
Builders Specification for *open eir*'s Telecoms Infrastructure Requirements

Version

V 2.0 February 2021

Revision History

Version	Document name	Comment	Status
V 2.0 Feb 2021	Builders Specification for <i>open eir</i> 's Telecoms Infrastructure Requirements	Textual corrections, simplified MDU micro-duct schematic, Appendix 1 expanded with additional JB drawings	Final
V 1.1 Sept 2017	Builders Specification for <i>open eir</i> 's Telecoms Infrastructure Requirements	Fibre cabling replaces copper cabling for new developments	Replaced
Original Nov 2007	Builders Specification for Eircoms Telecoms Infrastructure Requirements	Original	Replaced

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1. Overview

Open eir serve new housing developments with fibre to the home (FTTH) infrastructure.

The availability of ultrafast broadband in the home is an important issue for homeowners. A fibre connection ensures that the homeowner will always be able to access the highest available broadband speeds. Gigabit broadband speeds are offered today by service providers using the *open eir* Fibre to The Home (FTTH) network.

The process for connecting new developments to the FTTH network starts with the developer submitting site layout plans as per *open eir* requirements to the *open eir* housing estate unit (HEU). *Open eir* Design will in turn issue the developer with a duct and joint box layout plan.

Developers familiar with building duct and chambers for the *open eir* network will note that there is no change to the design of the underlying duct and chamber infrastructure that support fibre cable installation.

The developer builds the 110mm duct and chamber infrastructure in the development and provides and builds the lead in pipes into the single dwelling units.

In multi-dwelling units (MDUs) the developer deploys micro-duct between each apartment and a fibre connection box location and between each fibre connection box location and an agreed central location (which may be a comms room or a building entry point depending on the size of the MDU).

Open eir supplies 110/100mm duct, 10/08mm micro-duct, chamber frames with covers, ETUs and hockey sticks(sweeping bend) for lead in pipes and the developer deploys all of the above for the exclusive use of *open eir*. *Open eir* will require on-going access to the deployed infrastructure including the ends of ducts and micro-ducts and to all *open eir* equipment installed in the MDU.

Open eir is responsible for deploying the fibre cables in the ducts and micro-ducts and for the deployment of the fibre connection boxes and other fibre closures.

The installation of the customer fibre connection cable and the FTTH equipment in the home (ATB, ONT, router/modem) will be completed on foot of an order from the home owner for a service connection. A double power outlet is required in each dwelling unit at the customer duct termination point. At this location the customer duct will meet the Access Termination Box (ATB). The double power outlet will provide power to the optical network terminal (ONT) and the service provider router (modem).

2. Telecommunications Infrastructure

The developer builds the 110mm duct and chamber infrastructure in the estate and builds the lead in pipes into single dwelling units (SDU).

- 110mm (OD) /94mm (ID) duct is supplied by *open eir* and deployed by the builder for the exclusive use of *open eir* in accordance with the *open eir* layout plan and observing rules for separation from public utilities and depth of cover.
- *Open eir* chambers are to be built external to boundary walls and clear from driveways.
- The builder supplies and deploys per SDU/duplex unit a 32mm OD/25mm ID polyethylene pipe with a 6mm draw in rope. This pipe is to run between the nominated joint box chamber (JB) and the ETU at the building entry point (BEP) with no joins, twists or kinks.
- The specified hockey stick (sweeping bend) must be used as a sleeve to route the horizontal lead in pipe into the ETU.
- The lead in pipe must be routed under the garden rather than driveway or path to avoid future high reinstatement costs if repairs are necessary.
- The lead in pipe from the chamber to the ETU is not expected to be longer than 50m; if the lead in pipe is longer than 50m because the driveway is very long for example, then intermediate JB2 inspection chamber(s) may be required to ensure access points are available every 50m.

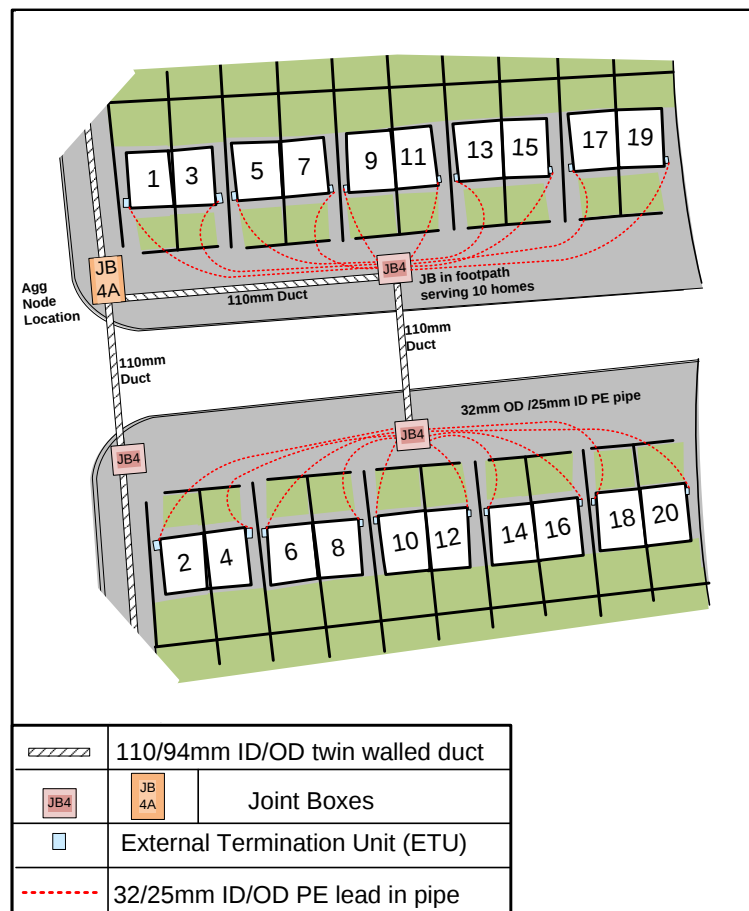


Figure 1 – Principle of duct and chamber layout with a lead in pipe to each home

3. Laying duct

Duct laid under concrete and paved surfaces must have a depth of cover of 750mm in a carriageway and 450mm in a footway; depth of cover is measured between the final surface level and the top of the barrel of the duct. Where ducts are to be laid in uneven undulating ground or grass margin, the depth of cover shall be measured from the level of the adjacent paved surface to the top of the barrel of the duct and shall be the same as for the ducts laid under the paved surfaces.

