Fibre Developer Handbook

March 2026

Copper lines on Openreach New Sites

Openreach has announced its plans to ‘switch off’ the traditional analogue (PSTN) Copper network by the end aof 2025.

Between now and then, Openreach will move tranches of exchanges into a ‘stop sell’ position when 75% of addresses in an exchange area can get full fibre broadband (also known as Fibre to the Premises or FTTP). This allows us to stop selling Copper WLR and PSTN products to Communication Providers (CPs) at those addresses.

For new sites we want to ensure that we only build one infrastructure which is full fibre. We want to remove the dependency on providing small amounts of Copper solely for the purpose of special service lines and from 15 November 2021 Openreach New Sites no longer offers additional Copper for the sole purpose of service lines.

Your equipment providers or CPs should be able to supply an All-IP or GSM based solution for existing Copper reliant services. Please contact them directly to organise these solutions which will allow your sites be fully FTTP serviced.

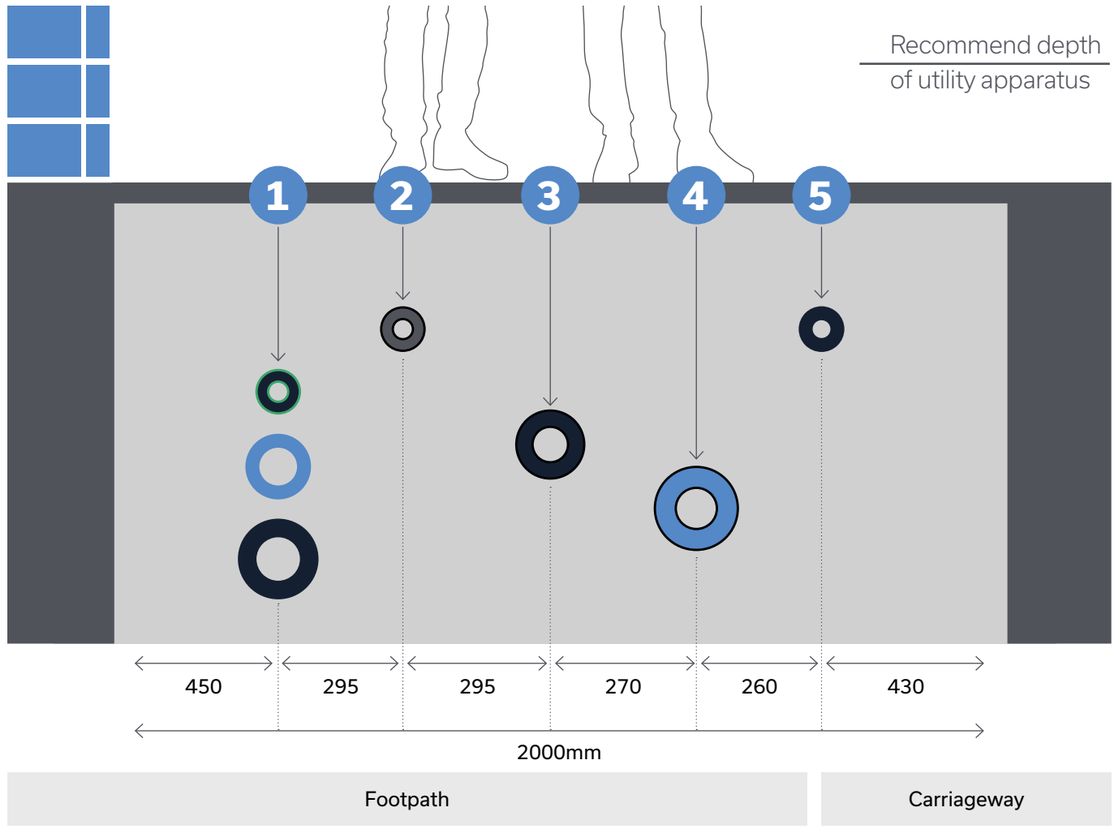
More information about Copper and FTTP Service Lines on New Sites can be found on our website:

openreach.co.uk/propertydevelopment

General duct guidelines

Arrangement of mains services

The latest information on the positioning of utilities, mains and plant can be obtained from Streetworks UK: **streetworks.org.uk**



Key

1. Electricity/HV 450 to 1200mm/LV 450mm
2. Cable TV 250 to 350mm
3. Gas 600mm
4. Water 750mm
5. Telecommunications 250mm

Avoiding damage to the BT/Openreach network

Openreach manage an extensive underground network that may be located within or around the perimeter of a development site. The BT/Openreach network is particularly vulnerable to excavation-related damage, and developers must not excavate, alter, or move any BT/Openreach apparatus without first contacting the Openreach Network Rearrangement team.

Network diversions may be required on both private and public land, and it is essential that works are carried out safely. Damage to our network can cause critical service outages, delays to your project, and will result in repair costs being charged to the responsible party. It is always advisable to check what infrastructure is present on your site before starting any works.

If you have identified—or suspect—that your development may impact BT/Openreach equipment, please register your enquiry with our Network Rearrangement team here: www.openreach.com/building-developers-and-projects/altering-our-network

Guidance on avoiding damage to underground utility plant is contained within the Health & Safety Guide No. 47: "Avoiding danger from underground services", available here: hse.gov.uk/pubns/books/hsg47.htm

This guidance highlights the need for up-to-date utility plans to be available on site and for safe digging practices to be followed at all times.

Click Before You Dig

To obtain a more precise location of Openreach infrastructure (either within your site or the adjoining land) and avoid costly damage, email: **cbyd@openreach.co.uk**

Utilisation of the Openreach Click Before You Dig free service has a proven record of minimising the potential for damage and cost.

or visit our website:
openreach.com/building-developers-and-projects/altering-our-network

General duct guidelines

Ducting to the building

Duct to the premises/building must be laid at a minimum depth of 250mm and be as straight as possible.

Ducting general principles

- All runs must be laid as straight as possible. If needed, you can carefully bend the ducts or use pre-formed bends supplied by Openreach.
- There must be no more than one pre-formed 90° bend in any single run of duct.
- Pre-formed 90° bends must not be installed in any duct linking two joint boxes.
- Footpath or service strip ducting must be laid at a minimum of 250mm depth of cover.
- All space alongside the duct must be backfilled with granular fill to a minimum thickness of 75mm.
- For all single dwelling units (SDU) duct must be terminated on the external surface of the property.
- The duct termination point must be in a location that will allow unrestricted access for any future maintenance activity.
- All ducts must be provided with a draw rope after installation, unless it's agreed locally to substitute the draw rope with a cable.
- Please notify your FBC when the duct has been laid and is ready for inspection prior to call off.
- Any internal duct feed must be sealed to prevent gas or water ingressduring construction. When cable is being installed duct will be permanently sealed by Openreach engineer. FBC can be consulted for further information.

Detectable Buried Service Warning Tape

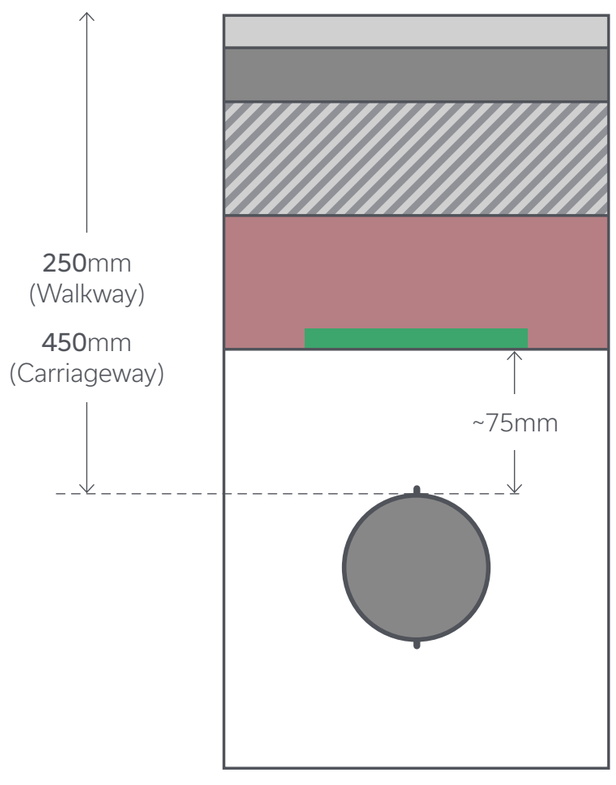
Traceable warning tape must be installed on your site above all new duct and direct-in-ground cable as no locator signal can be sent over fibre cables.

Warning tape with a traceable wire running through it will allow other utilities to locate our network prior to excavation and help our Plant Protection Officers accurately mark-up network positions.

Tape must be placed approximately 75mm above the installed duct or cable, in footways and carriageways.

Installation of tape on site falls under current SOD payment requirements.

Tape will be ordered by your FBC alongside other free issue materials.



Carriageway road crossings

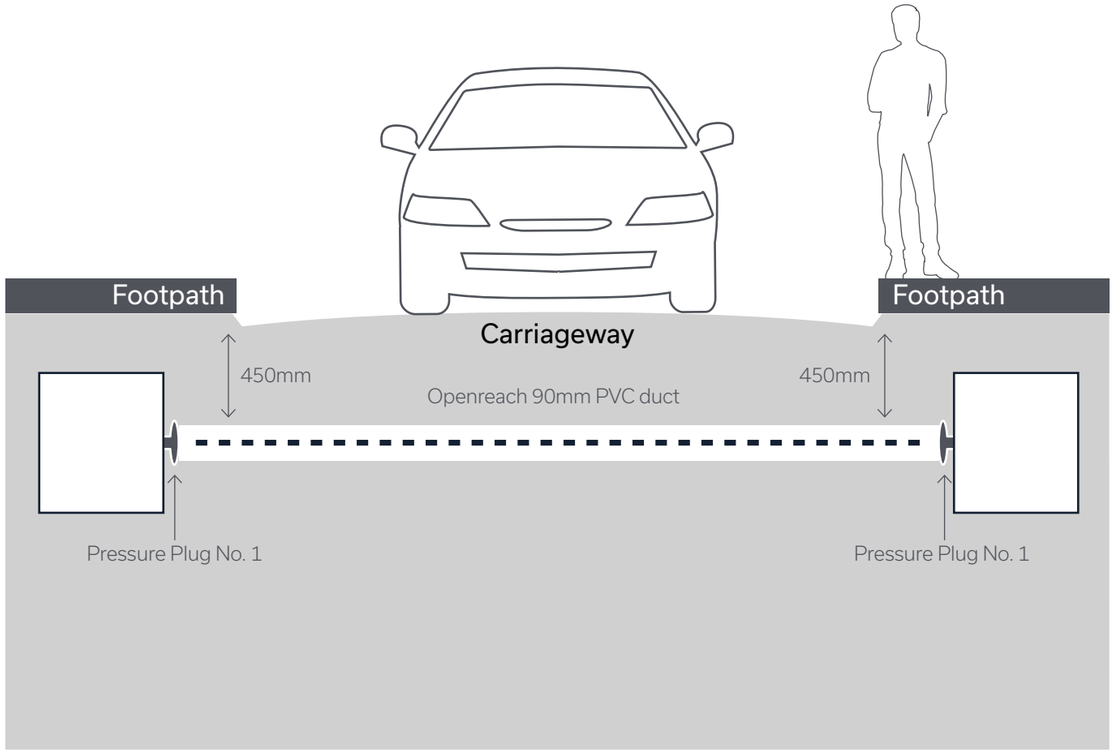
Across the carriage way

Where our duct crosses a carriageway, adjoining kerbs must be temporarily marked to note positions. Openreach duct must be laid on an outer edge of the service trench to enable box building. Pressure Plug No.1 should be installed in a D54 90mm duct road crossing. This seals the duct and removes the need for a rope above the surface and it becoming a potential trip hazard.

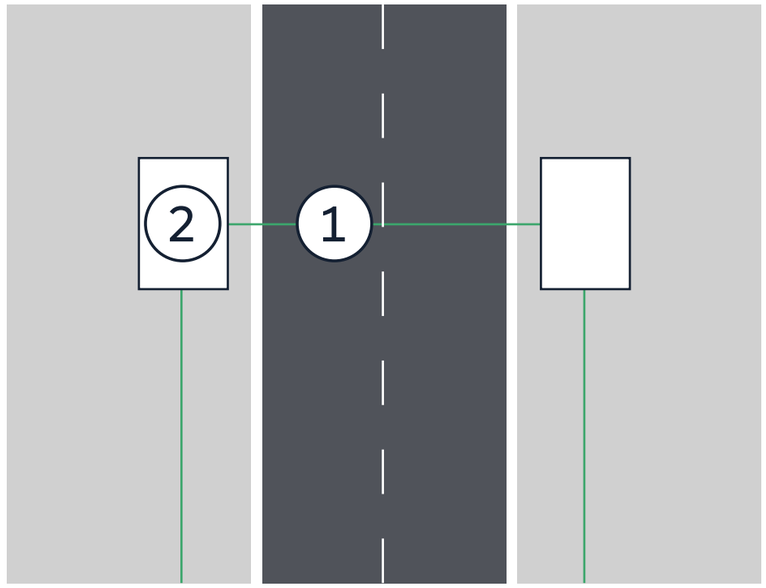
Beneath the carriageway

Duct laid beneath a carriageway crossing must be a minimum of 450mm depth and maximum of 600mm from the cover of the final surface levels and, for engineering reasons (Streetworks UK), separated from other services laid in parallel by 450mm (to permit us to install underground joint boxes without the need for bends).

Carriageway cross section



Correct duct layout from above



1. 90mm ducting Under carriageway
2. Footway box

Ducting to the building

Duct Installation

- Install rider and main D54 90mm duct lines from serving chamber
- Install Swept Tees as required to serve each plot
- Place D56 50mm 90 degree 350mm house bend so it is touching the wall of the plot and directly under the ingress point for the internal fibre cable. This MUST be in line as this is a common snagging issue when calling off plots.
- Install D56 50mm duct lengths from the house bend to the Swept Tee
- At the end of the rider install a reducer and a D56 50mm 90 degree long bend
- From the last plot on the rider install D56 50mm duct lengths from the D56 50mm 90 degree house bend to the 90 degree long bend.
- Installing duct in this order will endure D56 50mm house bend is used and tight against the wall. Only a D56 50mm house bend must be used at the plot wall. **No other D56 50mm bend must be used**.

Important safety requirement:

Under no circumstances must a duct be routed directly from an underground Openreach jointing chamber into a building. This presents a risk of gas ingress from the underground network into the property. All duct routes must comply with Openreach safety and ventilation requirements.

1. D54 90mm rider duct chamber to plots
2. D54 90mm main duct chamber to chamber
3. Swept Tee
4. Reducer
5. D56 50mm
6. D56 50mm 90 degree 350mm radius house bend
7. D56 50mm long 90 degree 450mm radius bend
8. Fibre ingress directly inline with duct

Ducting to the building

Order of installation

Ducting to the building

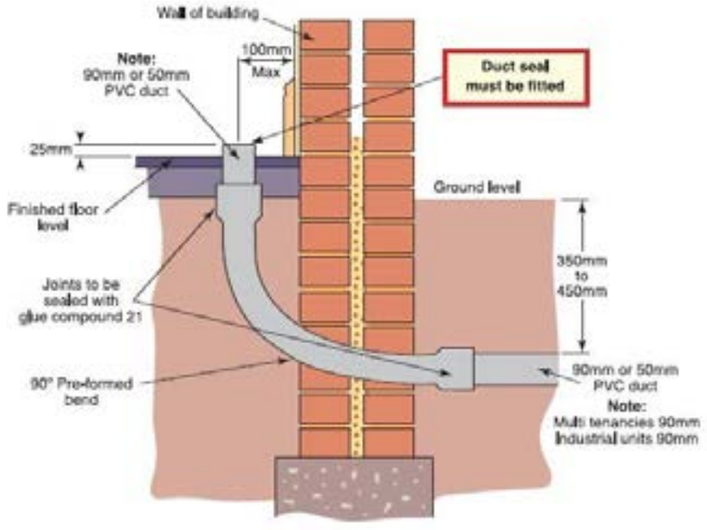
Duct Installation

- The top of the duct must be cut back to no more than 50mm above finished ground level
- When the duct installation is completed, it should be roped from the plot end back to the chamber
- 3m of rope must be left at either end of the duct tied ff in the chamber and secured at the plot using off cut from 50mm duct to prevent rope being pulled back
- A foam grommet should be installed in the top of the duct to prevent debris falling into the duct and causing blockages

Avoiding Obstacles

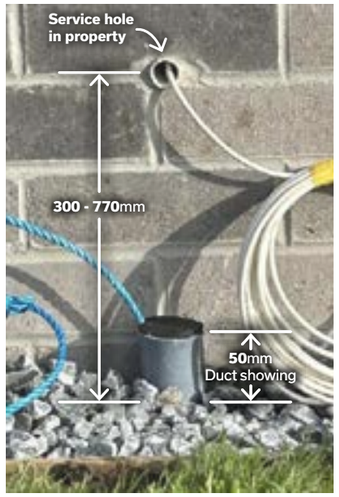
- Install the D54 90mm rider duct as normal with a Swept Tee positioned so a straight line can be run parallel to the wall from the Swept Tee and with a clear line beyond the obstacle
- Install the D56 50mm 90 degree 350mm radius house bend as normal tight against the house wall and angled to create a line past the obstacle.
- Add additional D56 50mm duct at the bottom of the house bend as required to avoid the obstacle.
- Install D56 50mm 45 degree bend as required to bring the duct back in line with the Swept Tee, then install D56 50mm duct as needed to connect to the Swept Tee

Ducting to the building - MDU



This diagram illustrates a typical duct entry arrangement for Multiple Dwelling Units (MDUs). Internal fibre termination equipment must be installed in a secure and accessible location within the building. Each building layout will be assessed on its own merits, and final equipment positioning will be agreed with the Openreach Field Based Co-ordinator (FBC). Note: Openreach can only extend internal cable up to 2 metres from the point of duct entry into the building. Internal fibre termination equipment must therefore be installed within this footprint.

