqueous Cable*

Where there is a requirement for a new subsea or subaqueous cable the owning Openreach planning team is advised to make contact with the subsea Engineering team via the form Subsea and Subaqueous Cable Enquiry Form

The subsea engineering team will provide guidance on any requirements to be considered by the Openreach planning team.

> **Caution:** The subsea team will provide guidance, but the planning of the work estimates **may** still fall under the ownership of the Openreach planning team. This will be dependant of the requirements, location and distance of the works.

11.1 Subsea engineering request

The Subsea and Subaqueous Cable Enquiry Form can be used to enquire about any of the following:

- Request for a new cable
- Repair enquiries
- Cable diversion enquiries
- Advice and Support

11.2 Openreach Planning Responsibilities

The requesting Openreach planning team will have a named project lead to establish a single point of contact within Openreach for the subsea team.

The Openreach planner will manage the Openreach build scheme from survey to job closure and their duties will include:

- Liaising with local Openreach/partner field teams
- Ensure recording of the completed scheme
- Attend project progress calls with the subsea team
- Working with other teams to resolve scheme issues

11.3 Dimensioning

The Openreach planning team should request enough capacity to cover all programme requirements and not just the driver programme.

This may include:

- Core
- FTTP programmes
- Ethernet

Note: This list is not exhaustive

Warning: The Openreach Ghost plan must be consulted.

11.4 Planning considerations

The Openreach planning team should also investigate the onland fibre requirements and plan for auxiliary access points where spare fibres may be dropped off for local access requirements on route to the subsea cable-crossing.

- Where possible all auxiliary nodes should be built in separate jointing chambers to the live subsea cable node. This will help to ensure engineers safety if a live node is opened in error.
- The Openreach planning team must remember that once the scheme is completed the network is considered to be closed and no further access to build additional auxiliary access points will not permitted without a de-powering of the network.
- To allow this an auxiliary access/storage joint will need to be designed into the scheme at the planning stage. This will allow safe access to the spare fibres/elements without entering the "powered" cable sections directly when all engineering works are completed.
- Once installed any spare fibres can be utilised by all parts of the Openreach planning community if available.
- The driver Openreach programme will fund the new cable scheme unless cross programme agreements are in place.

Warning: The "Beach Joint" must never be used as a distribution point

11.5 Planning Utilisation of an Auxiliary Access Node

When planners are required to access the auxiliary access node to extend fibres for local use the following policies must be followed:

- A Precision Test Officer (PTO) should be asked to confirm the location and identity of the auxiliary node before any planned work to extend spare fibres is issued.
- Job packs must include hazard and warning notes applied to the job pack by planning advising works are required on fibre that are provided from a powered subsea cable.

Warning: No work that will involve entering the closed live network should be planned without following the guidance in this document.

11.6 Repair of a subsea/subaqueous closed network cable

Repair or replacement of powered closed network cables may be required at certain times. Before any work can take place, the subsea cable will need to be de-powered.

Please follow the steps in section "De-Powering and Re-Powering of a subsea cable".

12 *Field Engineering on Subsea cables*

All field engineers who allocated tasks that involve working on the subsea cable network should be provided with the following before work commences:

- Job packs received in the field must include all relevant information that will allow must engineers to identify if they are suitably qualified to work on the planned task.
- If the field engineer is not confident that the survey and planned jobpack does not identify the closed network nodes the engineer is required to access. The engineer must stop work until further investigations have been completed.
- Information support could be provided by:
  - Arranging Precision Test Officer (PTO) attendance
  - Consulting E-Records
  - Contact the subsea engineering team

Note: This list is not exhaustive

- When the field engineering teams have completed all works, full labelling of the powered subsea network should be provided in all boxes along the route of the cable.

13 *Network Alterations*

Where subsea or subaqueous cables are affected by a proposed network rearrangement project, the Network Rearrangement representative who is dealing with the proposed diversions must contact the subsea team using:

The Enquiry Form

Telephone - 01288 359 176

Email bude-widemouth.cable.stn@bt.com .

This is necessary for all cables that have an element of subsea or subaqueous within their length, regardless of whether it is the sub-sea/subaqueous section that is affected.

Any proposed alterations to these cables must be approved by the sub-sea team before diversionary costs are provided to external customers.

The subsea team may require specific cable types to be used as replacements along the length of the cable, and they may need to arrange for the replacement of specialist sections of cable themselves. In this instance the Network Rearrangement representative will need to ensure that the costs associated with the specialist subsea works are passed on to the external customer, and that the costs incurred by the subsea team are reimbursed

from the external customers payments at the project review stage using the cost transfer process.

- For further guidance regarding the cost transfer process, please e-mail bude-widemouth.cable.stn@bt.com.