The bottom of the trench shall be levelled and rammed, in rocky or stony soils, earth, free from stones, shall be spread over the bottom of the trench and rammed to afford a bedding of 75mm in thickness upon which the duct shall be laid. The line of ducts shall be kept as straight as possible. To allow the body of the ducts to lie evenly on the bottom of the trench and to facilitate jointing, the earth shall be scooped out at the joint box position.

Duct must always be laid so as to finish with the spigot end facing in the direction in which the duct is being laid. The next duct is joined by placing a piece of timber not less than 110mm wide, across the free spigot end of the duct being laid and tapping the joint home fully. Any duct broken or cracked must be replaced before proceeding to the next length of duct.

When laying the 110mm duct, *open eir* hazard identifying tape must be deployed 300mm below ground surface, one strand of tape is used when laying a one or two way duct, and three strands of tape are used when laying six way duct. Before handing duct over for cabling the developer should ensure the ducts have been rodded, tested (with brush and mandrill) and roped. All ropes secured at both ends of the duct run.

4. Underground clearances from public utilities

The developer should build the *open eir* infrastructure with the minimum separation distances from gas, water and electricity utility services detailed below. Where the separations below are very difficult to achieve, extra mechanical protection between both sets of plant at the 'pinch point' shall be provided using concrete slabs or tiles or bricks. Do not lay other utility service pipes through *open eir* joint boxes and do not conjoin *open eir* structures with any other utility structures.

Open eir provide grey ducts to the developer for the exclusive use of *open eir*

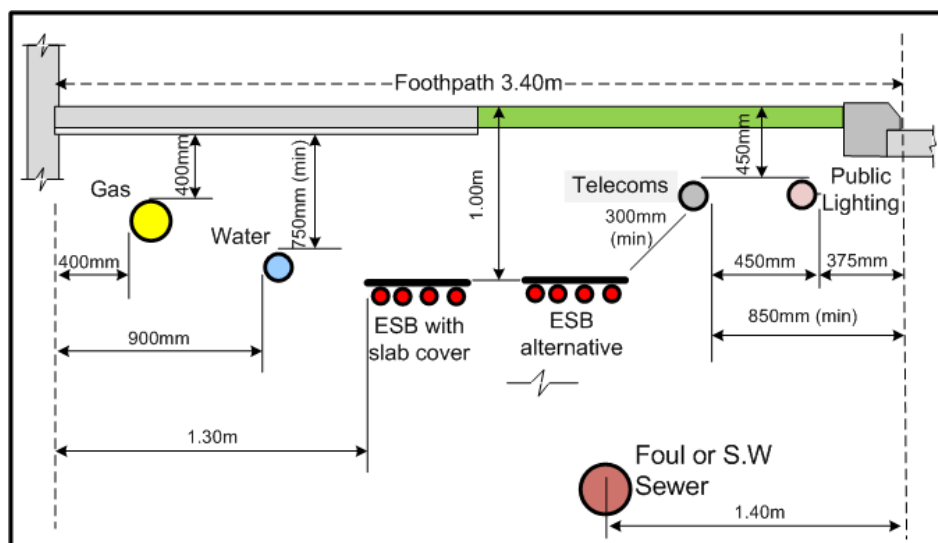


Figure 2 - Separation between *open eir* duct and other utilities

Gas	The minimum clearance between <i>open eir</i> plant and gas mains should be 300mm as measured between the protruding collar of gas main and the outer edge to <i>open eir</i> plant, whether that is the wall of a joint box or ducting as the case may be.
Water	The minimum clearance between <i>open eir</i> plant and a water main should be 300mm. Any joint box built in connection with communication services, must be sited to provide a minimum of 330mm clearance from the nearest water main hydrant, valve or other waterworks appurtenances. Ducts must not be laid through Local Authority manholes, gullies, or sewers in such a manner as to interfere with the use of drainage services.
Electricity	<u>Crossing a High Voltage (HV) underground service</u> A minimum clearance of 300mm should be provided between duct and the outer surface of the HV duct or cable. This clearance applies to 10kV, 20kV, 38kV and higher.
	<u>Running parallel to a High Voltage (HV) service</u> A minimum separate of 300mm (measured radially if the two plants are at different levels) is required between <i>open eir</i> duct and the outer surface of the HV duct or cable. This clearance applies to 10kV, & 20kV. Greater clearances applies for 38kV and higher
	<u>Crossing a Low Voltage (LV) service</u> The minimum separating distance is to be 50mm but a greater separation should be afforded wherever possible.
	<u>Running parallel to a Low Voltage (LV) service</u> A minimum distance of 300mm radially should exist in the case of <i>open eir</i> ducts and ESB Low Voltage cables running parallel to one another.

Table 1 - Summary of *open eir* to underground utility separation distances

5. Joint box construction

Joint boxes shall be constructed in accordance with the design detail drawing as supplied. See Appendix 1.

All block work to be laid to good building practice:

- Block work to be tied in properly.
- Walls to be vertical
- Concrete Base
- Clean finish
- Frame to sit squarely
- All on sound foundations
- Lintel over duct

All boxes to be cleaned of rubbish and debris before handover. The necessary allowance shall be made for the proper intake of the ducts to the joint boxes, from footway or carriageway positions so that the duct enters the box at the specified level above the floor of the joint boxes, from any given side. All duct shall be cut back a maximum distance of 25mm from the walls. The cover frame shall be sealed to the box block work in an orderly manner. Anchor Irons and Sump Grates shall be provided as per specifications.

6. Customer Lead in Pipe for Single Dwelling Units

The customer's fibre lead is brought in to the customer's home at the service provision stage.

The pulling in of the customer fibre lead will be straight forward provided the lead in pipe and the duct connecting the external wall box (ETU) to the inside of the house have been deployed correctly by the developer with a free pulling rope in place in each duct. If this is not the case then the homeowner/developer will have to remedy the problem before the fibre lead can be pulled in by *open eir*.

The figure below summarises the lead in pipe requirements.