External duct presentation



Complying with building regulations

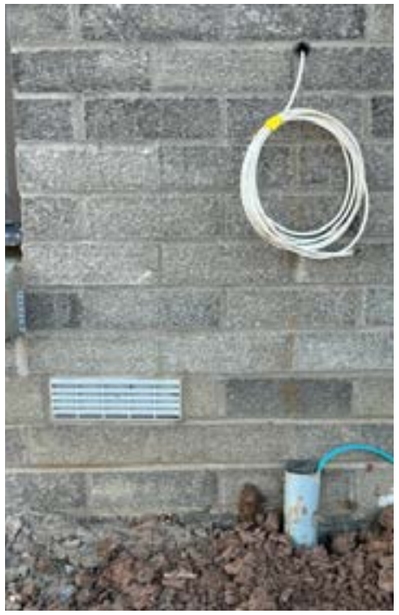
Where you are not working with Openreach or another infrastructure company to provide a functioning broadband and phone infrastructure to the home, Part R regulations require the provision of duct in the default position discussed below so that infrastructure can be installed in the future.

ONT in the default position

When the ONT is to be fitted in the default position on an internal wall directly opposite the entry position of the service access hole adjacent to the external duct location, external capping will be fitted on completion. To keep things tidy, make sure that the service access hole is drilled in line with the duct and in keeping with the dimensions shown on this page. The service will be sealed with a grommet or mastic before fitting the external capping.

Do not position ducting or capping in a way that covers any air bricks.


Completed external presentation with capping



Air Bricks: Risk of Gas Ingress

Every effort must be made by the developer to ensure that the position of the fibre ingress point and the underground duct does not result in capping being installed over an air brick.

Covering an air brick can restrict necessary ventilation and increase the risk of gas being drawn into the property from the underground network.

Modular jointing chambers

The optional approved pre-formed modular chamber system can be used to speed up the installation process and bring significant productivity benefits as there is no need for specialist box building teams.

Modular boxes are not a free stores item from Openreach but can be purchased directly from our two approved suppliers, Radius Systems and Cubis Systems. These suppliers provide modular boxes in both black and grey and are the only approved suppliers for Openreach. A box must only use sections of a single colour – black and grey sections cannot be mixed.

For purchasing enquiries, please contact either Cubis or Radius using the following details:

Radius Systems

https://radius-cts.com/products/quadbox-jmf/

Sandra Davoust McCann

Sandra.DavoustMcCann@radius-systems.com

+44 (0)28 3844 6060

Cubis Systems

https://www.cubis-systems.com/uk/products/access-chambers/stakkabox-jmf/

Stephen Warke

SWarke@cubis-systems.com

+44 (0)28 3831 3100

Modular boxes can also be sourced from a number of nationwide builders' merchants. This may be more suitable for smaller sites that need smaller quantities.

Joint box modular footways 104 and 106 are the Openreach approved versions (BT specification LN712).

The lightweight high-strength system is supplied as 150mm deep twin wall high-density polyethylene (HDPE) rings to provide maximum flexibility and strength which are simply stacked on a prepared base and backfilled with suitable as-dug or Type 1 material.

If purchasing a pre-formed chamber please speak to your FBC who can order all associated box furniture.

Modular jointing chambers

Available size range

At least 5 sections are needed to meet the minimum box depth of 750mm.

At no time must minimum box depth of 750mm be compromised.
Consult your FBC if minimum depth cannot be achieved

JMF Type	Clear Opening	Depth Per Section
104	915 x 445mm	150mm
106	1310 x 610mm	150mm

Chamber base

Modular chambers must be installed on a 150 mm concrete base for JMF102/104 and 200mm concrete base for JMF106. Base must be level and clean.

Duct entries

Duct entries can be cut as and where required using a hole saw mounted on a cordless drill.

The chambers incorporate guides which identify drilling points to ensure correct duct spacing.

A maximum of 4 duct entries can be made into a single wall of the modular box.

Modular jointing chambers

Furniture

Cable brackets and steps (where required) are supplied in a bagged kit and easily slot into purpose designed pockets in the chamber. The brackets and steps drop into preformed slots

Installing the corner step

Installing the Cable Bearer

Camber adjustment

If the frame requires levelling to the ground surface, or to a newly raised surface level, rising frame units are available as an option.

These should be used in conjunction with mortar to build the frame up to the required level. Where levels mean that the cover needs raised by more than the 50mm allowable mortar bed, bricks, quarry tiles etc. should not be used to adjust the height of the cover.

A further modular box section should be cut horizontally (minimum depth to be a 40mm wall section), with the voids of the cut chamber filled with C32/C40 concrete or mortar.

As with brick-built chambers, care should be taken to make sure:

- The box is set at the correct depth and the base/plinth is installed correctly.
- The side wall is not damaged/misshapen due to over compaction.
- The frame is level with the surface and a core drill is used for cutting duct entries.
- The wall bearers are provided by Openreach and can be ordered by your FBC.

Footway boxes (JBF104/6)

Joint box designs and specifications may vary depending on the duct layout and whether multi-way ducts or major road crossings need to be incorporated into the network design.

Full technical drawings and specifications for all joint and footway boxes can be found at:
openreach.com/fibre-broadband/fibre-for-developers/guides-and-handbooks

Materials

- **Bricks:** BS EN771-1. Stretcher Bond- JBF 102/104. English Bond- JBF 106
- **Cement:** BS EN197-1:2000 ordinary mix. Three parts sand to one part cement.

Specifications

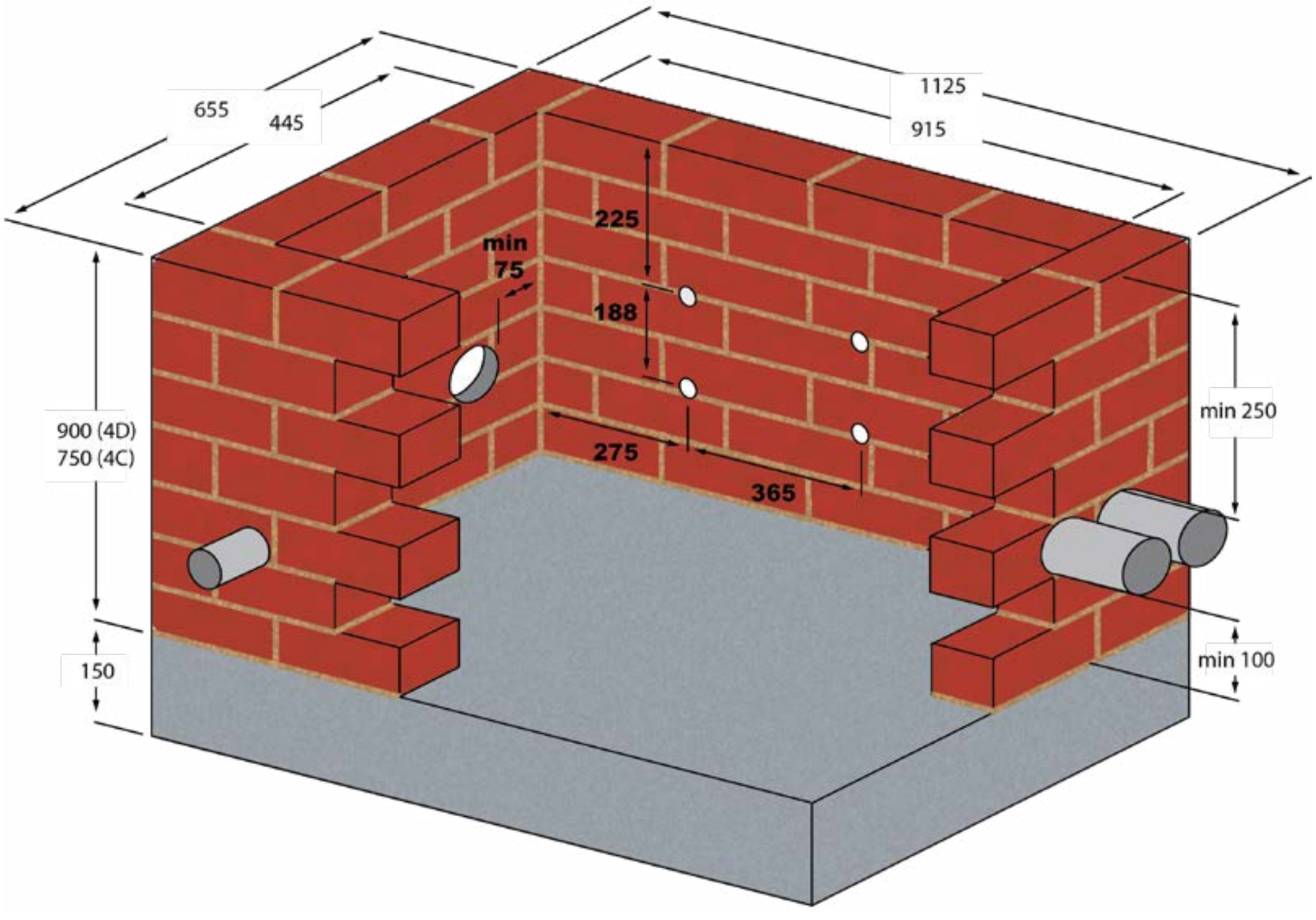
- **Base:** Concrete, clean and level. 150mm-JBF 102/104. 200m - JBF 106
- **Brickwork:** Keyed in at the corners and pointed.
- **Frame and cover:** Set on a mortar bed and fitted squarely to the box structure. Lifting keys for the covers can be purchased from TW Engineering Co Ltd at **www.twtools.co.uk** (tel: 0115 932 3223).
- **Duct entries:** Must not enter through corners and be no less than 75mm from the side wall. Duct to enter wall at a minimum depth of 250mm from the top of the frame, cut flush and clear the base by a minimum of 100mm.
- **Bolts:** Must be fitted in each box to allow ironwork to be installed by the developer.
- **Step(s):** One step is required in all boxes deeper than 700mm.
- **JBF104(C):** 915mm(L) x 445mm(W) x 750mm(D).
- **JBF104(D):** 915mm(L) x 445mm(W) x 900mm(D) the minimum depth for boxes either side of road crossings.
- **JBF106(C):** 1310mm(L) x 610(W) x 750(D).
- **JBF106(D):** 1310mm(L) x 610(W) x 900(D) the minimum depth for boxes either side of road crossings.
- **All backfill material** to be class 6N type.
- **Workmanship, materials and method of construction** are to comply with all current relevant contract documents, British Standards and codes of practice for the construction industry.
- **Concrete:** Grade C35/45 with a water cement ratio 0.4 minimum. Cement content 380kg/m. Aggregate maximum size 20mm. All in accordance with BS8500.
- **All ducts** shown are based on maximum recommended values for Duct Type 54D.
- **End ducts** to be inline.
- **Ducts** to be positioned not less than 75mm from a side wall.
- **Mesh:** only required on 106 box bases
- **Short lengths of Duct 54D 90mm** to be used on non-ducted routes. Appropriate duct to be used on ducted routes.
- Where instructed to do so drill one set of three holes using a 12mm masonry drill bit to a depth of 80mm for future fitting of equipment mounting bracket.
- For details and specs on using corbelling visit the link at the top of this page.

Joint Box Footway 104
– the preferred option

Internal dimensions.
Brickwork Stretcher Bond.

Dimensions in mm (not to scale)

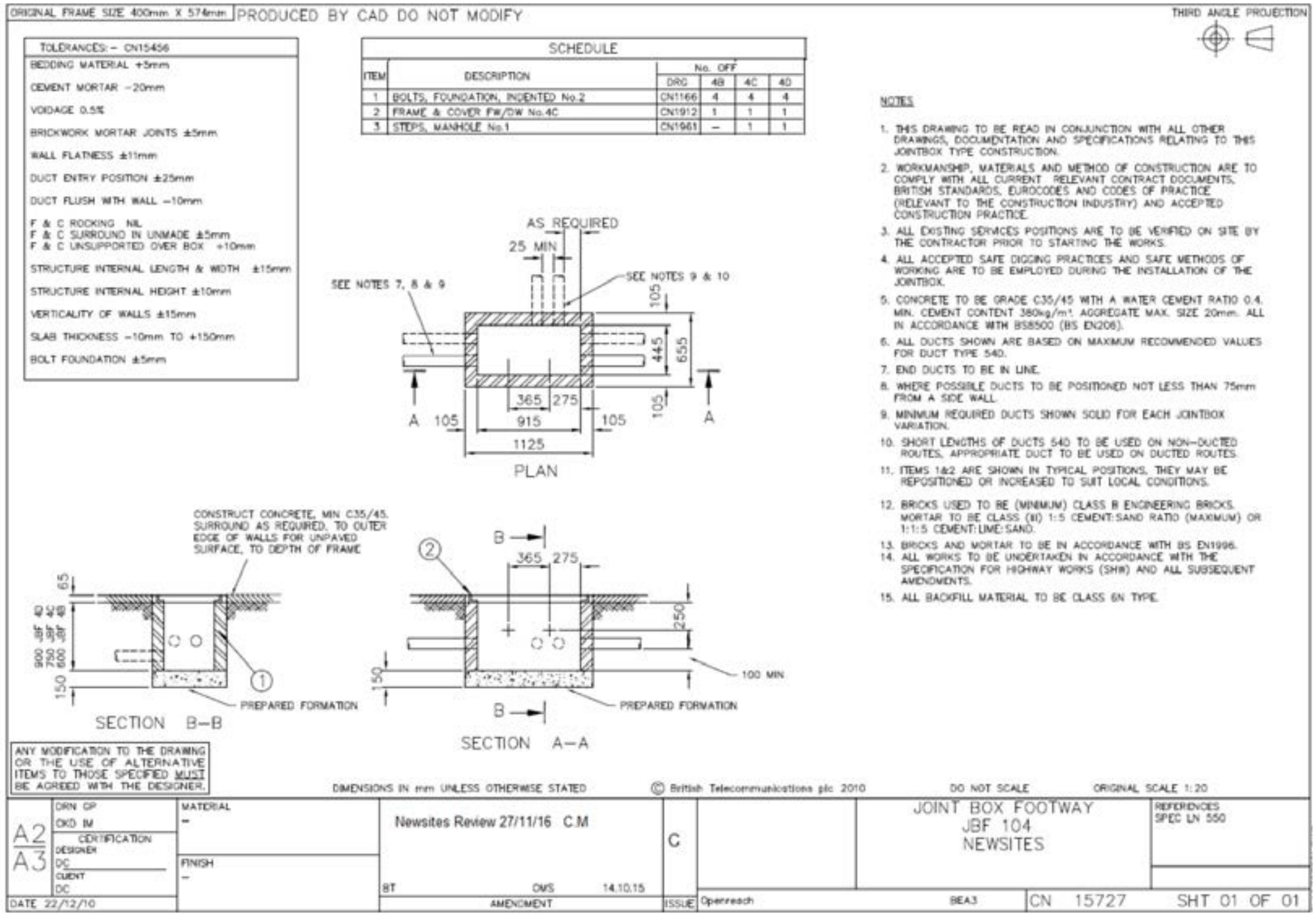
Maximum depth 900mm



Joint Box Footway 104
– the preferred option

Full size drawings can be found at:

openreach.com/fibre-broadband/fibre-for-developers/guides-and-handbooks

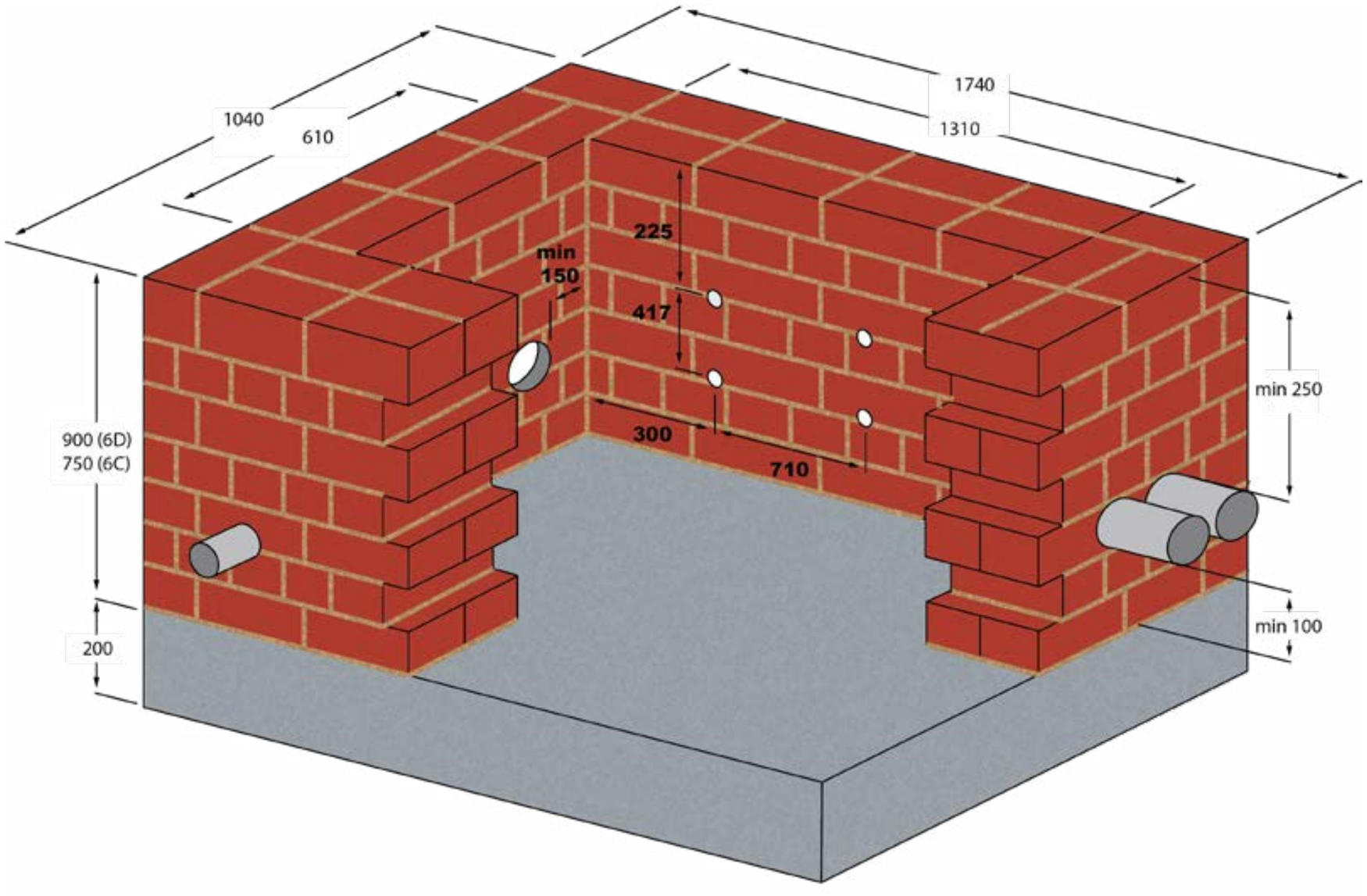


Joint Box Footway 106

Internal dimensions.
Brickwork English Bond.