  Once the network alterations have been agreed with the sub-sea team and the external customer has agreed costs and timescales, the planned work must be issued by the Network Rearrangement representative with any specialist instructions provided by the sub-sea team. The work must be overseen by a qualified Precision Test Officer (PTO) under the "Planned Engineering Works" A60 process. It is likely that the sub-sea team will require a representative to attend site also.

14 *De-Powering and Re-Powering of a Subsea cable*

This section sets out the procedure for the safe de-powering and re-powering of a subsea cable.

This is a mandatory procedure for anyone wanting to work on the powered segments of the subsea cable network.

A list of all powered CJ numbers is provided in appendix A of this document.

If in doubt contact the subsea team at BUDE 24/7 on telephone 01288 359 176 email bude-widemouth.cable.stn@bt.com

Only a Terminal Power Safety Officer (TPSO) has the ability to make the network safe to work on.

The subsea cable team will be responsible for appointing a qualified TPSO.

14.1 De-Power and Re-Power process

The De-Power and Re-Power process for engineering teams is as follows:

Do you have a job with a hazard and warning note applied to the job pack by planning advising works are required on a powered subsea cable

or

Do you know or suspect you need access to a powered subsea cable?

If YES, complete the steps below. If NO, carry on BAU.

Caution: If the engineer is unsure that the jobpack has correctly identified network as non-powered the engineer should follow the steps in section **"Field Engineering on Subsea cables"** within this document.

Step 1: Openreach allocator/engineer make contact with Bude 24/7 subsea team on 01288 359 176.

Step 2: Bude open a subsea log item to track request, Bude verify, validate and approve or reject the request.

Step 3: Bude organise Terminal Power Safety Officer (TPSO), to safely power down cable as per SFY/SCS/B011 – Email confirmation to all once complete.

Step 4: Openreach provide written acknowledgment to Bude that power down has taken place and request permission to work (PTW). Bude input into log.

Step 5: Bude organise TPSO to issue PTW to Openreach engineer, detailing cable powered down against subsea log item reference number from step 2.

Step 6: Openreach engineers enter de-powered node and carry out work.

Step 7: Openreach engineers complete work and return cable to TPSO advising cable can be re-powered works complete.

Step 8: TPSO will complete PTW and inform Bude cable can be re-powered, subsea log item updated.

Step 9: Bude acknowledge request, confirm Openreach PTW is closed and organise TPSO to power up cable, Log updated.

Step 10: Bude document and close their log entry and close case

15 *Network Regulations*

Where and whenever Openreach provide network, we must make sure we meet all the rules and regulations that govern how we install and maintain the network.

Please ensure the following sites are consulted:

Environmental Regulations

Network Regulations

Warning: Failure to meet Network Regulatory agreements may result in Openreach removing (at our own cost) any illegally installed cables across any waterways where restrictions apply.

16 *eRecords*

16.1 E-PIPeR, Geo-Hub, ORION

The PIPeR recording system should be used to record/identify subsea or subaqueous cables. A remark should be entered into the notes field as shown below.

Planners should interrogate all available records systems to identify subsea cables

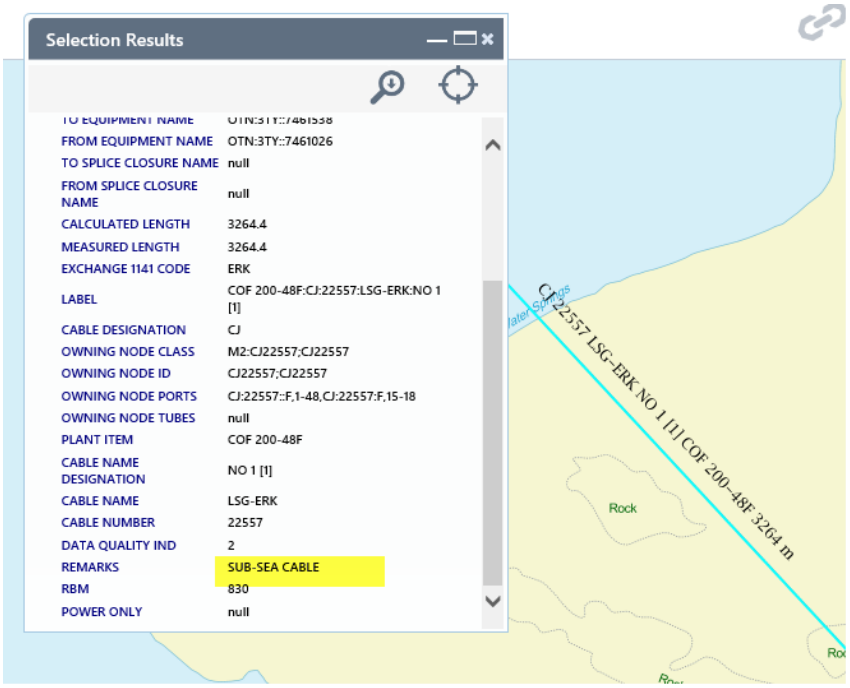

Diagram 20 – Excerpt from PIPeR showing a subsea cable

17 *Jobpack Requirements*

All planned Jobpacks that involve accessing a powered subsea node or an auxiliary node for provision or repair will need to include the following:

- A hazard note stating the work will require access to a powered subsea node or an auxiliary node
- Contact numbers for the subsea engineering team
- Appropriate stores for subsea cables
- Reference to this document ISIS: NWK/LNK/C586
- Reference to “Working near Water” safety requirements

18 *Labelling*

Labelling of the powered subsea closed network should be provided in all boxes along the route of the cable.

To obtain the labels please contact - bude-widemouth.cable.stn@bt.com

19 *Stakeholders*

Stakeholders are consulted during the development of new, and updates to existing, Network Policy ISIS, many of whom influence and sign on to policy documents as members of groups and forums.

The following people were originally identified as key stakeholders of this document and agreed to sign-off as Network Policy.

Ongoing stakeholder engagement in relation to incremental ISIS versions is captured within our team's 'Stakeholder Engagement Log' - located within our Stakeholders intranet page.

Stan Edwards - Network Policy, Quality & Accreditation Specialist

Spencer Barrett - Senior Manager Planning and Safety

Tom Boswell - Senior Manager, Engineer & Innovation

Sean Binks - Senior Fibre Planning Manager

Michael Winters - Senior Fibre Planning Manager – Spine

Adam Robb - Core Cable and Spine Investment Programme Manager

Lee Bird - Senior Manager, Plant & Equipment Safety

Ross Sherra - Regional Programme Manager FND North

Chris Webber - Subsea, Network Engineering Test Manager (Technology)

Andrew Nunn - Subsea, Network Design Professional (Technology)

Peter Griffin - National Ethernet Senior Manager

Roger Causley - Senior Manager, People Safety

Jo Derbyshire - Senior Manager, Network Rearrangement

Ken Topping - Principal, Network Optimisation and Health

Steve Ewen - Network Modelling Manager

Dan Jones - Senior Manager, National FTTP Operations

Rachael McLeish - Senior Manager, Complex Engineering

Ewan Hyslop - Senior Area Manager NED

Lesley Kellett - Government & Industry Manager

Arthur Gormley - Strategy & Sourcing Senior Manager

20 *Further Guidance*

20.1 Documentation

ISIS: SFY/SCS/B011 - Subsea Cable Systems Safety Procedure

ISIS: NWK/LNK/C553 - Fibre – Optical Distribution Frame -ODF - Policy

ISIS: NWK/LNK/C213 - NGA - Optical Consolidation Rack (OCR) – Policy

ISIS: EPT/CFP/A008 - Cable Fire Performance: COF950

ISIS: NWK/LNK/C212 - Fibre – Spine Planning – Policy

20.2 Glossary

Glossary of Terms

21 *Appendix A*

A list of all known powered subsea CJ cable numbers is shown below.

	Segment	CJ No	Terminal	Terminal
HIE	Seg 1.01	CJ22500	Largs	Millport
	Seg 1.02	CJ22501	Kilchattan Bay	Millport
	Seg 1.03	CJ22503	Rothesay	Toward
	Seg 1.04	CJ22508	Kilfinan	Lochgilphead
	Seg 1.05	CJ22516	Campbeltown	Shiskine
	Seg 1.06	CJ22519	Corrie	West Kilbride
	Seg 1.07	CJ22523	Jura	Port Askaig
	Seg 1.08	CJ22520	Glenbarr	Port Ellen
	Seg 1.09	CJ22524	Jura	Ormsary
	Seg 1.10	CJ22495	Kilchoan	Tobermory
	Seg 1.11	CJ22498	Craignure	Oban
	Seg 1.12	CJ22492	Ardgour	Onich
	Seg 1.13	CJ22472	Stornoway	Ullapool
	Seg 1.14	CJ22464	Lochmaddy	Leverburgh
	Seg 1.15	CJ22466	Carnan	Dunvegan
	Seg 1.16	CJ22469	Ardvasar	Mallaig
	Seg 1.17	CJ22532	Dervaig	Scarinish
	Seg 1.18A	CJ22557	Lochboisdale	Eriskay
	Seg 1.18B	CJ22556	Eriskay	North Bay
	Seg 1.19	CJ22533	Evie	Westray
IOS		CJ25262	LandsEnd	St Marys
Portsmouth Ryde No.10		CJ26412	Portsmouth	Ryde
Portsmouth Ryde No.11		CJ26413	Portsmouth	Ryde
IOW3		CJ26477	Cowes	Fawley

END OF DOCUMENT