Note the external fibre cable can only be brought one meter (1m) inside the house where it is terminated on a passive box known as an access terminating box (ATB). The demarcation device which converts the fibre to copper is known as an ONT (Optical Network Terminal) and can be placed one meter (1m) from the ATB.

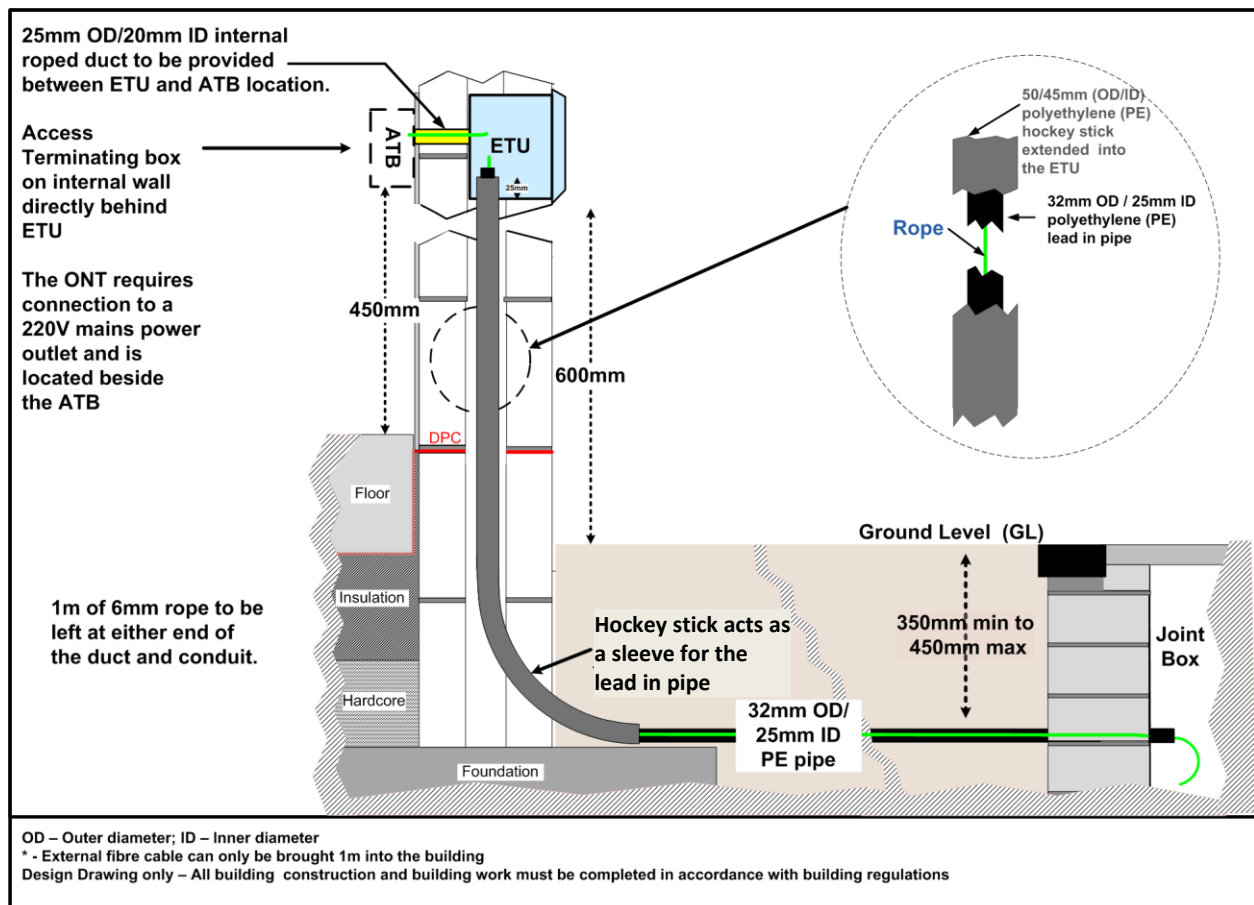


Figure 3 – Lead in pipe – design drawing only.

7. Customer Lead in Pipe for duplex units

Three scenarios for routing a lead in pipe into a duplex building are outlined below. The lead in pipe must be constructed so that a fibre cable can be fed unbroken from the designated junction box on the footpath to a designated location one meter (1m) inside each unit.

In scenario 1 and scenario 2 the lead in pipe solution is built to an ETU (Figure 4 and 5 below); note in scenario 1 the lead in pipe is in an external wall of the lower unit while in scenario 2 the ETU is in an adjoining wall.