Dimensions in mm (not to scale)

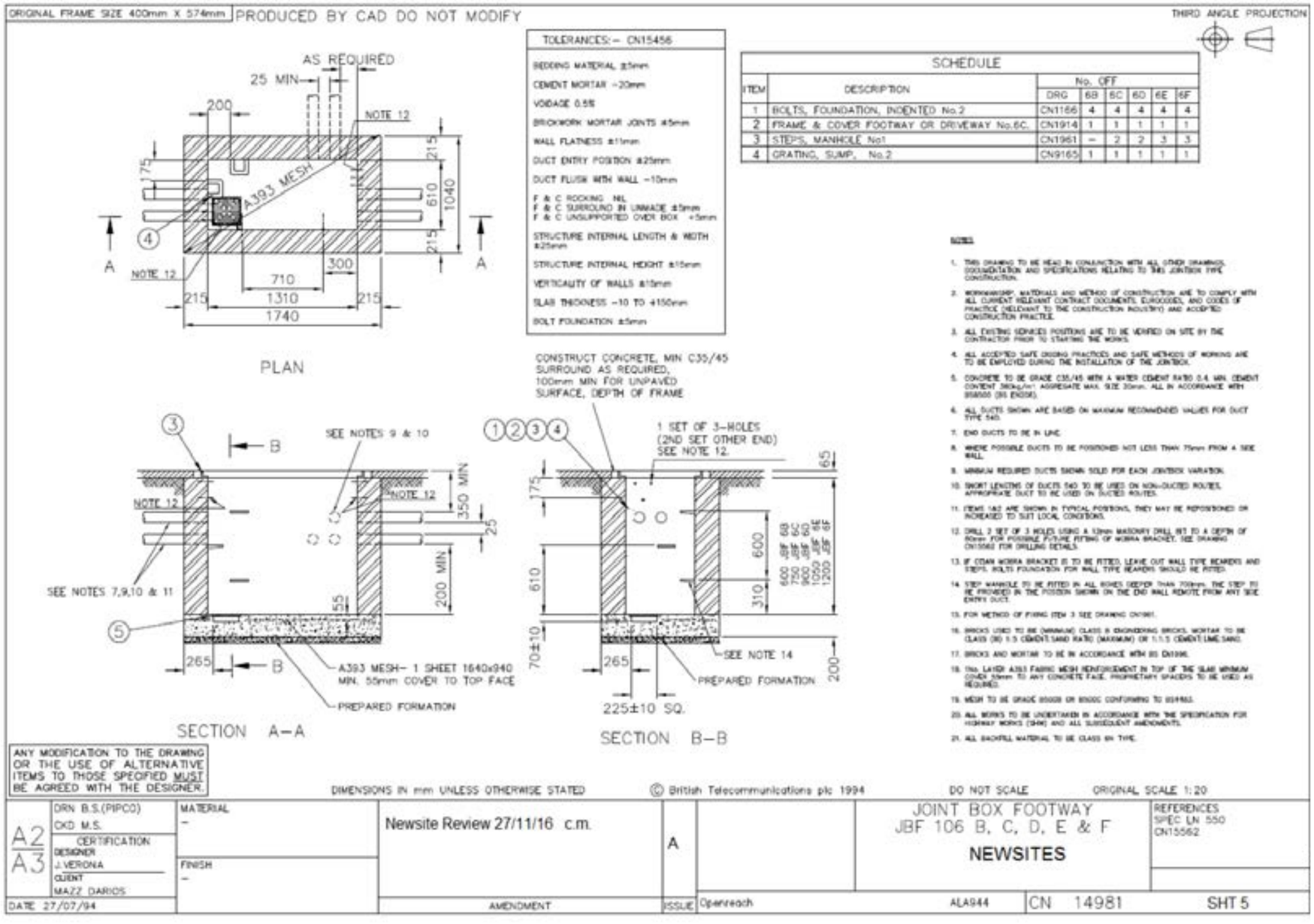
Maximum depth for road crossings 900mm
Sump to be fitted in all 106 footway boxes



Joint Box Footway 106

Full size drawings can be found at:

openreach.com/fibre-broadband/
fibre-for-developers/guides-and-handbooks



Carriageway boxes - JBC2/4

Full technical drawings and specifications for all joint and footway boxes can be found at:
openreach.com/fibre-broadband/fibre-for-developers/guides-and-handbooks

Specifications

Materials

- **Bricks:** Minimum Class B Engineering Bricks, BS EN1996
- **Cement:** BS12:1996 – Specification for Portland cement
- **Concrete:** C35/45, BS EN206
- **Mortar:** Class (iii), 1:5 CEMENT:SAND ratio (max) or 1:1:5 CEMENT:LIME:SAND

Base

- **Cement:** BS12:1996 – Specification for Portland cement
- **Concrete:** 1 layer of A393 mesh to top face of base slab. Minimum 55mm cover to any face. B500B or B500C, BS4483

Brickwork

English bond, flush pointed

Frame and cover

- **Frame cover** to be installed to HAPAS approved DMRB CD534 installation practices

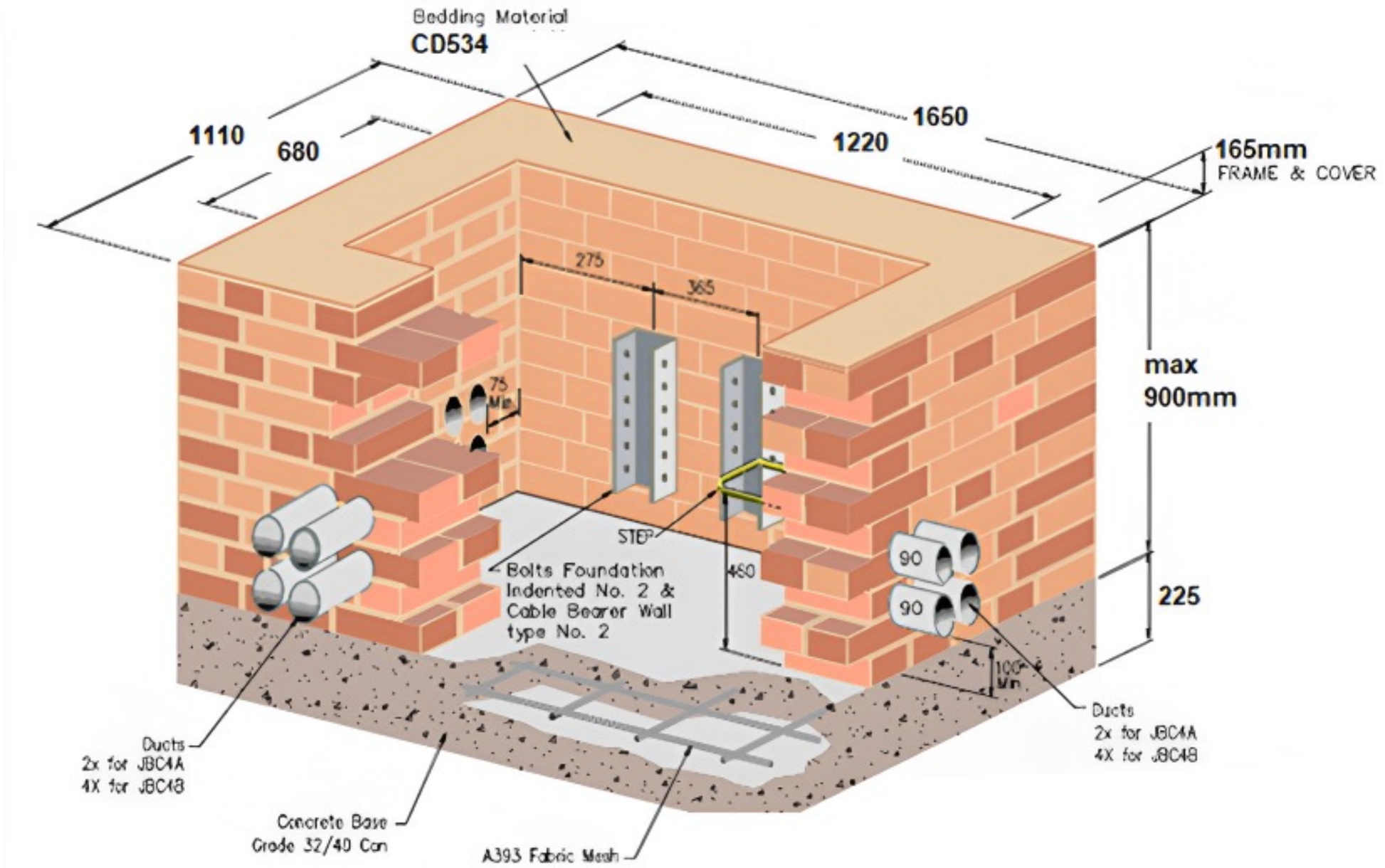
Lifting keys

- **Key Joint Box Lifter** should be used to lift the cover and can be purchased from TW Engineering Co Ltd at www.twtools.co.uk (tel: 0115 932 3223) or similar supplier of your choosing

Ducting

- **Duct** to be cut flush to the internal box wall
- **Duct** must not enter through corners and be no less than 75mm from the side wall
- **Duct** to enter wall no less than 450mm from the top of the frame

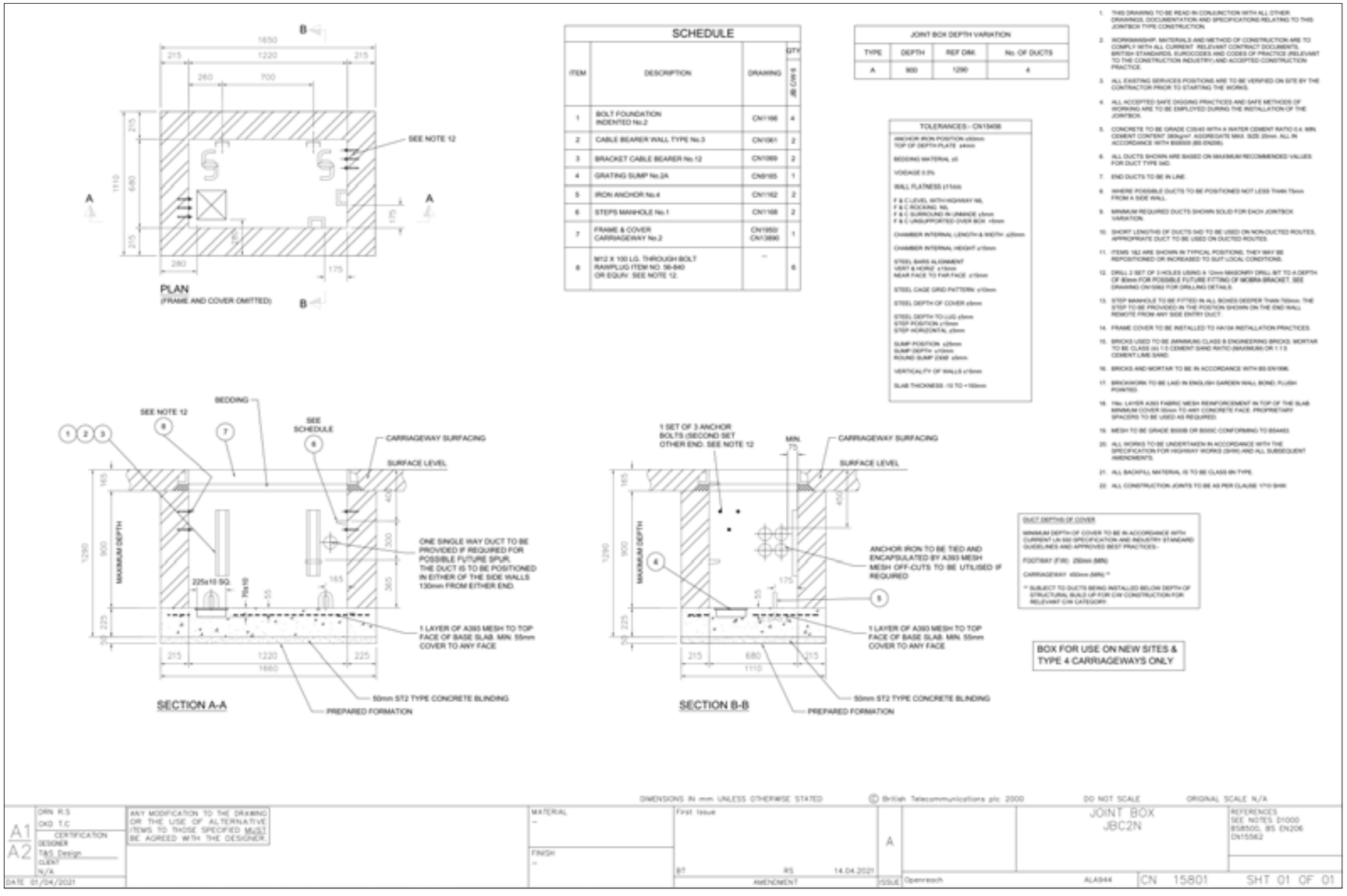
Carriageway boxes - JBC2(N)



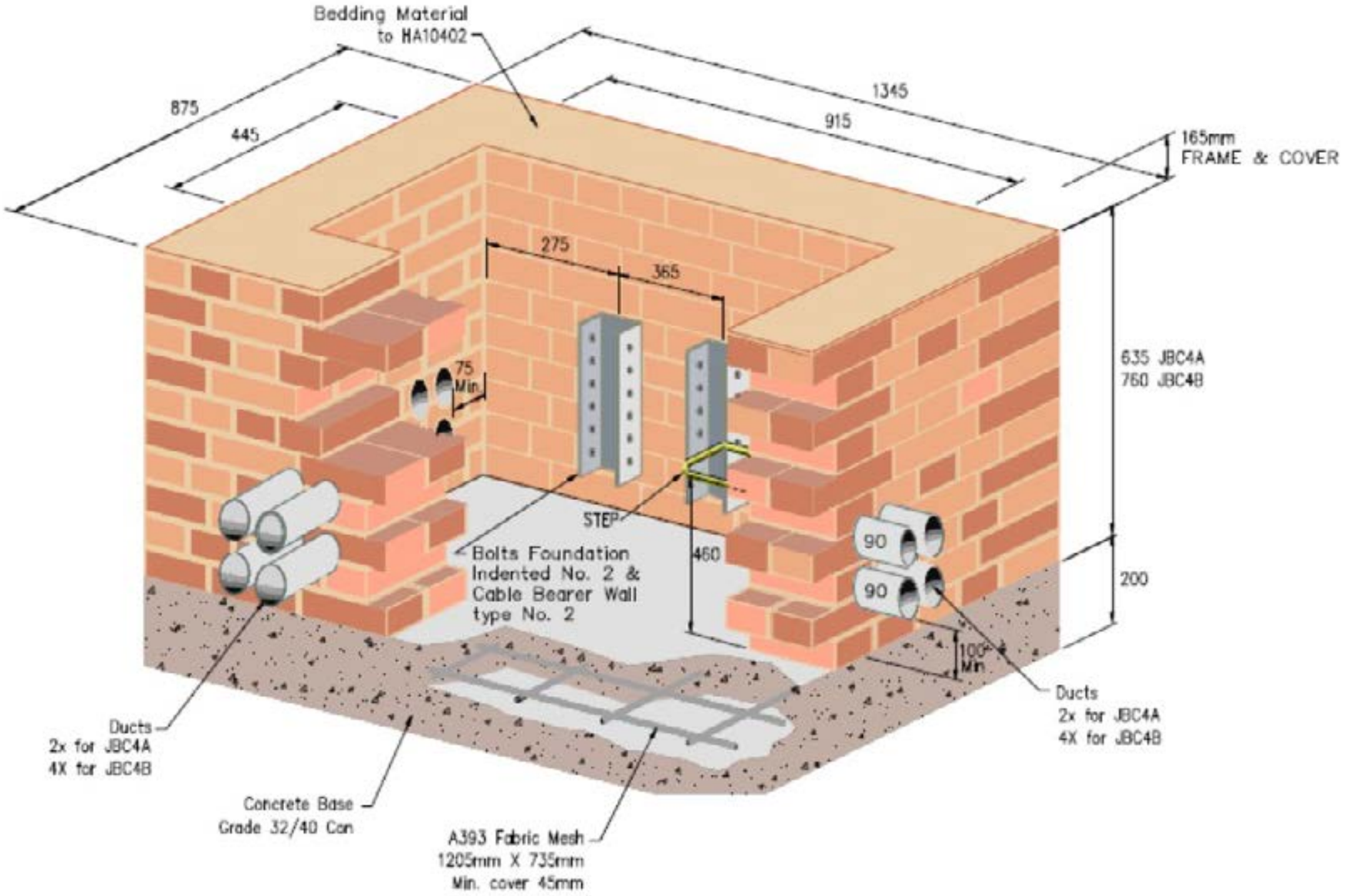
Carriageway boxes - JBC2(N)