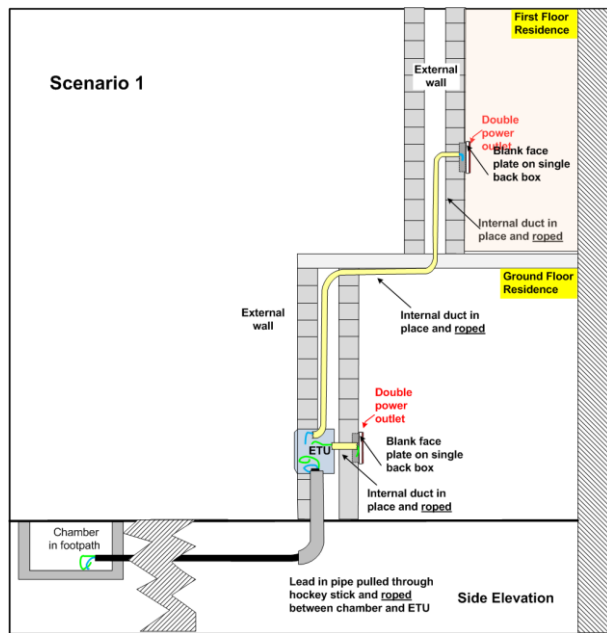


Figure 4 Duplex with ETU in External wall

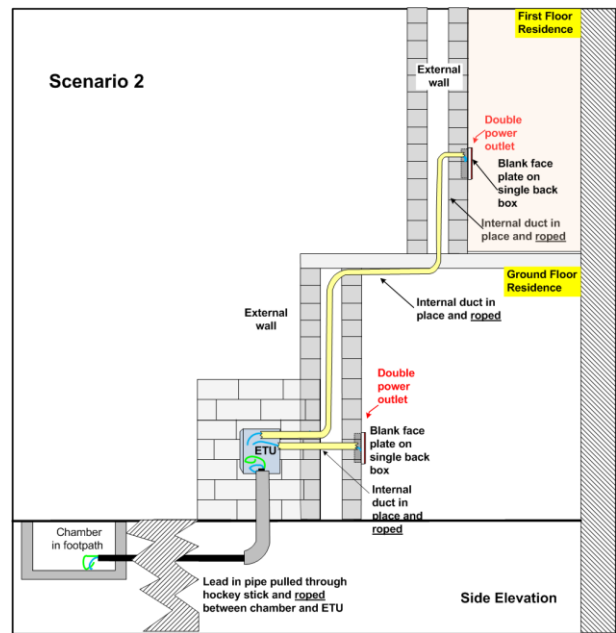


Figure 5 Duplex with ETU in adjoining wall

In the third scenario (figure 6) a small joint box (JB2) is used to facilitate the turning of the cable into the two homes and a services chamber is available to accommodate a roped duct to the top residence.

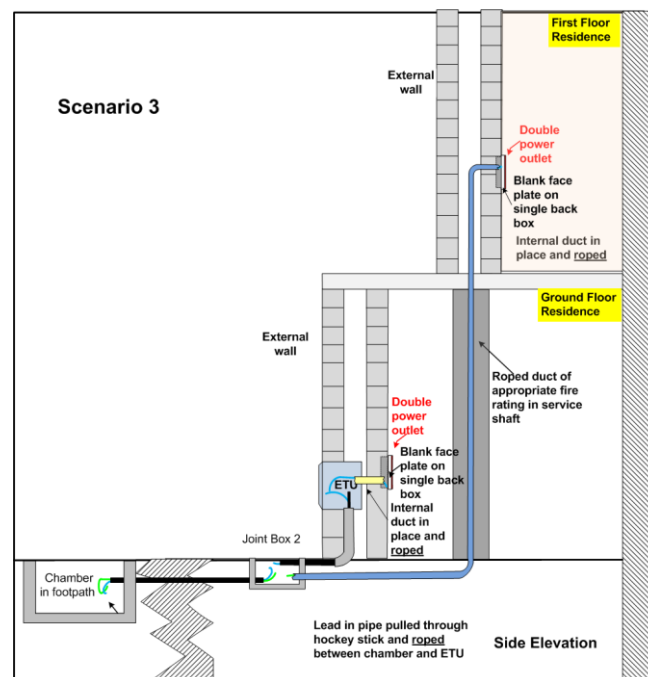
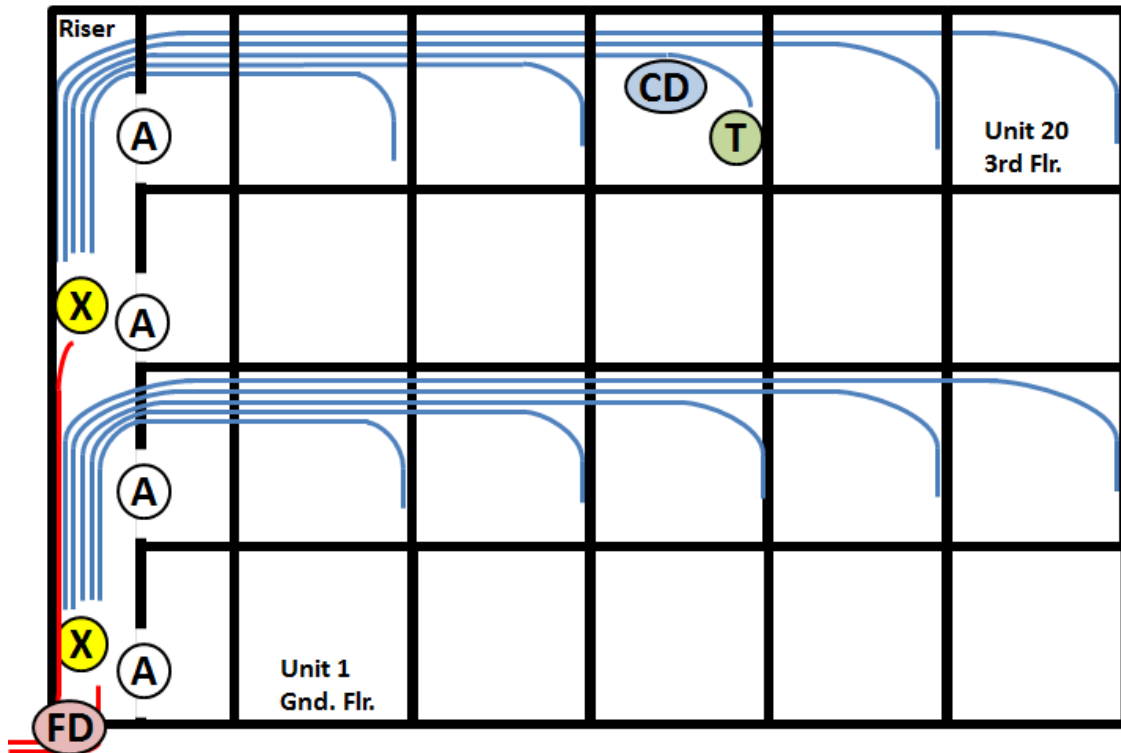


Figure 6 Duplex where JB2 is used to turn the cables instead of an ETU

8. Multi Dwelling Units (MDU)

The schematic in figure 9 below provides an overview of the in-building micro-duct (10/08mm) network to be built by the developer in the MDU. *Open eir* supply the 10/08mm micro-duct to the developer to install for the exclusive use of *open eir*.



	A customer micro-duct is placed between a terminating point,  , in a unit and the agreed fibre connection box location,  , in the riser.
	Feeder micro-ducts are placed between the fibre connection box location,  , and an agreed common location such as a comms room or a building entry point.
	Access,  , such as a riser door is required for maintenance/provision at the connection point location.
	Fibre connection box location
	Customer micro-duct termination point. An access terminating box (ATB) will be placed here at service provision stage. Two power points are required at this location.