Full size drawings can be found at:

openreach.com/fibre-broadband/fibre-for-developers/guides-and-handbooks



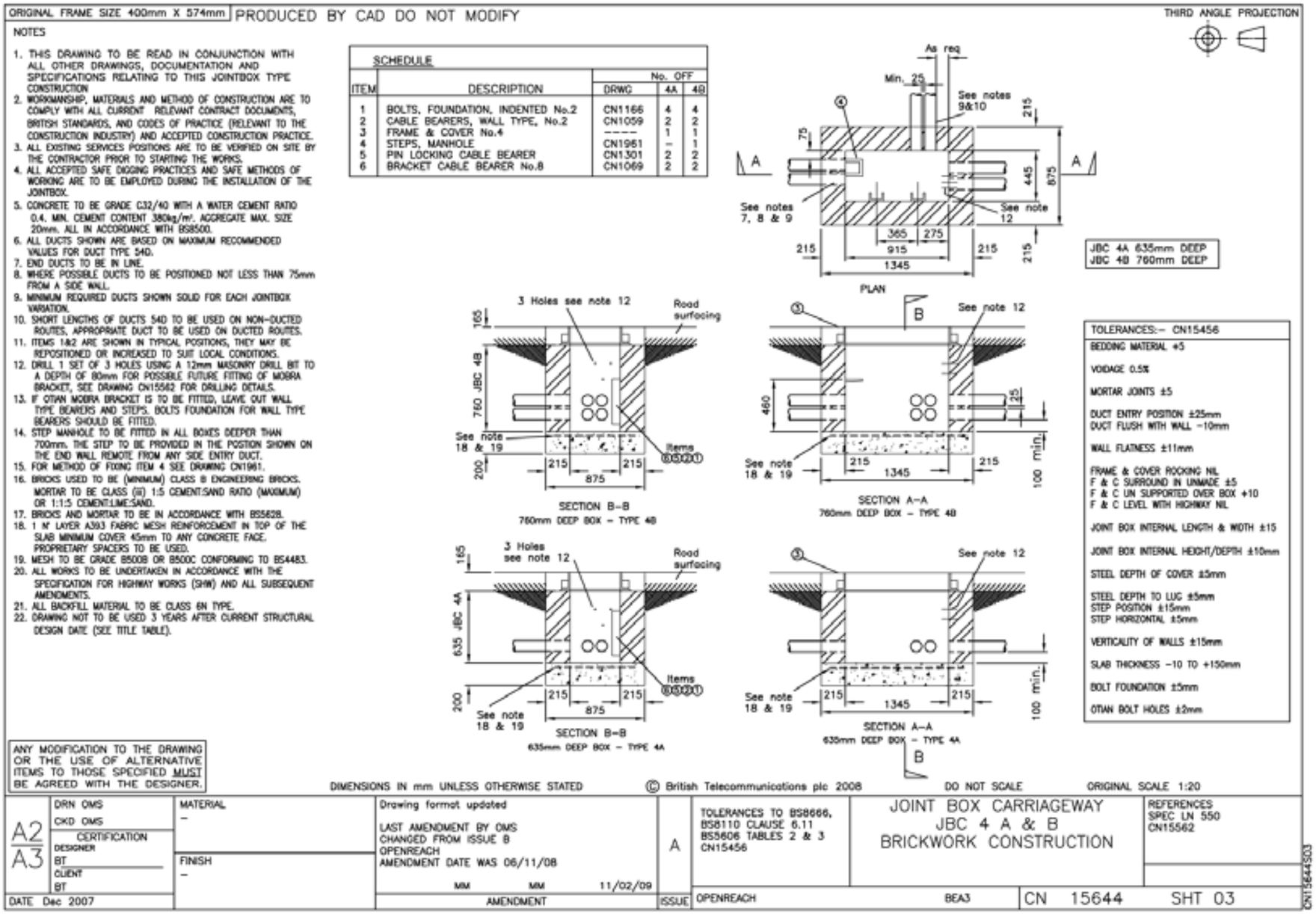
Carriageway boxes - JBC4(N)



Carriageway boxes - JBC4(N)

Full size drawings can be found at:

openreach.com/fibre-broadband/fibre-for-developers/guides-and-handbooks



Frames and covers

Cubis Systems and Radius Systems are the only suppliers of these Openreach approved products.

Only approved frames and covers should be fitted on your site. They are identifiable by the following markings; 'EN24 B125' the British Standards kitemark the Manufacturer Mark (RADIUS or CUBIS) the year of manufacture and the BT identifier.

The 'standard frames and covers' are supplied by Openreach. They consist of a galvanised steel fabricated frame, fitted with unfilled galvanised steel fabricated cover trays and cross -beams.

All covers can be fitted to modular or brick-built Chambers

Please note

Where there's evidence or high risk of vehicles using the soft verge e.g. as an undertaking area opposite a T-Junction, a passing point on a narrow road or a parking area, it will be necessary to install a 'carriageway chamber, frame and cover'. There is also an optional 'recessed frame and cover'

Recessed frames and covers

These can be purchased by the installer as an option to the 'standard frame and cover'.

Each cover tray has two key-hole fittings (in the centre of the short side) one of which carries a BT identity mark and the manufacturers' three letter identification 'SID'. The other key-hole fitting displays EN124 and B125 together with the BSI Kite mark certifying the covers to BS EN124: 1994.

Recessed frames and covers will accommodate infill blocks to a maximum depth of 60mm. If you're planning to install frames and covers that aren't supplied by Openreach e.g. for block paving, or you have any doubts about what frames and covers to use, please speak to your FBC.

Frames and covers

Precinct lids

Precinct lids are footway box lids used in high streets or retail areas where developer what to blend in their footway lids with the block paving or resin.

Openreach do not provide these lids, but if sourced externally they must be BT approved and have 3 markings – EN124, BS125 and the kitemark.

Installation

All frames and covers must be levelled to the final running surface.

Where a box is located within grass, soft or unmade surfaces, the frame must be surrounded with a 100mm wide strip of minimum grade C25/30 concrete, to the full depth of the frame, finished level with the top edge of the frame and the outside edge. It must be straight and parallel to the frame.

Unapproved frames and covers

Unapproved frames and covers must not be fitted.

Openreach will take any necessary action against any developer who fits unapproved frames and covers within the network, including any potential claim for damages and costs, with possible

delayed Service On Demand (SOD) payments. If you're unsure how to specify approved covers, please contact your FBC.

Dropped kerb and shared surface chamber boxes

If your site has shared surfaces for roads and footways, please ensure the correct joint box is installed based on the following guidelines.

There must be a defined kerb line between the road and footway to install a footway spec box or modular box in the footway area

If no defined kerb line is present, a carriageway spec box must be installed as regular traffic could pass over these areas

Driveways attached to houses and entrances to service areas do not require a carriageway spec box, so footway and modular box can be used for these areas

Fibre cable & kit installation
- SDU

Installation of pre-connectorised cable at first fix

- For single dwelling units single ended internal fibre cable (ezbend) will be available in various lengths and will be delivered on drums that can be ordered via the FBC. Excess lengths **(at least 3m externally, 500mm internally)** will need to be left coiled internally and externally for Openreach engineers to connect the plot.
- Install a single back box where the ONT is to be located.
- Coil **500mm** of the pre-connectorised end of the cable into the empty back box, taking care not to damage the green connector, then fit a blanking plate to help protect the fibre. Ensure the cap on the end of the green connector is kept on during construction to avoid damage to the fibre.
- Feed the bare end of the cable internally to externally through the external wall service hole.
- A minimum of **3m** of cable is required to be left coiled externally. The cable can be cut and the end covered with electrical tape if needed to keep the right amount coiled outside the house. Avoid leaving any unnecessary slack cable in the wall cavity of the house.

Providing power for the ONT

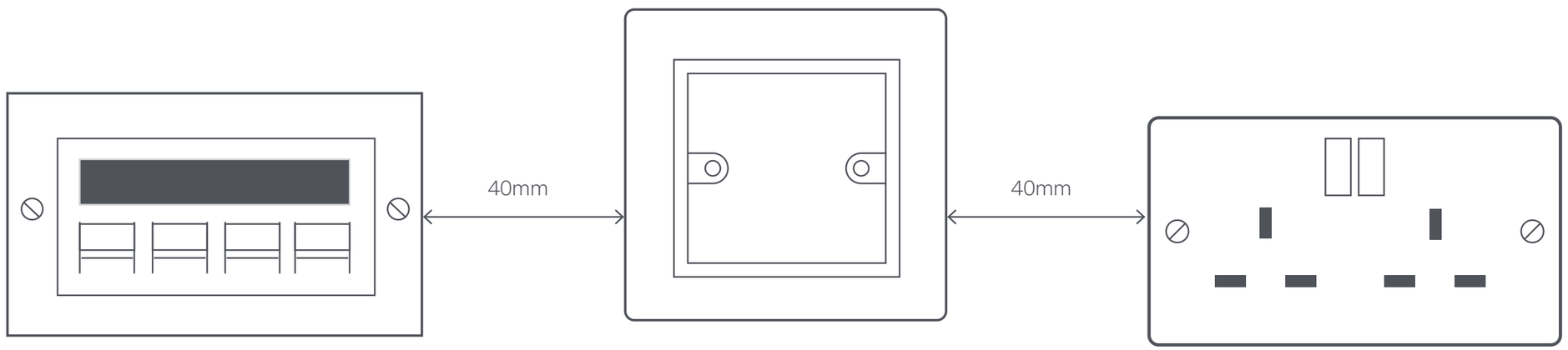
- A power socket must be provided at the ONT install point to provide power. Positioning for this socket can be seen on the next page.
- Openreach recommends a double power socket to be installed to allow the homeowner to plug in their communication provider router if required.

500mm coiled in internal back box

Minimum **3m** coiled externally

Fibre cable & kit installation
- SDU

ONT position



Openreach ONT in non-standard position

Wherever possible, the external duct should be positioned on the opposite side of the wall to where the ONT will be installed, removing

the need to run internal fibre cables. However, there are cases where the kit will need to be installed away from the external lead in and your FBC will be able to advise.

When the ONT is to be fitted in a non-default position i.e. not directly behind the external entry point, such as in a utility cupboard, the previous guidelines must be followed to provide entry of the cable into the home.

You will have a larger length of cable that will run from the entry point into the building to the Openreach ONT. In this case you have the responsibility of running the single ended internal fibre cable (ezbend) required inside the house in such a way that it is undamaged and complies with building regulations for the installation of telecommunications infrastructure cabling.

The same rules apply to the running of fibre cable internally that are specified in the section on exterior ducting. Fibre cable should be installed in protective conduit with no bend greater than 90 degrees. Once installed the ONT must be kept powered on.

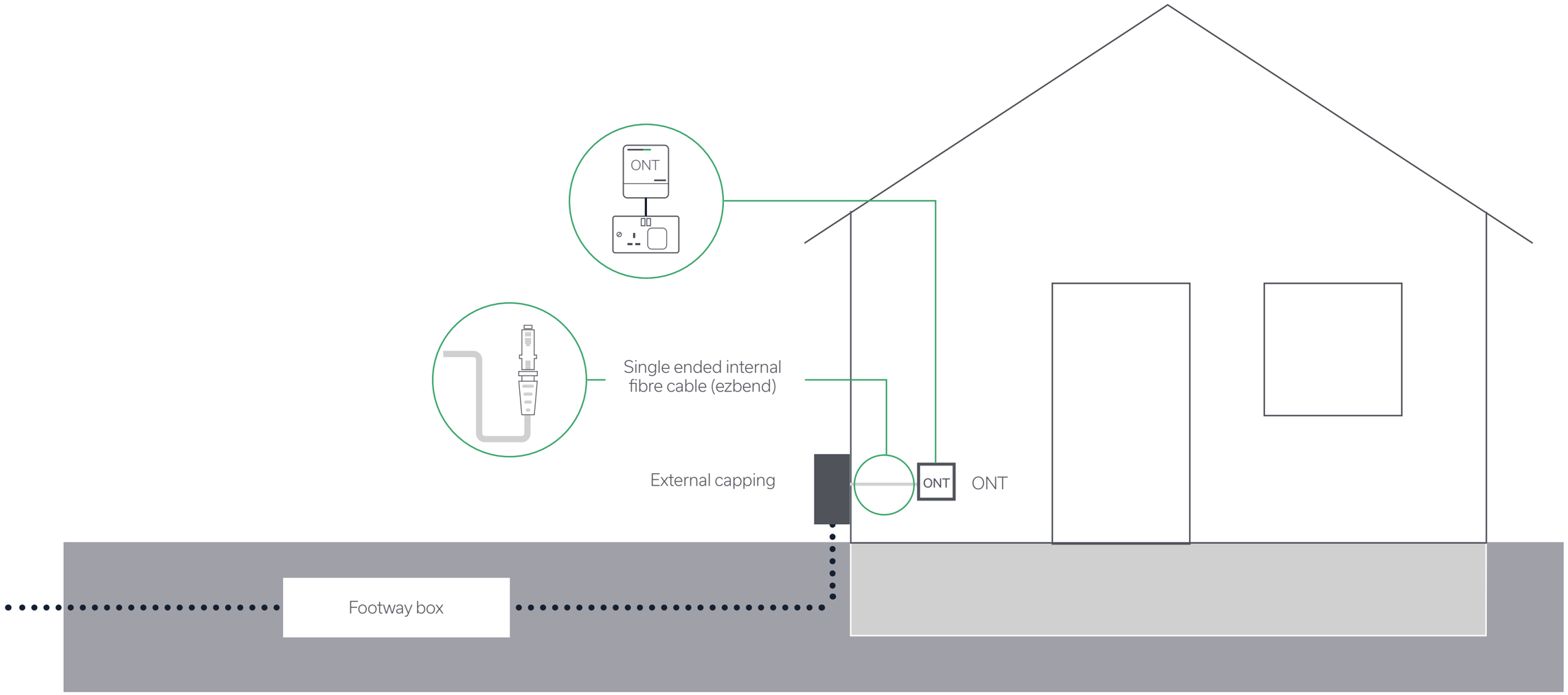
If this option is followed but the cable is found to be damaged once in situ during construction work inside the property, cables must be replaced before the fibre service can be tested and called off by your Openreach FBC.

It is important to select the right cable to achieve the minimum excess slack. Any unavoidable extra slack should be stored in a no drill zone wall cavity, taking great care not to loop the cable tightly as this will cause the cable to fail.

Fibre cable & kit installation
- SDU

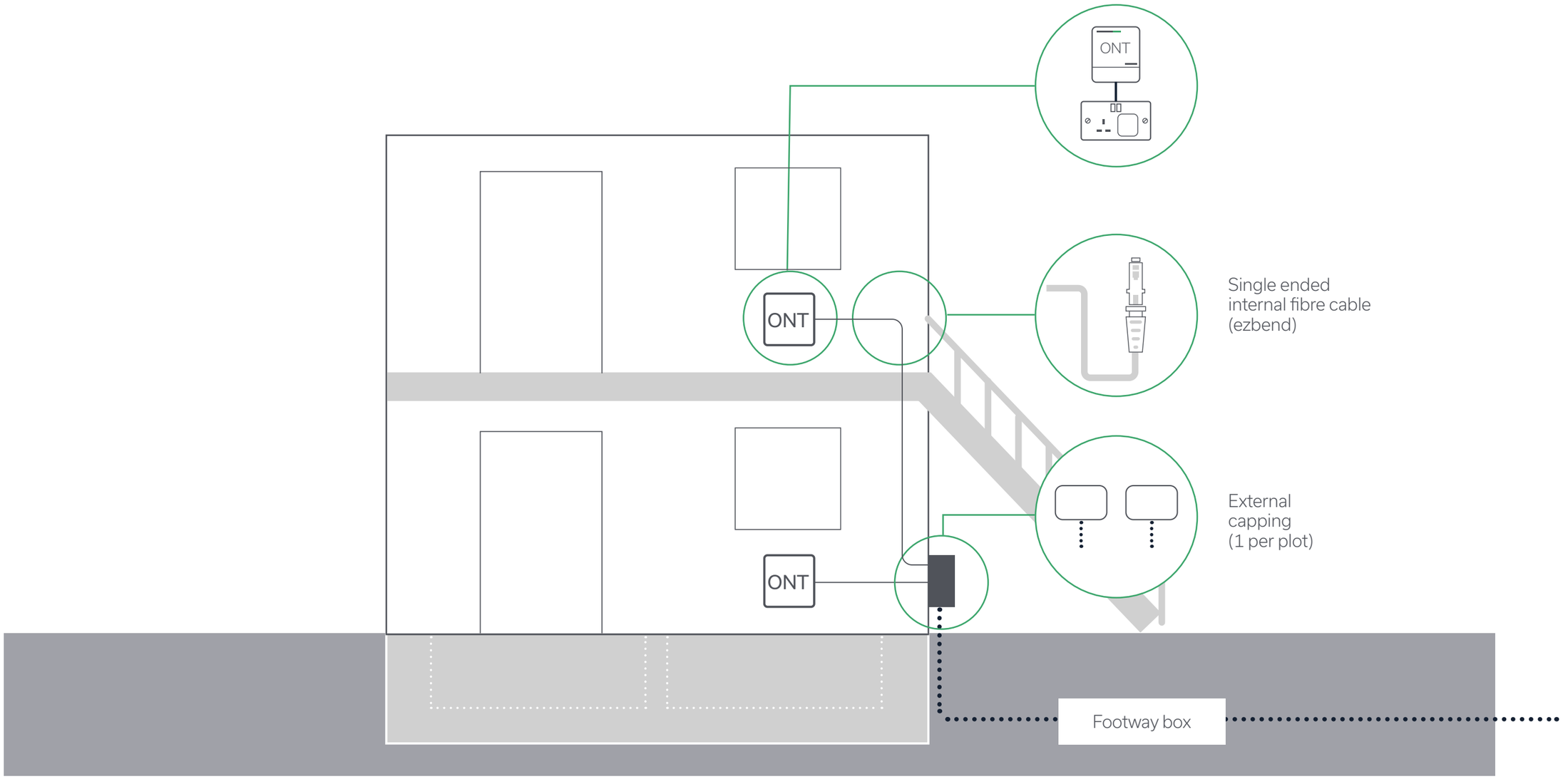
SDU Examples

Standard SDU



Fibre cable & kit installation
- SDU

Maisonettes



Fibre cable & kit installation
- SDU

SDU Examples – Internal duct feed

If internal duct feed to SDU plots is provided, then under no circumstance should a section of duct feed directly from the underground jointing chamber to the inside of the house.

Important

Not Business as Usual (BAU): This arrangement is not the standard build method. It must only be used where it has been pre-agreed with the Openreach Field Based Co-ordinator (FBC) and there is a clear, site-specific reason to deviate from the standard approach.

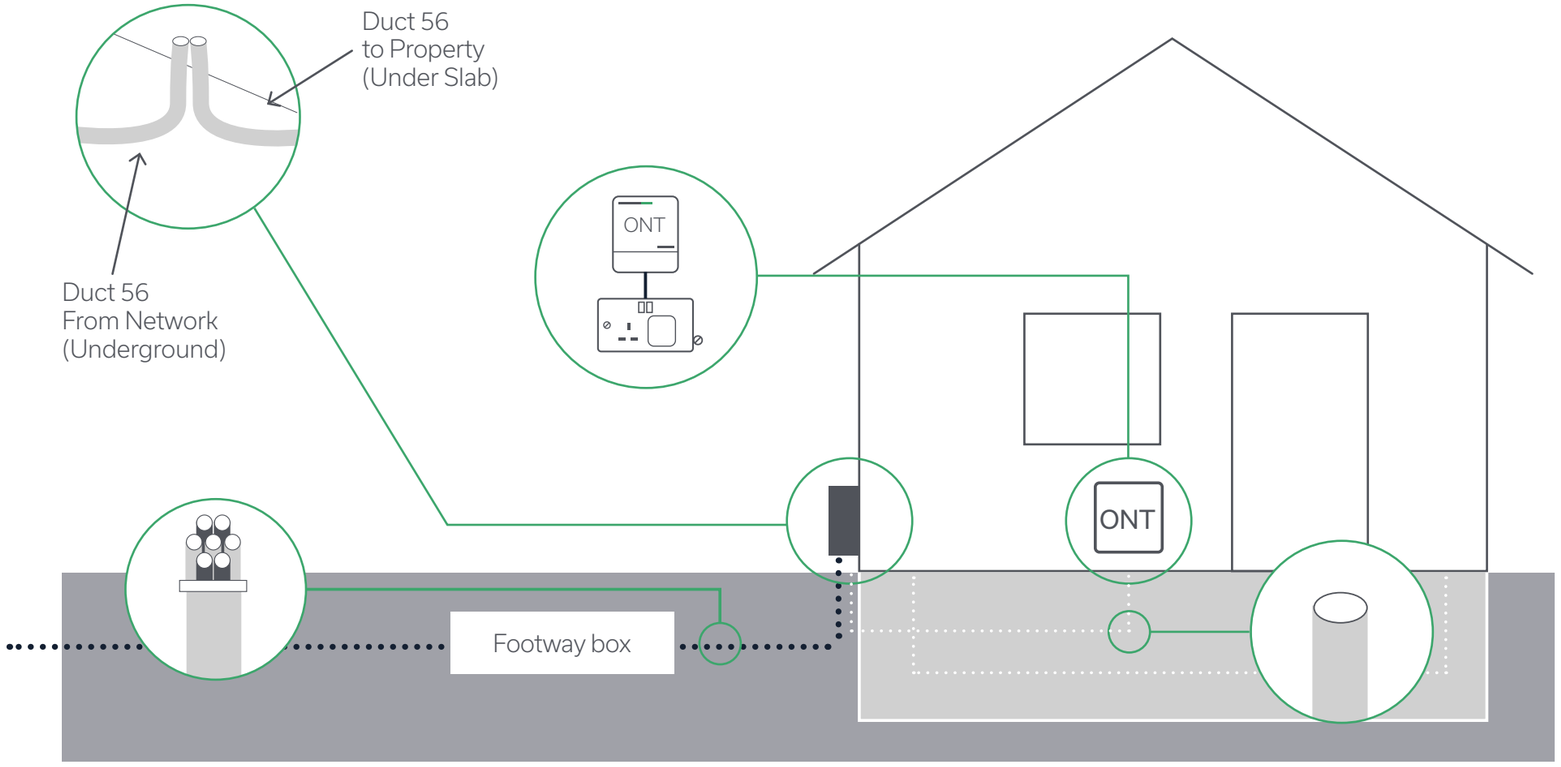
This is due to the risk of gas passing from the underground network directly into the house. Instead, Openreach will only support internal duct feeds where there is a separate duct section from the underground jointing chamber to the exterior of the house and then a secondary separate duct which feeds under and then inside the house.

The two duct mouths on the external house should be located as close to each other as practically possible. Currently, Openreach does not have a double duct capping and cover solution, but we are trialling some designs with industry.

The only current solution is to provide two separate capping and covers side-by-side. Depending on the distance between the two cappings the fibre cable will be partly exposed on the outside wall of the house.

We are working closely with industry in regards to Modular and Passive Homes to ensure our installation methods comply with the building standards and methods being employed. If you are building houses of this type then we will develop a solution as part of the site design if our standard installation methods are not suitable.

Any internal duct feed must be sealed by Openreach to prevent gas or water ingress. The required Duct Seal Silicone 1A will be provided by your Openreach FBC.



Fibre cable & kit installation
- MDU

Multiple Dwelling Units (MDU)

Openreach will create a fibre layout based on your Mechanical & Electrical (M&E) drawings (on larger MDUs) of the MDU. The design will calculate the materials required to build the network. Your FBC is on hand to guide you through the ordering process to make sure the equipment is available when you need it.

The incoming Duct 54 and fibre cable will terminate in the communications intake room or riser cupboard. This needs to be a secure and safe location with access for installation and any future maintenance visits.

Our fibre box/splitter needs to be installed at a minimum height of 200mm and a maximum of 1500mm. Your FBC will agree the location with you.

Connectorised internal fibre cable needs to be run from each plot to the fibre DP location or basement box, depending on MDU layout. A minimum of 3m of coiled cable needs to be left at the fibre DP, with 1m left at the plot end.

On most MDUs a tail cable may be required to be run from the floor DP down the riser to the basement box. A wayleave may be required from the building owner prior to installing apparatus in common areas.

Any internal duct feed must be sealed by Openreach to prevent gas or water ingress. The required Duct Seal Silicone 1A will be provided by your Openreach FBC.

Openreach fibre equipment must be installed in a secure and accessible internal location suitable for installation and future maintenance. The Fibre Distribution Point (UFS) must be positioned within agreed height limits and with sufficient clearance to allow safe installation and cable management. Containment must be provided for internal fibre cables, with slack managed appropriately within the containment above the unit to support safe installation and future maintenance. Final equipment positioning will be agreed on site with the Openreach Field Based Co-ordinator (FBC).

First fix work

- Fit all external duct from the site connection point to the building entry position.
- Fit all tray work from the building entry position to and up the risers to the internal splitter position(s).
- Run the fibre cable from the splitter or fibre node/budi location to (and in) the riser to the communications room.
- Ensuring bend radius of cable must meet all necessary installation requirements i.e. no 90 degree bends
- If the risers are away from the point of entry but fed through a vented car park then the external cable can be fed on tray work.
- If the risers are away from point of entry and fed through a non-vented car park then an area needs to be allowed within 2m of point of entry to change from external to internal cable.

Next Steps

- Once ductwork and cable has been run from communications room to Fibre DP/budi – contact FBC to gain confirmation that all cables are run correctly
- FBC will then raise a job with the Openreach Internal teams to commission the splitter(s).
- Once commissioning is complete contact FBC as each plot is ready for connection (front door on, power on, ONT location is decorated).
- FBC will then raise a job with the Openreach internal teams to commission the plot(s).

Fibre cable & kit installation
- MDU

Each apartment will require a designated connectorised internal fibre cable run in a continuous fault-free condition from the designated ONT location within the apartment to the floor DP within the riser.

At the splitter locations the cable should be clearly marked with the apartment number and left safely coiled within the riser.

In each apartment Install a flush mounted single back box at the desired ONT location.

Install the connectorised fibre cable from this point to the designated riser termination point.

Ensure there is 1m of spare connectorised fibre cable protruding from the back box.

Push some of the spare cable back into the wall void and coil the remainder inside the back box, taking care not to damage the connectorised end.

Install blanking plate or brushed face plate to protect cable ready for provision of ONT nearby.

Bends in fibre cable must be kept to a minimum and the installation of trunking, cable trays/grids must not compromise the bending radii.

Fibre cable containing no metal parts can be run on shared trays. Plate cable fixings with cable ties must be used to fix fibre cable direct to walls to avoid it being damaged.

Under no circumstances should cable or tubing be secured to or supported by the suspended ceiling hangers or under floor support legs. It is the developer's responsibility to provide fire stopping on completion of the cable/tubing installation.

Openreach networks must not interfere with or be interfered with by other services within the riser or any other shared space, such as:

- Un-insulated hot water pipes.
- Unscreened mains cables.
- Fluorescent lighting.
- Heavy duty switch gear.

A wayleave may be required from the building owner prior to installing apparatus in common areas. Remember you may need to order copper lines for commercial properties, for example lift lines.

Fixing cables securely

If you're running any cables through a fire protected area like a fire escape route, escape staircase or walkway, the cable must be adequately secured using non-combustible fixings.

Wiring regulations must be followed, ensuring that wiring systems in escape routes are supported in such a way that they will not be liable to premature collapse in the event of fire.

This applies to all cabling and not just electrical cables e.g. alarm, telecoms and control wiring. This applied from January 2019 throughout the installation as the 18th Edition wiring regulations came into force.

Fire stopping compartment penetrations

All holes drilled through floors and fire compartment walls must be fireproofed using correct materials to prevent the spread of smoke in the event of a fire. Openreach can provide these materials in either cartridge (similar to silicone sealant) or putty form.

DNO Meter Cupboards

No Openreach equipment should be installed in an electrical meter cupboard that is classed as "hands only" or "limited access".

Openreach internal fibre cable for ONTs should also never be positioned in a location where power cables are terminated, unless all the following rules are satisfied:

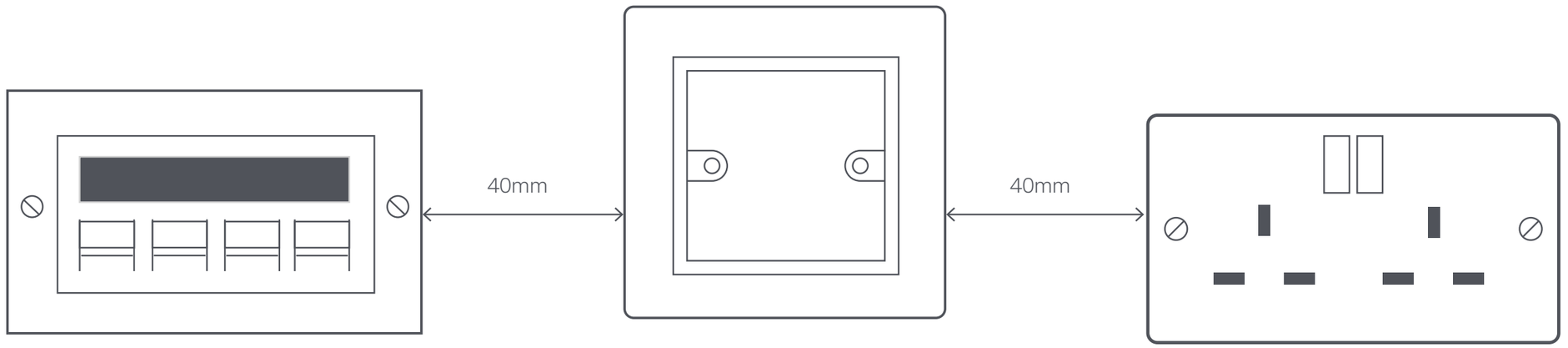
- There is no alternative safer location available to terminate the Openreach cable.
- The termination point is installed at the furthest point available, away from DNO power termination.
- The termination point is installed at a minimum distance of 100mm separation from the DNO power termination.
- The Openreach distribution point must be installed in a location that is safe and accessible for any Openreach follow-on tasks to be completed.

Fibre cable & kit installation
- MDU

Providing power for the ONT

A power socket must be provided at the ONT install point to provide power to the ONT. Positioning for this socket can be seen below.

Openreach recommends a double power socket to be installed to allow the homeowner to plug in their communication provider router if required.



Your FBC will advise of all cable marking/labelling and will check for this when 'calling off' the work.

IET wiring regulations must be followed.

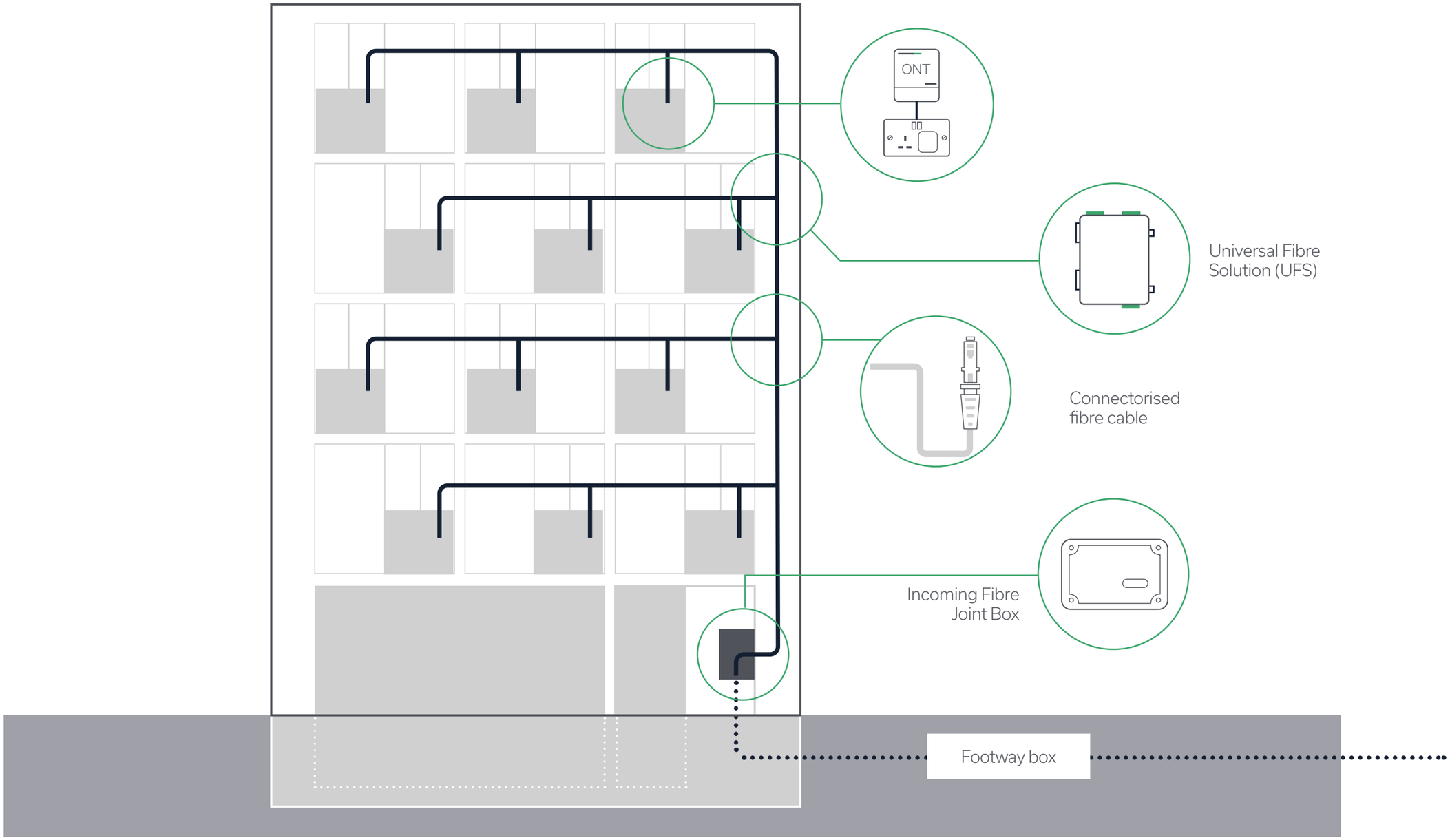
External cables can run to a maximum of 2m from the internal building entry point.