Figure 7 – Micro-ducts in MDUs

8.1 MDU Internal micro-duct network

There are two stages to the internal micro-duct network to be deployed by the developer for each MDU block. The first stage is a 10/08mm customer micro-duct (CD) to be deployed between each unit and a fibre connection box location. A fibre connection box can serve up to 12 units. The second stage is a 10/08mm feeder micro-duct (FD) to be deployed between each fibre connection box location and an agreed common location in the development. This common location may be a building entry point location for smaller developments and a dedicated comms room for larger developments.

In larger developments (60+ units) *open eir* may need space in a fire rated comms room for passive equipment and this will be discussed and agreed with the developer in advance of *open eir* issuing duct and micro-duct to the developer. The typical space required in a comms room to serve a 90 unit residential development will be a floor to ceiling height wall 1m wide. For each additional 90 units a further adjacent wall space of 0.75m is required. The passive equipment (fibre enclosures) will be wall mounted. The feeder micro-ducts from the connection boxes in the risers and a duct from the *open eir* external network will be run to this location in the comms room. This footprint must be accessible for maintenance. In some developments with a large number of commercial units additional equipment may be required and the width of the footprint may need to increase by 1-2m.

The developer must also provide a double power outlet at the customer micro-duct termination point in each unit; see section “Power and space requirements in a unit requiring service”, below.

Installation of fibre cables, enclosures and fibre connection boxes will be carried out by *open eir*.

8.2 *Open eir* access to duct, micro-ducts, cables, connection boxes and fibre enclosures

Open eir requires the following access:

- All feeder micro-ducts between the comms room/building entry point and the fibre connection box locations must be accessible for cable deployment and maintenance.
- Both ends of a customer micro-duct must be accessible; couplers are not expected on these short lengths of micro-duct. It is expected that this micro-duct will generally be built into the fabric of the building.
- Access is required to locations (including a comms room, riser access, building entry point) where *open eir* equipment is deployed

Notes:

1. There must be sufficient space and light available in order to work on fibre connection boxes (and other *open eir* equipment).

9. Power and space requirements in a unit requiring service

The customer duct/micro-duct in the unit should be left safely secured in a closed surface mounted single back box by the developer and this will be replaced with a surface mounted access terminating box (ATB) at service provision stage.

The customer fibre cable will be deployed in the customer duct/micro-duct at service provision stage.

An access terminating box ATB, an Optical Network Terminal (ONT) and a service provider's router (modem) will be installed in a unit at service provision stage. These three boxes are collocated as shown in figure 8 below. The ONT and the service provider router (modem) each require a standard ac power connection.

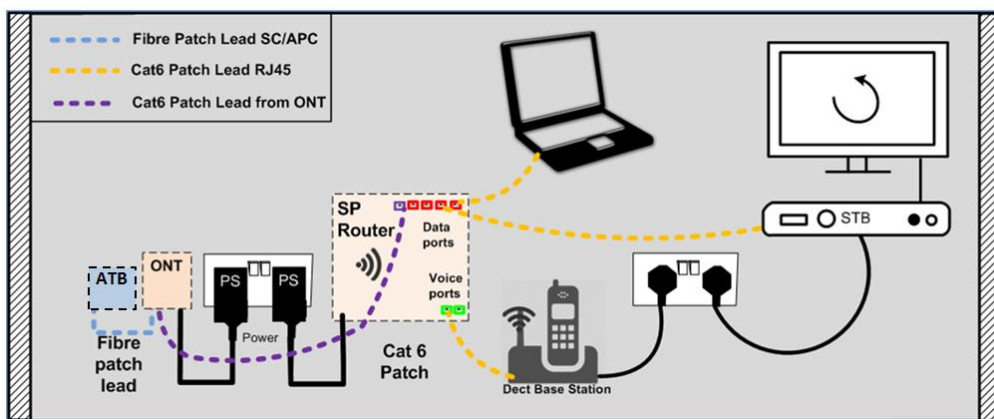


Figure 8 - ATB, ONT and Service Provider (SP) router are provided at service provision stage

10. When is a dwelling unit ready for connection

The customer fibre connection in a dwelling unit can be completed when the developer has the following in place:

- Single Dwelling Unit (SDU) and (Multi-Dwelling Unit) MDU - A double power outlet at the customer duct termination point location is energised. At this location the customer duct will meet the Access Termination Box (ATB). The double power outlet provides power to the optical network terminal (ONT) and the service provider router (modem). The ATB, the ONT and the Service provider router(modem) will be installed at the service provision stage. See Figure 8 above.
- SDU -the roped lead in pipe between the joint box (JB) chamber and ETU is free from defects and the rope pulls freely.
- SDU- the roped customer duct from ETU through to the internal wall surface (where the ATB will be located at service provision) is free from defects and the rope pulls freely
- SDU-no other services are routed through the ETU
- SDU- un-obstructed access is available at the ETU
- SDU- ducts sealed at ETU
- SDU- building work complete at the customer duct termination location where the access terminating box (ATB) will be located (ETU and ATB are on opposite leafs of the same external wall)
- MDU – the developer has provided and tested the customer micro-ducts from the apartments to the agreed fibre connection box locations.
- MDU – the developer has provided the feeder micro-ducts from the fibre connection box locations to an agreed common location (Comms room/building entry point) and *open eir* have completed the fibre cabling between these locations and completed the connection of the building to the *open eir* FTTH network.
- MDU - where the development includes large numbers of commercial units requiring additional fibre equipment this equipment has been installed and connected to (i) the in-building micro-duct network and (ii) the external *open eir* FTTH network.

11. Supply of materials

11.1 Supply of internal materials for MDUs

The following materials will be supplied free issue to the developer and installed by the developer for the exclusive use of *open eir*.

	Material Code	SAP Short Description	Qty.
1	5011622	10/08mm LSOH micro-duct	500m per drum
2	5011623	10mm LSOH couplers	each
3	5009500	10mm gas block	each

Table 2 –Internal micro-duct materials for MDUs

Closures and fibre cables will not be supplied to the developer but will be installed by *open eir* or *open eir's* contractor for the **exclusive use** of *open eir*.