From this point onwards, all external cables must be terminated or transitioned to internal fibre cables to comply with Fire Safety Regulation BS7671.

Conduit or trunking must not be used to carry external fibre cables beyond 2 metres from the building entry point. Your FBC can provide more guidance if needed.

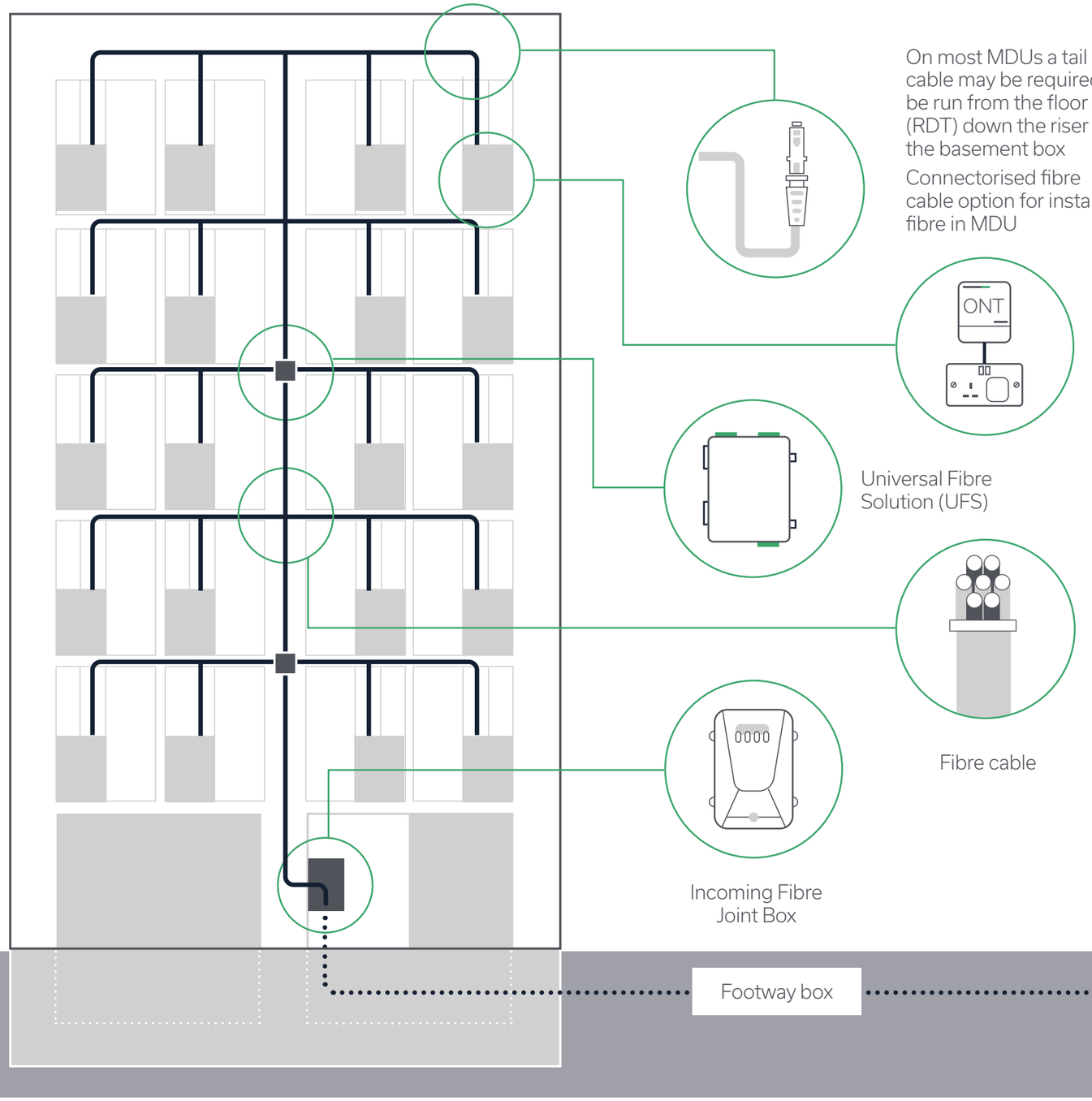
Internal fibre cable must not be bent beyond its minimum radius. If it has been damaged or there is evidence of kinking it shall be discarded. Your FBC will advise on replacement of the cable. Care should be taken to avoid stretching cable/tubes through installation. If cables are damaged this way you will be required to replace them.

Fibre cable & kit installation
- MDU



Fibre cable & kit installation
- MDU

Large MDUs



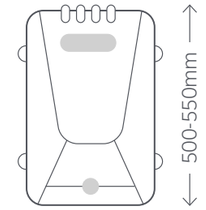
On most MDUs a tail cable may be required to be run from the floor DP (RDT) down the riser to the basement box

Connectorised fibre cable option for installing fibre in MDU

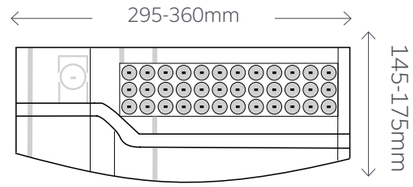
Universal Fibre Solution (UFS)

Fibre cable

Incoming Fibre Joint Box



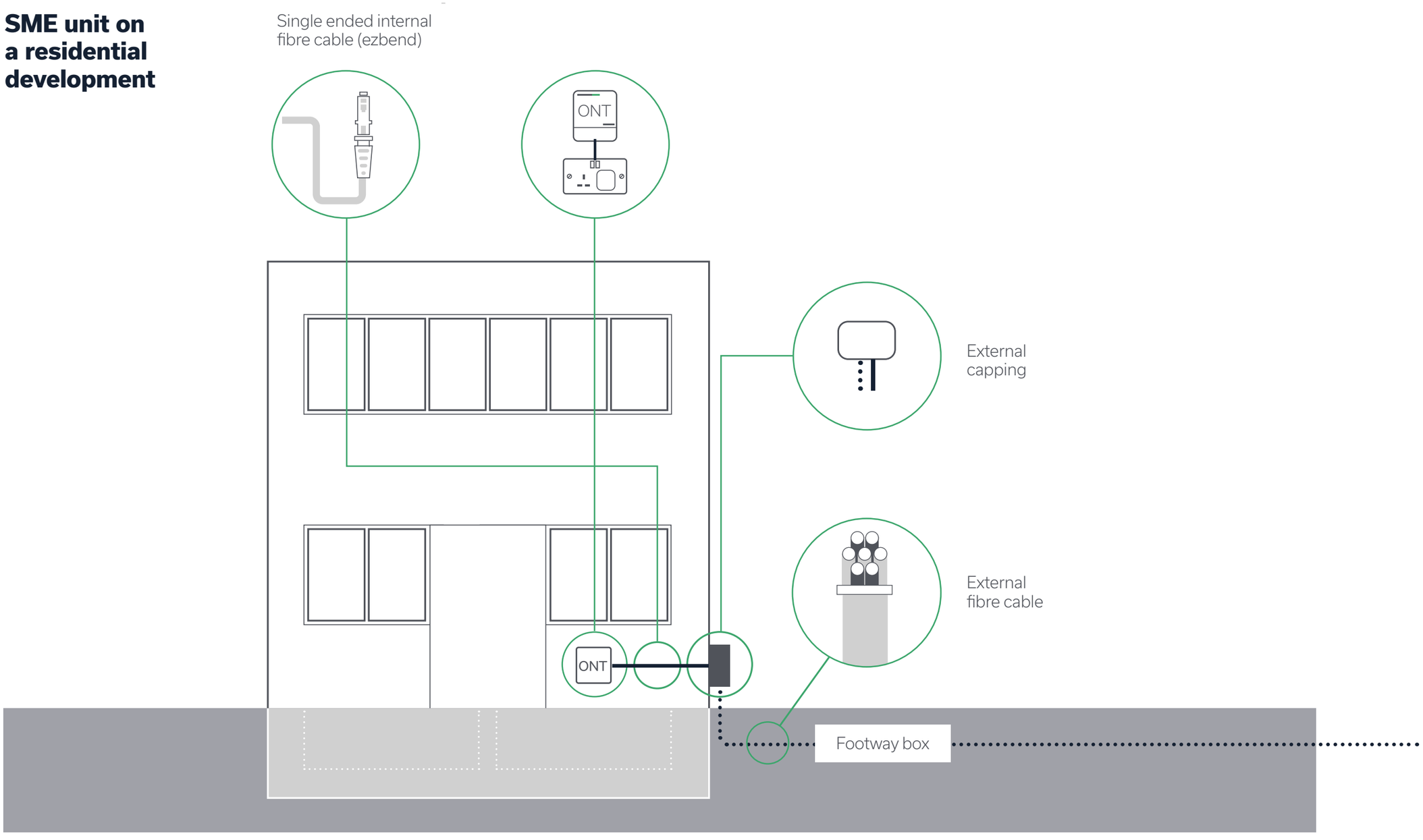
For larger MDUs there may be a requirement to install multiple fibre boxes and splitters.



These boxes/splitters will be connected with fibre cable commonly housed within the riser space.

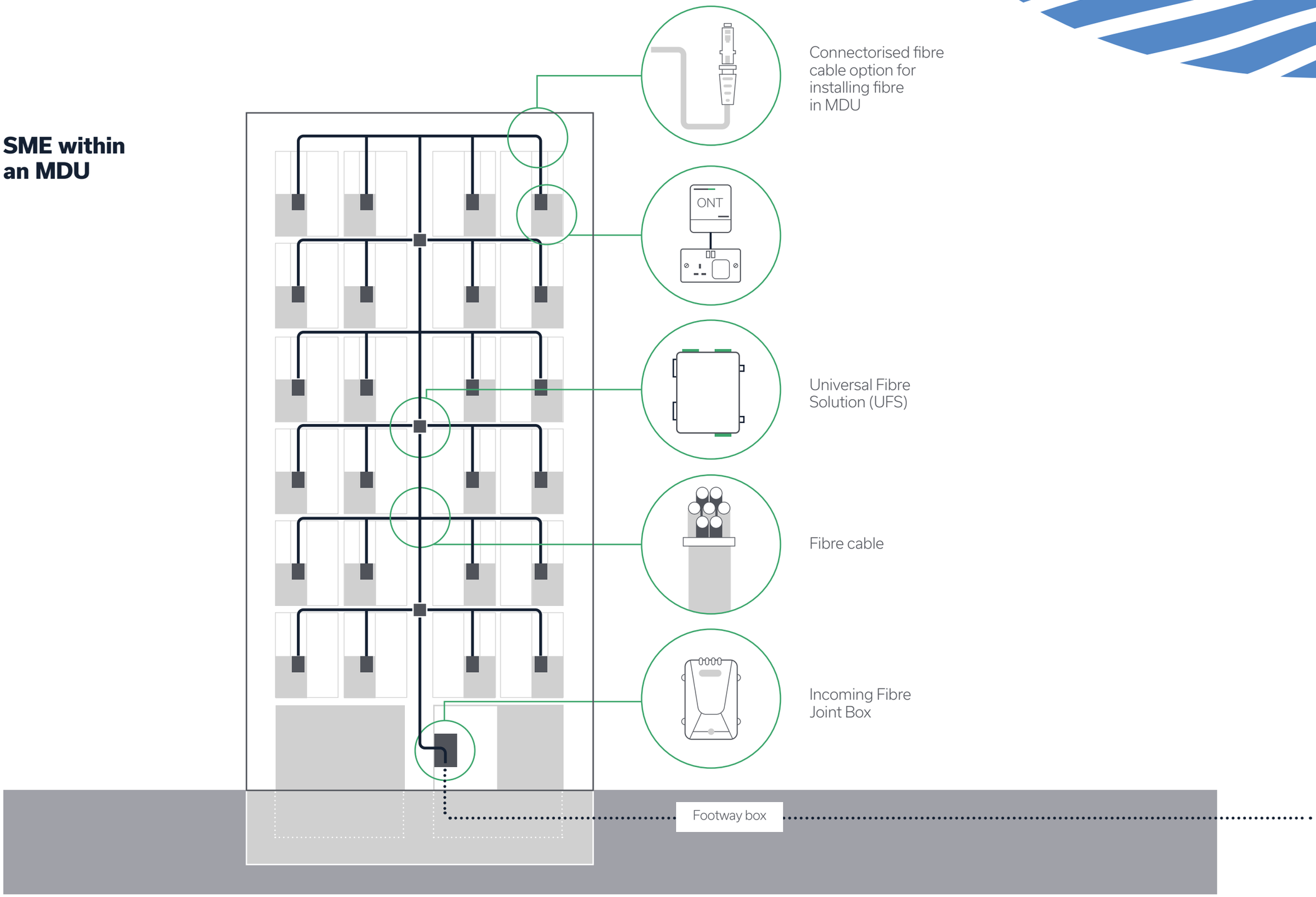
Additional commercial units

SME unit on a residential development



Additional commercial units

SME within an MDU



Connectorised fibre cable option for installing fibre in MDU

Universal Fibre Solution (UFS)

Fibre cable

Incoming Fibre Joint Box

Openreach ONT

The ONT is the Openreach demarcation point. It replaces the traditional copper master socket. End users will connect the router provided by their communications provider to the ONT to enable internet service.

Openreach currently uses two models of ONT for new build installations. They are functionally identical have minimal size differences. ONTs are installed in a low impact shroud connected to the back box where the internal fibre cable is located.

Typical ONT dimensions (as viewed from front face)

Height	108.8mm
Width	109.9mm
Depth	32mm
Weight	TBC
Screw hole distance	60mm

Please note

The Openreach ONT no longer contains an Analogue Telephone Adapter (ATA) which converts digital signal into traditional telephony dial tone. Telephony over fibre is now the responsibility of the communication provider, and the homeowner may need to plug their telephone into the communication provider's router.

Homeowners should speak to their chosen service provider about the specifics of voice over fibre when ordering their broadband service

Home wiring

With the shift to full fibre networks, traditional analogue voice services are being phased out. A full fibre network transmits a digital or All IP signal rather than analogue.

In addition, the latest Openreach ONT variants no longer come with an integrated ATA (Analogue Telephone Adaptor). Some CPs may provide an ATA port on their router, but this is dependent on the individual CP and therefore Openreach cannot guarantee the availability. Therefore, we strongly recommend against installing traditional analogue voice cabling and extension sockets around your new build.

Instead, Openreach highly recommends substituting with data cabling via CAT6 cable. This gives the future homeowner the flexibility to use the extension for data or, by using their own customer procured ATA, traditional voice services.

It's worth noting that most CPs are recommending their customers use VOIP (Voice Over IP) equipment for voice calls rather than ATA's to convert the FTTP IP signal to analogue. Homeowners can contact their CPs to find out more about the options for voice services.

Homeowners will connect their communication provider router to the Openreach ONT to enable their internet service. If the ONT is located in an under-stair or service cupboard this can potentially restrict the Wi-Fi coverage and performance of the router.

Suggested internal wiring options are shown on the next pages.

Please note

All internal wires and sockets beyond the ONT are the responsibility of the developer/homeowner.