11.2 Supply of outside plant materials

The materials listed in the table below will be supplied by *open eir* with quantities to be determined by *open eir* design. The materials will be installed by the developer for the exclusive use of *open eir*

Frames and covers for joint boxes and manholes
Twin Wall Duct 110mm (where applicable)
ETU (External Termination Units) where applicable
"Hockey Stick" sweeping bend for ETU (50/45mm (OD/ID continuous)
<i>Open eir</i> identification tape
Anchor Iron
Sump Grates
Duct spacers 2 way & 4 way
Ring beam if required

Table 3 Materials supplied by *open eir*

The materials listed in the table below shall be provided by the Developer. This list may not be exhaustive and any other items agreed by *open eir* and the developer should be supplied.

Lead-in Duct 32mm OD/25mm ID lead-in duct	
SDU Internal Duct from ETU to ATB (first master socket) 20mm inner diameter, circular, low internal friction 1m length max from ETU to ATB - No sharp bends for ease of telecoms cable replacement to the ATB	
Footway and carriageway chambers - Concrete solid blocks type I.S. 20 - Engineering Brick Class B as designated on drawings.	
Cement Shall be Portland, normal setting	
Sand Shall be clean sharp river or pit sand	
Pull rope plastic (6mm minimum) for the following - from <i>open eir</i> joint box (JB) to ETU - from ETU to ATB socket outlet - all 110 mm duct	
Lintels (heads) over duct entry in JB's as per JB drawings in appendix 1 below	

Table 4 - Materials supplied by Developer

Appendix 1 Joint Box Specifications

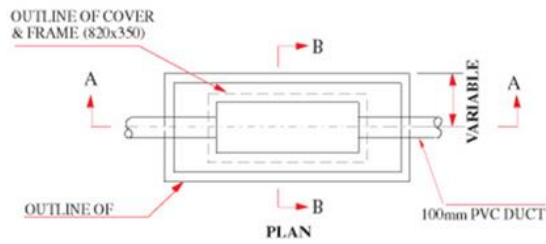
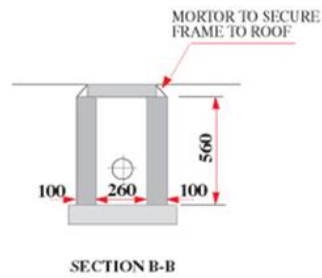
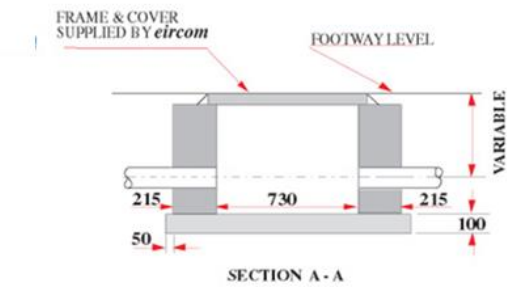
Chamber type	Sidewalls	Drawing	Specification	Inner dimensions			Plinth Dimensions		
				L mm	W mm	D(Min-Max) mm	L mm	W mm	D mm
JB2		UG.769		730	260	560	1260	560	100
JB4	Upright (2 ducts)	UG.7.33 sh.1	UG.7.33 sh.2	910	448	610-1000	1440	770	150
JB4	Flat (ducts)	UG.7.33 sh.1.1	UG.7.33 sh.2.1	910	448	610-1000	1440	1000	150
JB4A	Upright (2 ducts)	UG.7.35 sh.1	UG.7.35 sh.2	910	890	610-1000	1220	1440	150
JB4A	Flat (2 ducts)	UG.7.35 sh.1.1	UG.7.35 sh.2.1	910	890	610-1000	1440	1440	150
JB4A	Upright (4 ducts)	UG.7.36 sh.1	UG.7.36 sh.2	910	890	725-1500	1220	1440	150
JB4A	Flat (4 ducts)	UG.7.36 sh.1.1	UG.7.36 sh.2.1	910	890	725-1500	1440	1440	150
JB4B	Upright	UG.793 sh.1	UG.793 sh.2	1475	900	725-1500	2010	1450	150
JB4C	Flat (4 ducts)	UG.766 sh.1.1	UG.766 sh.2	1810	900	725-1500	2340	1440	150
JB5	Upright (2 or 4 ducts)	UG.787 sh.1	UG.787 sh.2	580	580	890	1110	880	150
JB6	Upright	UG.750 sh.1	UG.750 sh.2	1250	580	890	1780	880	150

Table 5 - Summary of Joint Boxes commonly used in the *open air* network

Footway chamber specifications

- To be read in conjunction with drawing sheets shown below
- Foundation Plinth - The concrete to be grade C35 with min. cement content 290 kg/m³. This plinth to form the chamber floor (dimensions per JB summarised above), which should be reinforced with B785 mesh centrally placed in concrete plinth.
- Where sump is indicated in drawing - it should be dish formed and not extend through plinth. Sump Dimensions: Diameter 150mm, Depth 100mm.
- Mix for concrete grade C35 to be:- 1 cement, 1 sand, 2 washed pebble
- Chamber Walls - Walls to be constructed of solid blocks type S20, and engineering brick class 'B'. Type S20, blocks to be coloured black and have a minimum compressive strength of 21N/mm². Class 'B' brick to have a minimum strength of 50N/mm².
- All mortar to be - 1:3 cement/sand mix
- All joints to be - 8mm to 15mm thick
- Construction Details - The dimensions of the opening broken out in the footpath for the chamber shall be at least 200mm greater all around than the outside dimensions of the block work to provide for the minimum width of pavement reinstatement. Block and brick lays to be in accordance with specification diagrams. With 900x215x100mm reinforced concrete lintel to I.S.240 above duct opens. After allowing the mortar in the block work to cure for 3 days, the voids outside the block work shall be backfilled with either:- lean mix concrete (1 cement to 3 sand 6 gravel) or crushed rock to CL.804. to be laid in 200mm thick layers and each layer to be well consolidated with a mechanical compactor.
- Top of duct to be - 450mm min. below finished ground level.
- Optimum position of duct to be - 115mm above floor of chamber.
- Cover frame to be - fully bedded on minimum of 10mm mortar.
- Position of cable bearer brackets and sump to be decided on site.