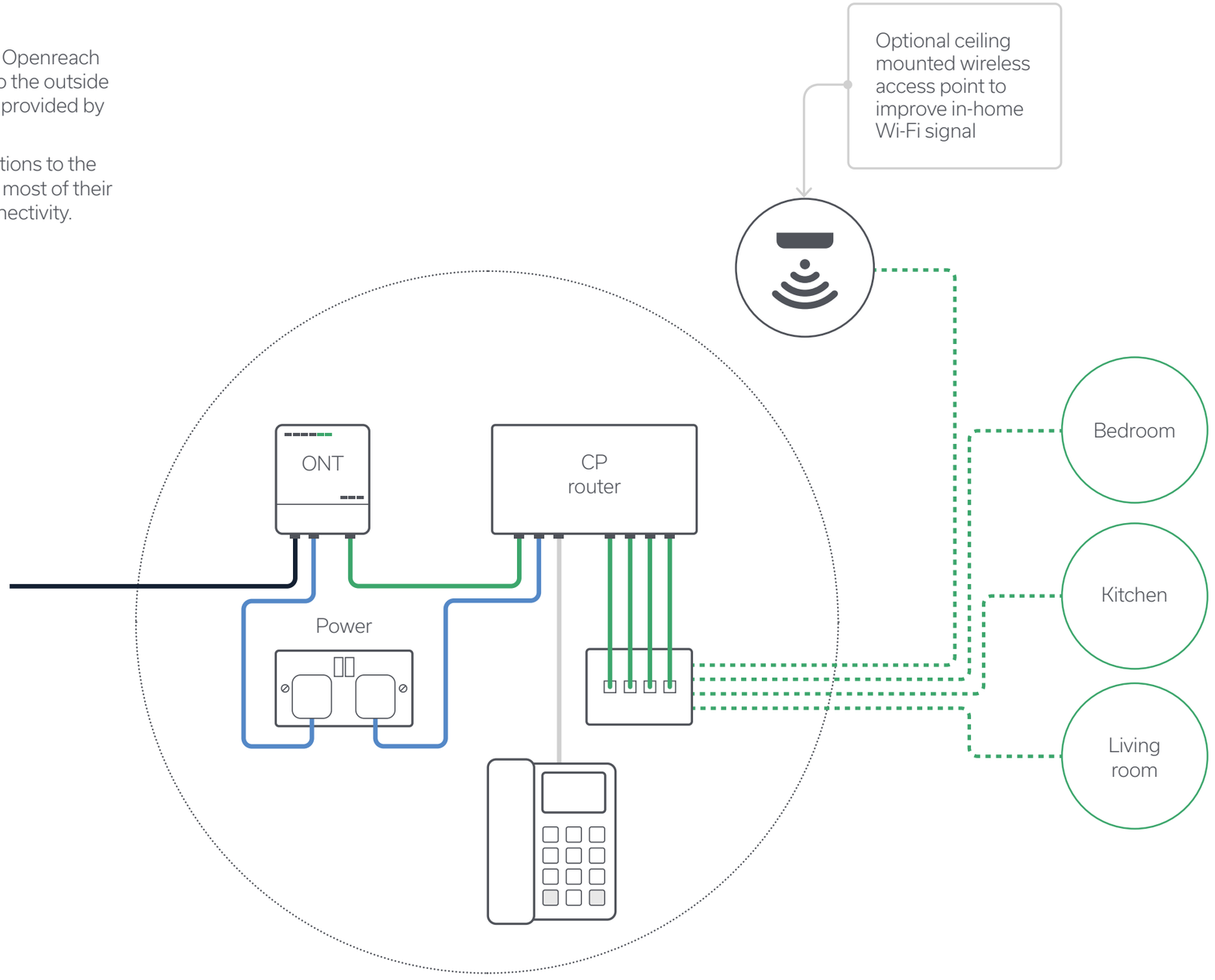
For information, advice and guidance around positioning, please refer to PAS: 2016 Next Generation Access for New Build Homes guide.

Home wiring

Option 1 – The simple install

The simplest installation involves the provision of the Openreach equipment (i.e. the ONT will be positioned adjacent to the outside wall) to which the customer then attaches the router, provided by their communications provider (CP).

This installation limits the number of physical connections to the router and means the homeowner may not make the most of their FTTP connection due to the reliance on wireless connectivity.



Key

- Visible ethernet cable
- Single ended internal fibre cable (ezbend)
- Voice cable
- Power cable
- Behind wall ethernet cable

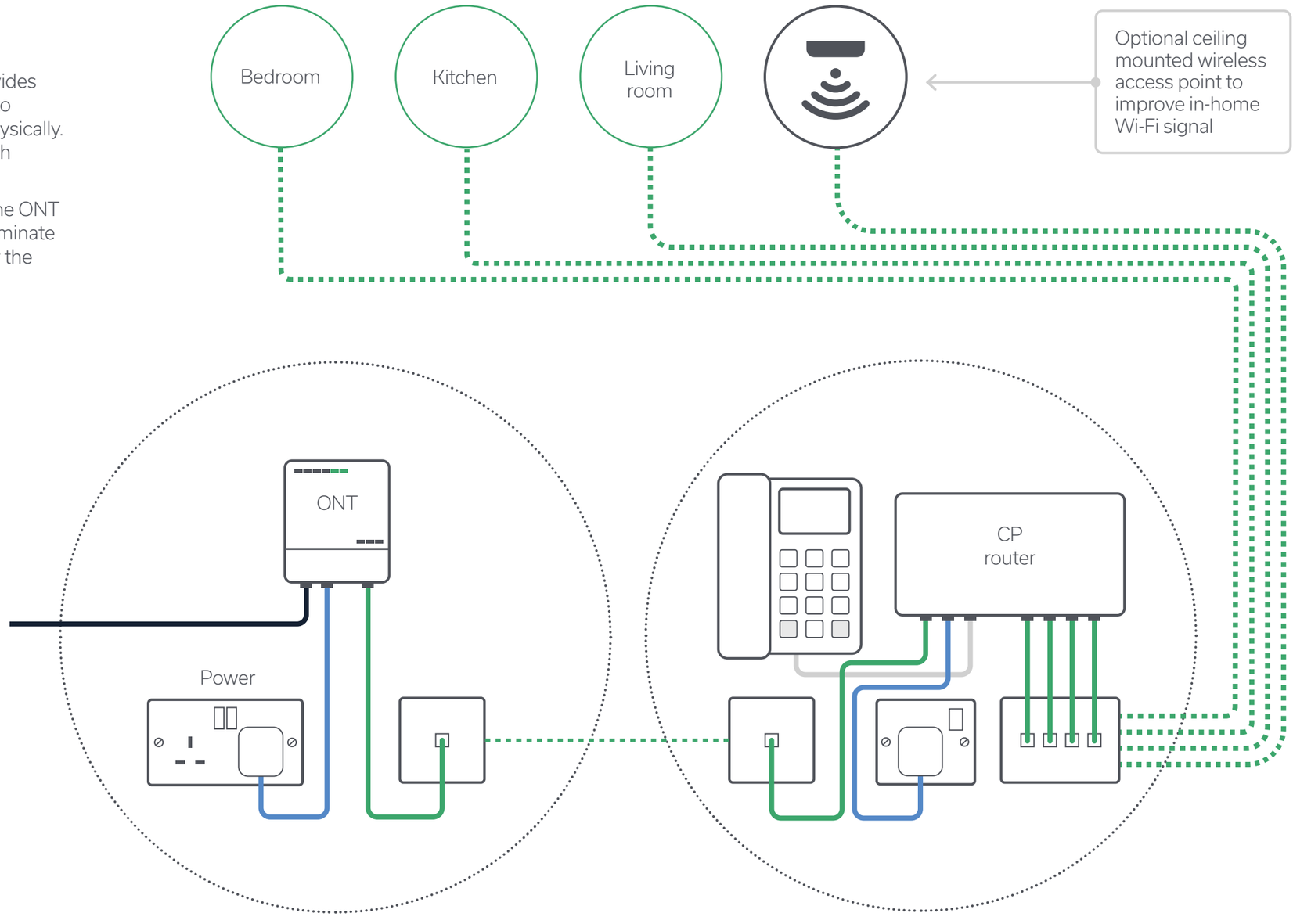
ONT Optical Network Termination

Home wiring

Option 2
Relocating the router via internal network cabling

Relocating the communications provider (CP) router provides a better quality wireless connection, as well as the ability to connect static devices such as TVs or games consoles physically. This allows these devices to take full advantage of the high speeds and bandwidth of a Full Fibre connection.

Additional Cat6* cabling is required for this option from the ONT to the chosen relocation area. This connection should terminate in an RJ45 socket. A power socket should be provided for the CP router next to this socket



Key

- Visible ethernet cable
- Single ended internal fibre cable (ezbend)
- Voice cable
- Power cable
- Behind wall ethernet cable

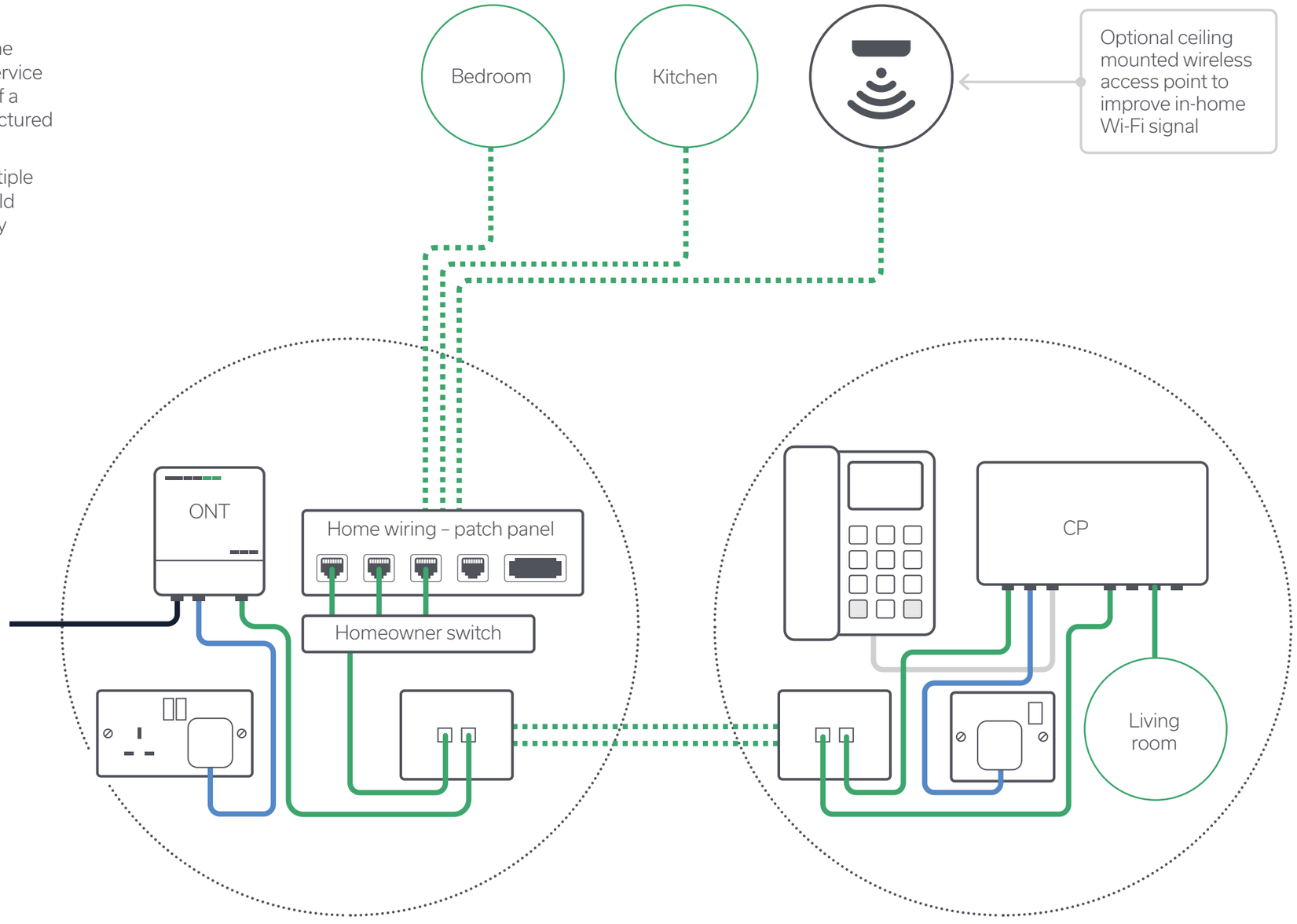
ONT Optical Network Termination

Home wiring

Option 3
The networked home

Further to the second option, this setup cables back from the CP router position within the property to the under stairs/service cupboard position of the Openreach ONT for the location of a patch panel. This means that, as much as possible, any structured cabling is discreetly located out of sight.

A patch panel is the best option to intelligently connect multiple rooms with structured cabling. In this setup a customer could also install an ethernet bridge/switch to further create a truly networked home.



Key

- Visible ethernet cable
- Single ended internal fibre cable (ezbend)
- Voice cable
- Power cable
- Behind wall ethernet cable

ONT Optical Network Termination

Physical Infrasture Access (PIA)

PIA allows non-Openreach network providers to share Openreach's network infrastructure, which on Full Fibre new sites consists mainly of ducts and chamber boxes. PIA can also be used to share telegraph poles as well as underground infrastructure.

Non-Openreach network providers will have to be invited onto site by you as a developer to be a part of a PIA delivery, Openreach is unable to provide this initial contact. If you have a non-Openreach network provider interested in a PIA product, inform your Openreach FBC and they will guide you through the following steps.

An initial site meeting between you the developer, your Openreach FBC and the non-Openreach network provider will be completed to discuss the PIA proposal.

Your FBC will share the required quality standards with you the developer and the non-Openreach network provider.

Your FBC will perform a series of checks to ensure the non-Openreach network provider has various requirements in place to allow the PIA product to be legally used.

Your FBC will confirm when the duct and chamber box work has been completed to allow the non-Openreach network provider to install their equipment.

Physical Infrasture Access (PIA)

PIA Scope

Your FBC can answer any questions about PIA on new sites.
Enquiries can also be submitted by contacting:

0800 328 7196

or

pia.enquiries@openreach.co.uk

Acceptable uses of PIA:

- Install multiple cables, Blown Fibre Tubing (BFT) and/or sub duct into Openreach's duct and jointing chambers
- Attach equipment and cables on Openreach poles.
- Use duct entries up to and into buildings, e.g., to a riser cupboard is permitted but any entries other than a ducted entry, for example a hole drilled in a wall are not permitted.

PIA does not allow:

- Use of Openreach's infrastructure within a building
- Openreach to use a CP's duct in the public highway

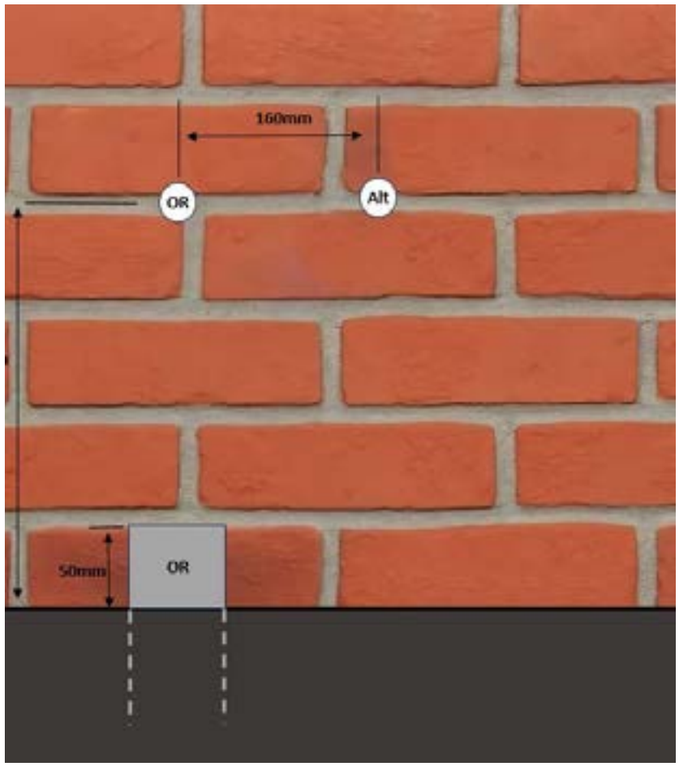
Physical Infrasture Access (PIA)

On site build
External presentation

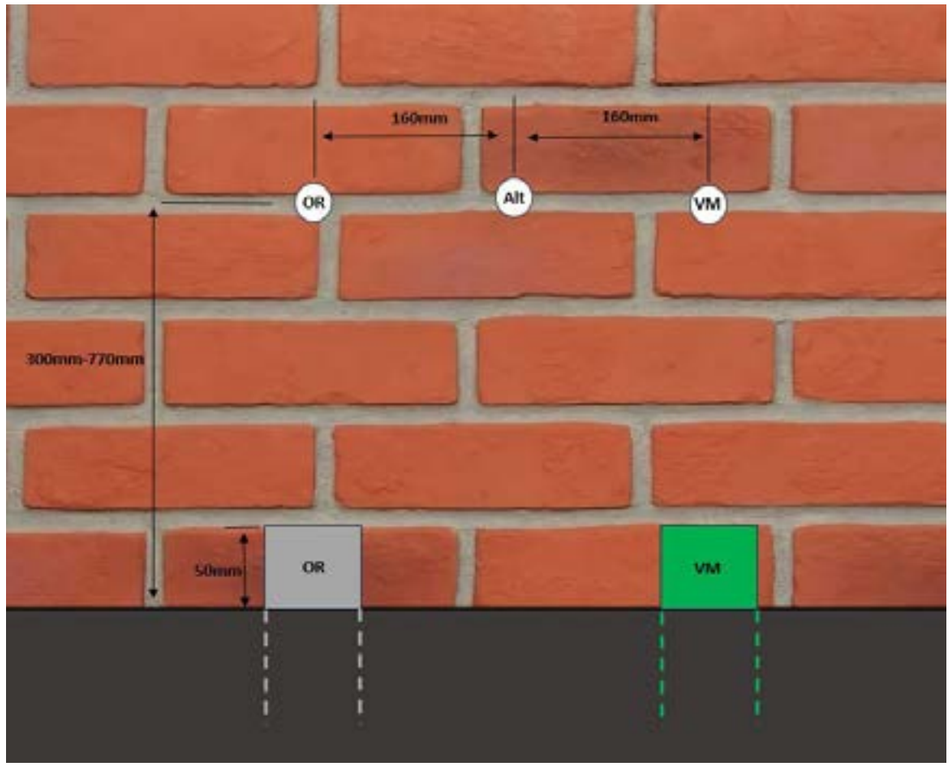
PIA CP must install apparatus in accordance with Openreach's engineering principles. These are the same standards and practices that apply to Openreach's Direct Labour (DL) and its partners. An FBC who is onsite at the same time as the CP's build team may point out quality issues, for example, that a joint should be supported.