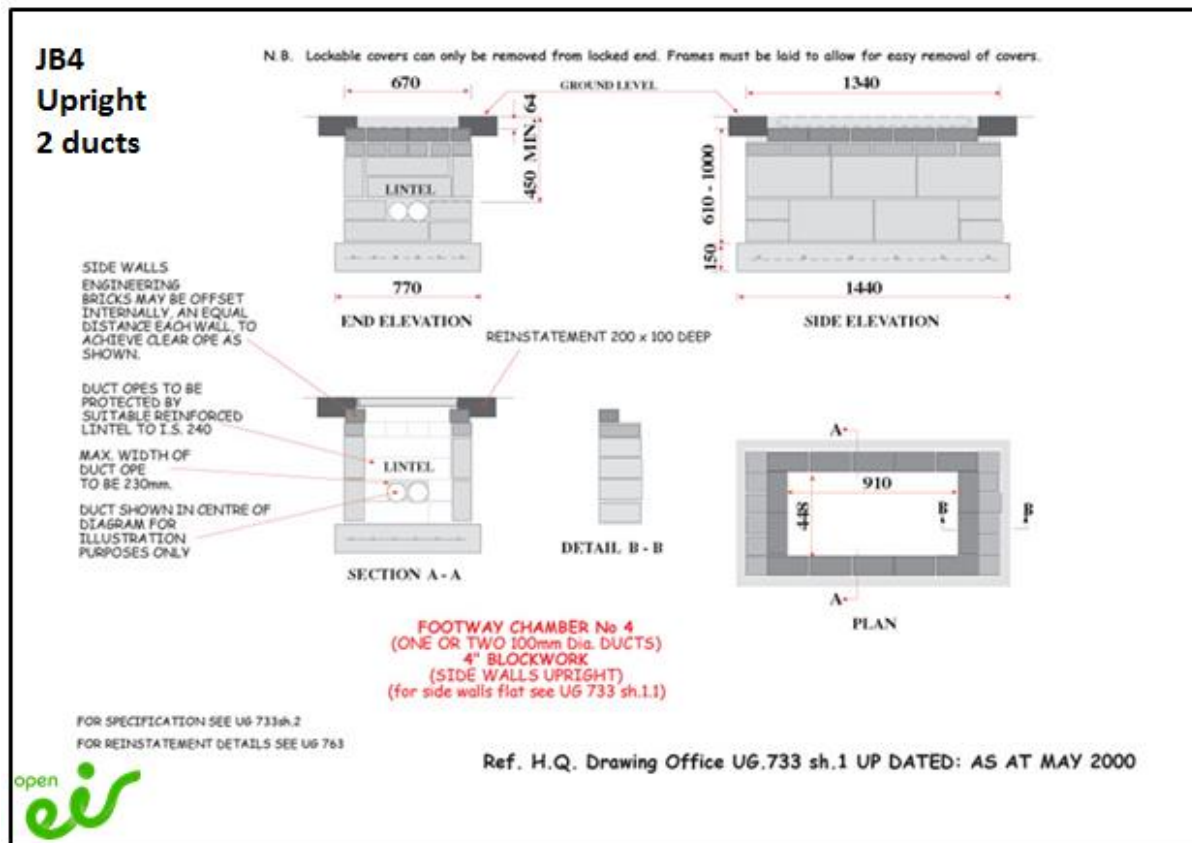
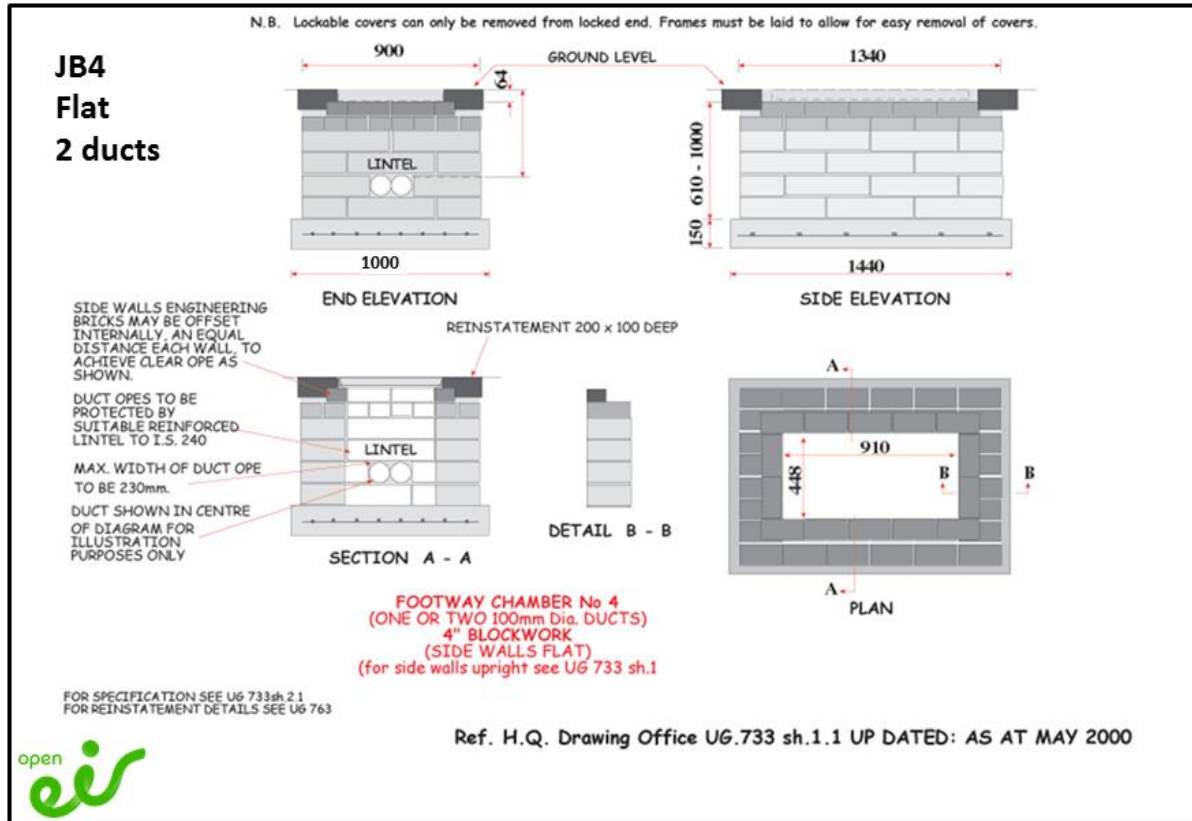
JB2