To minimise the likelihood of damage to Openreach's CSP when a CP installs its own CSP, the layouts shown in the diagrams below must be followed. Although these diagrams are recommended for PIA setups, Openreach are not responsible for the quality of install of any non-Openreach equipment

Single Altnet

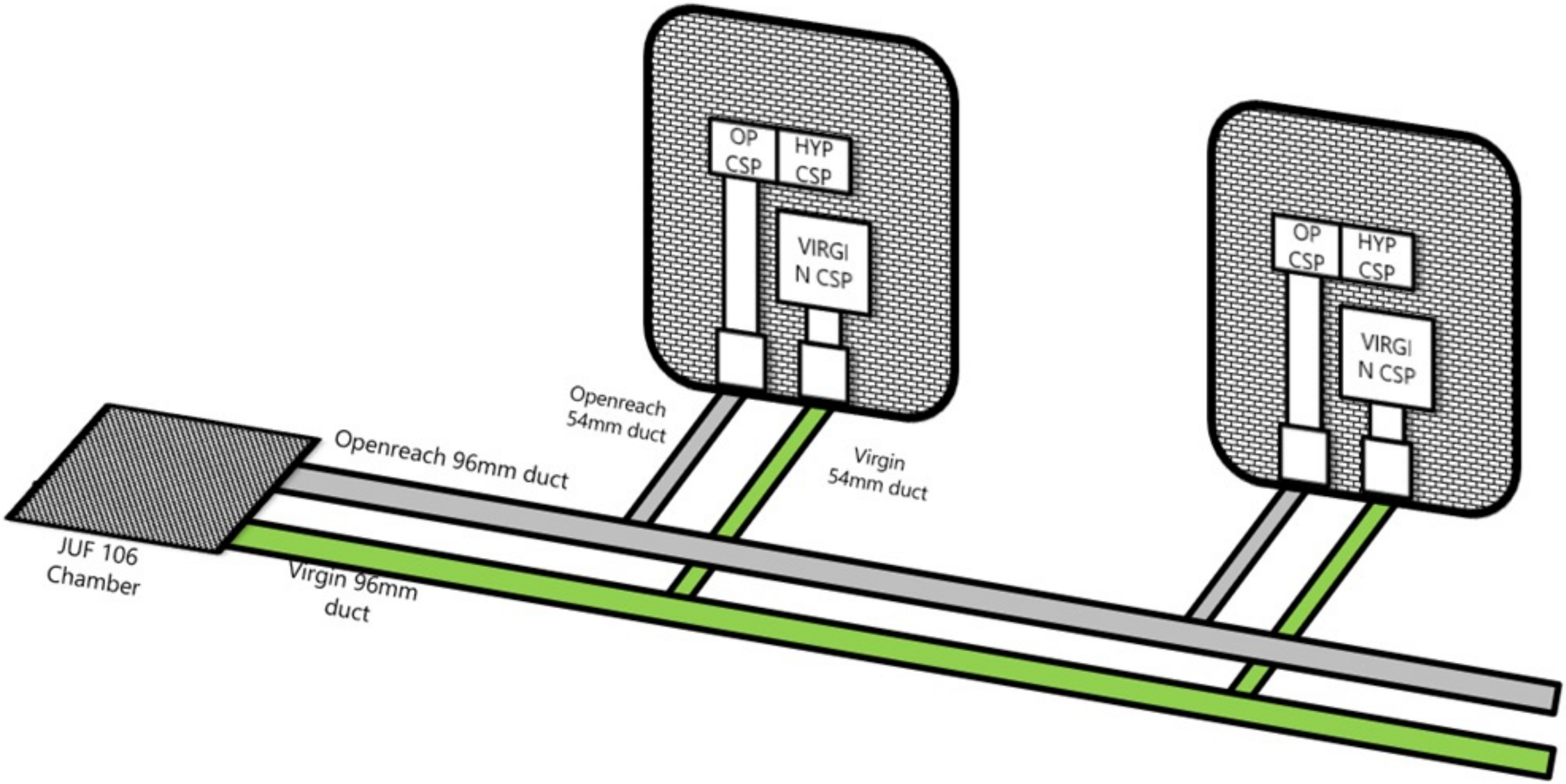


Tri Party



Physical Infrasture Access (PIA)

On site build



Physical Infrasture Access (PIA)

On site build
Suggested modular box duct positions

Virgin Duct in third ring from base

Openreach duct in second ring from base

Physical Infrasture Access (PIA)

Completed examples

Quality control checklist

To help make sure your site network is built to a high-quality standard, we've produced a checklist for each phase of the build. Your FBC will complete an online version of this checklist at each stage, this list can be used as a reference.

Any subsequent changes to the site plan after stages have been signed off must be communicated and agreed with your FBC as soon as possible.

Any re-work because of an out-of-date site plan could cause delivery delay and incur you costs in time related charges.

Item being audited	Category
Base has been cast correctly.	Joint Box
Reinforced base cast correctly for Joint Box Carriageway JBC (N).	Joint Box
Bearers and brackets fitted. Steps fitted where appropriate.	Joint Box
Bolts fitted and positioned correctly during construction of boxes.	Joint Box
Joint Box constructed to correct dimensions and installed at the correct depth. Any deviations to plan recorded and signed off.	Joint Box
All concrete/brickwork carried out as per developer 'How to' guide specification.	Joint Box
Cement and brick types used as specified or exceptions agreed and documented.	Joint Box
Frames and covers bedded and correctly installed (if unmade surface, Joint Box frame secured).	Joint Box
Joint Box constructed as planned, positioned correctly and conforms to drawings. Alternatives agreed and documented.	Joint Box
Modular box installed and prepared as per instructions.	Joint Box
Ducts properly trimmed and keyed when set in walls.	Joint Box
External cable/Blown Fibre Tubing (BFT) protected and sealed in Joint Box.	Joint Box
Fibre cable and draw rope provided in sound condition and correctly jointed where applicable.	Duct
Cable/BFT left in planned location.	Duct
Correct rope/cables/tubing installed as per developer 'How to' guide.	Duct
Correct type of duct provided and used.	Duct
Duct laid in required position, at correct depth and installed in the correct position in the Joint Box.	Duct
Duct properly trimmed and keyed when set in walls.	Duct
Duct separation distance maintained, or exception agreement obtained and documented.	Duct
Ducts laid at minimum depth (250mm), or exceptions agreed and documented. (To be viewed in footway where possible, if not check via Joint Box).	Duct
Joint Box constructed as planned, positioned correctly and conforms to drawings. Alternatives agreed and documented.	Duct
Temporary duct seals fitted to agreed standard.	Duct
Ducts positioned correctly on external walls and in line with the cable entry point.	Duct
Ducts positioned in line with the cable entry point.	Plot
Customer cable entries correctly positioned and provided.	Plot
External cable/BFT protected and sealed.	Plot
Duct seal Plug 1A fitted.	Plot
Back box installed at entry point.	Plot
Back box fitted at a usable depth, within close proximity to a double 240v outlet for FTTP services.	Plot
Location of unit entry point suitable for FTTP equipment.	Plot
The property has been designed to accommodate voice and data wiring i n a convenient place for home owners to use FTTP services.	Plot
A permanent 240 volt supply is required for FTTP. Developer has been informed that no orders can be made or taken via a communications provider until all installation works of Openreach equipment into each plot has been completed and tested.	Plot
Voice and data cabling provided and terminated correctly for FTTP services.	Plot
If FTTP self install development ONT, all leads connected correctly and plot commissioned.	Plot
If self install not completed and Openreach completes all internal work then SOD payment for self install is not applied.	Plot
All tubes or cables presented as per schematic diagram and capped.	Multi dwelling unit
Designated track ways/trays supports in good working order with separations maintained.	Multi dwelling unit
Connectorised fibre cable installed as per schematic in accordance with manufacturer's specifications and IET wiring regulations. Cable labelled and coiled safely within riser.	Multi dwelling unit
Connectorised fibre cable installed with 1m of spare length protruding from the back box to enable jointing.	Multi dwelling unit
Back box fitted in each unit at a usable depth, within close proximity to a double 240v outlet for FTTP connectivity.	Multi dwelling unit
Location of unit entry suitable for FTTP equipment.	Multi dwelling unit
If FTTP self install development ONT, all leads connected correctly and plot commissioned.	Multi dwelling unit
If self install but Openreach completed all internal work then SOD payment for self install is not applied.	Multi dwelling unit

Calling off plots
Best practice

- Call off plots singularly when completed – **do not** "group" plots as this could delay equipment installation in footpath boxes, delaying connection & resident occupation
- Unlike other utilities Openreach don't charge for engineering visits to connect plots
- We will cable plots to suit completion/occupation dates; lead-times are 15 working days as agreed at initial site meeting documentation, see below.

9	**I am aware that it is crucial that Openreach require 15 working days' notice to complete and commission the plot installations before building inspection/handover date, whichever is earlier.** **Splitter boxes must also be completed at least 4 weeks before any inspection date and verified with the FBC. Failure to do this can lead to significant delays in providing service to the customer**	

- Completion of footpath box, ducting and roping are crucial for successful plot call-off
- The FBC will identify any ducting or road crossings that are essential for equipment installation and subsequent plot connection
- Keep the Openreach Field Based Co-Ordinator (FBC) updated on plot progression and occupation dates
- If you share your occupation schedule this doesn't dictated the call-off date with Openreach, ducting etc has to be in place before call-off can be accepted

Site actions

Required for plot call-off

These must be in place and correct before plot call-off

Box built to quality standards?

Ducting installed & roped?

The fibre easi bend cable to be left coiled outside the plot aligned to the duct end, and to be fed into the plot to where the preferred ONT location will be. We cannot call off the plot if the cable is damaged.

Plot has permanent power?

As well as the plot provided with power, we require a dedicated electrical socket for the ONT.

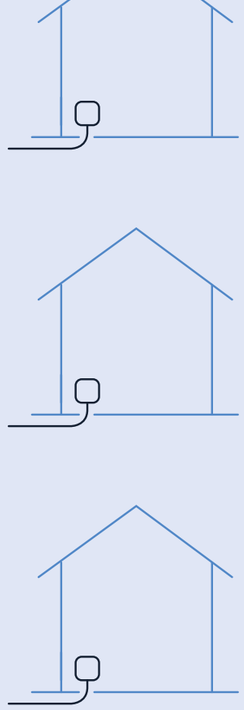
If Alt Nets are also onsite, they will need a separate dedicated socket.

15 working day lead time

Contact FBC and request plot call-off

FBC agrees plot call-off, engineers attend site

Council of Mortgage Lenders (CML)



Calling off plots
What needs to be in place

Prior to any plot being considered by Openreach for call off these must be in place

- Cable from utility cupboard to the front of the house, usually installed by the electrician
- Permanent metered power available for ONT installation.
- Ducting from house front to footpath box, finished to the required quality standard with duct cut to correct level, directly beneath the service hole and complete with rope from plot to footpath box
- Footpath box is complete to standard as specified in the Developer handbook:

  https://www.openreach.com/content/dam/openreach/openreach-dam-files/new-dam-(not-in-use-yet)/documents/help-support/New-Sites-Fibre-Handbook-August-2024-online.pdf
- Once these are in place and the site team have contacted the Openreach Field Based Co-Ordinator (FBC) the FBC will visit site and agree the plot(s) is correct for plot progression

Minimum **3m**
coiled externally

Health and safety advice

This guidance is a practical aid for designers and site workers on what to eliminate, avoid and consider when working on the Openreach network on your site.

The advice is not exhaustive so speak to your Field Based Co-Ordinator (FBC) if you need further information.

Red lists

Hazardous procedures, products and processes that should be eliminated from the project where possible

Distribution point (DP) location

- Placing DPs into voids or other enclosed spaces with inadequate ventilation.
- Placing DPs adjacent to, or above, any fragile surface.
- Placing DPs directly above, or adjacent to, water features/courses etc.
- Locating DP at greater than 1.5 meters above finished floor level (without fixed access system incorporated into design).

Power systems

- Ensure all power installation meets relevant standards, and where DC supplies are planned seek further advice about requirements for earthing of racks, power supply ratings etc. to take account of future needs and growth.

Cabling routes and lead-ins

- Routing of cables where the cables are above head height within false ceiling systems without
  a proper access system incorporated.
- Routing of cables external to building requiring specialist access methods (scaffold, mobile elevating work platform etc.)
- No internal ducting laid into single dwelling units (SDUs).

Aerial and antenna transmission/ receiver systems

- Not mounted on building walls or other difficult to reach areas of a building.
- Design of roof mounted services that require access (for maintenance and so on), without provision for safe access (such as barriers) in particular access for aerials/antennas systems.

Amber lists

Products, processes and procedures to be eliminated or reduced as far as possible and only specified or allowed if unavoidable. Including amber items would always lead to the provision of information to the principal contract or contractor where only one contractor has been appointed.

Distribution point (DP) location

- DPs located into voids or enclosed spaces provided with ventilation systems built in.

Aerial and antenna transmission/ receiver systems

- EMF exclusion zones adequately managed with fixed barriers or partitioning systems.

Cabling routes and lead-ins

- Routing of cables where the cables are above head height within false ceiling systems.
- Routing of cables internally where access points require use of access equipment (ladders, step-ladders or platform steps) to allow for pulling in of cables.

Green lists

Products, processes and procedures to be positively encouraged.

- **Adequate access for vehicles** to minimise reversing requirements (one-way systems and turning radii) in particular if specialist vehicles will need access (pole erection units, MEWP vehicles etc.).
- **Provision of adequate access and headroom** for maintenance in communications rooms, and adequate provision for replacing heavy components.
- **Thoughtful location of mechanical and electrical equipment**, such as telecoms equipment, termination points, Wi-Fi transceivers etc. and so on to facilitate access, and placed away from crowded areas.
- **Lighting within communications rooms** adequate for fine tasks (fibre splicing, small diameter copper wire terminations etc.)
- **Provision of adequate air handling**/ conditioning and ventilation for the installed equipment base within the communications room (and people having to access and work within the area).
- **Early installation of permanent** means of access, and prefabricated access systems with hand rails.
- **Provision of edge protection** at permanent works where there is a foreseeable risk of falls after handover (consider radio antenna or aerials installations on roof spaces).
- **Encourage the use of engineering controls** to minimise the use of personal protective equipment.

Abbreviations and acronyms

BSI	British Standards Institute
BT	British Telecommunications
CLI	Customer Lead In
CP	Communications Provider
DP	Distribution Point
FDP	Fibre Distribution Point
FTTP	Fibre to the Premises
FBC	Field Based Coordinator (formally New Site Representative)
HDPE	High-Density Polyethylene
IET	Institute of Engineering and Technology
JBC (N)	Joint Box Carriageway New Sites
JBF	Joint Box Footway
LSZH	Low Smoke Zero Halogen
MDU	Multiple dwelling unit

MJF	Product code designation for the Cubis Industries – StakkaBox/Quadbox
M&E	Mechanical & Electrical
NJUG	National Joint Utilities Group
NTE	Network Terminating Equipment
NTP	Network Terminating Point
ONT	Optical Network Termination
PAS	Publically Available Specification
PE	Polyethylene
PVC	Polyvinyl Chloride
RFH	Reduced Fire Hazard
SID	Manufacturers three letter identification
SDU	Single dwelling units
SOD	Service on Demand
UG	Under Ground

Available Build Materials

Speak to your FBC to order materials on this list required for site build

DUCT 54 (90mm) 6m length
(order in metres)
Code: 100268

DUCT 54 (90mm) 1.5m length
(order in metres)
Code: 095070

DUCT 56 (50mm) 3m length
(order in metres)
Code: 100271

FRAME AND
COVER 104C
Code: 075875

FRAME AND
COVER 106C
Code: 075877

BOLTS FOUNDATION
No 2
Code: 070131

Cover for
JBC3N
Code: 015667

BEND DUCT 54A
(90mm)
Code: 094937

BEND DUCT 54B
(90mm)
Code: 095065

BEND DUCT 54C
(90mm)
Code: 095265

CABLE BEARER
Wall Type 3
Code: 070283

BRACKET CABLE
BEARER
Code: 070210/1/2

PINS LOCKING CABLE
BEARER
Code: 070858

CABLE MANAGEMENT FOR
MODULAR BOXv

BEND DUCT 56
house end (50mm)
Code: 090126

BEND DUCT 56A
(50mm)
Code: 094929

BEND DUCT 56B
(50mm)
Code: 095002

PLUG DUCT 1A
100 in a bag (50mm)
Code: 094987

COVER 101A
(cover enter to house)
Code: 071987

CAPPING 25
(for house wall)
Code: 072180

MODULAR BOX STEP

DUCT TEE 54/56
(90mm to 50mm)
Code: 001792

DUCT TEE
(54/56 Split)
Code: 094976

DUCT TEE 56/56
(50mm to 50mm)
Code: 095004

CONNECTOR BEND
(cover duct at wall)
Code: 095096

BAGGED DRAWROPE
(250m)
Code: 041304

CABLE 2pr
(200m on a drum)
Code: 034468

www.openreach.co.uk

Openreach Limited

Registered office: 6 Gracechurch Street, London EC3V 0AT.
Registered in England and Wales no. 10690039.
Produced and designed by Openreach.

openreach