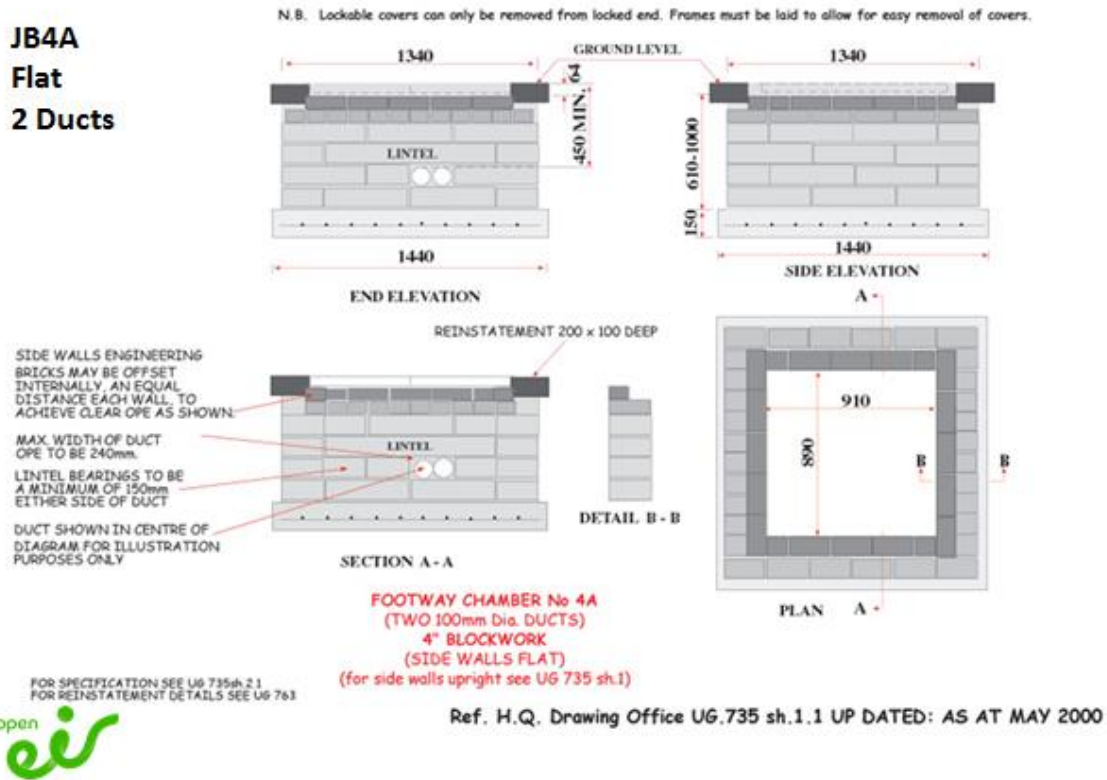
SPECIFICATION

1. FOUNDATION PLINTH - CONCRETE TO BE GRADE C35.
2. WALL TO BE CONSTRUCTED OF SOLID BLOCKS TYPE S20 WITH A MINIMUM COMPRESSIVE STRENGTH OF 21N/mm
3. ALL MORTAR TO BE 1:3 CEMENT/SAND MIX. - RAPID HARDENING, PORTLAND CEMENT.
4. JOINTS TO BE 8mm TO 15mm THICK.
5. COVER FRAME TO BE FULLY BEDDED ON MIN. OF 10mm MORTAR.

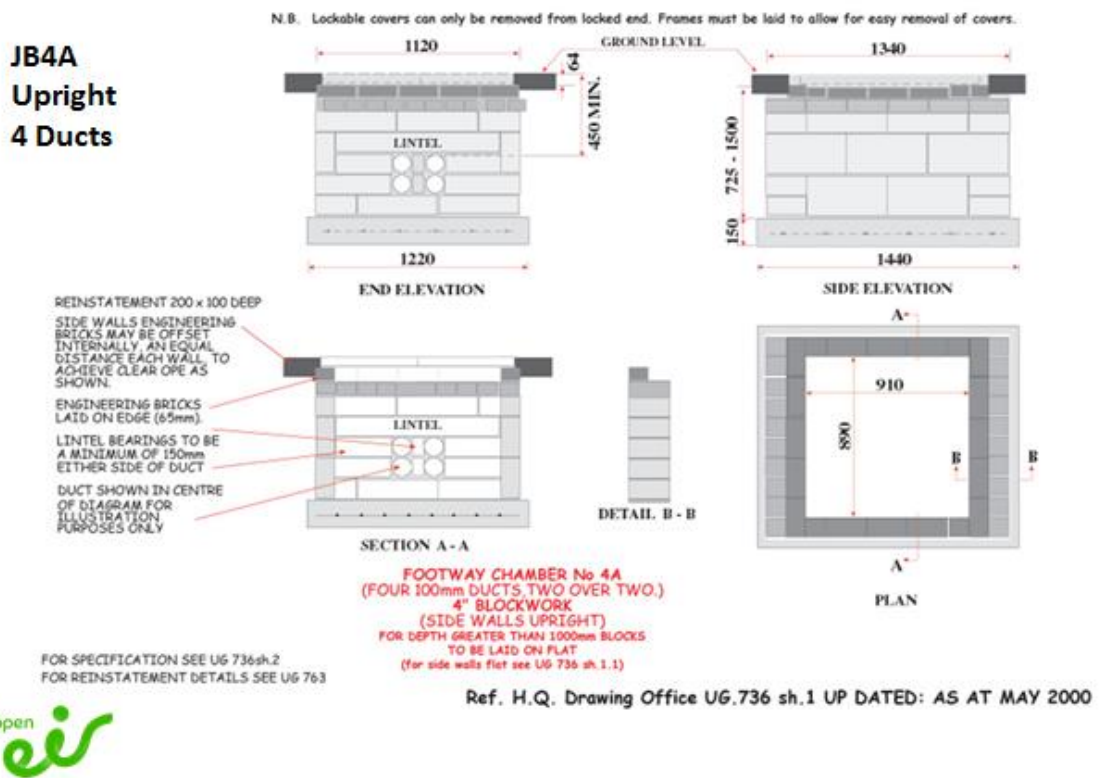
**FOOTWAY CHAMBER No 2
(JOINT BOX No.2)
ALL MEASUREMENTS IN MILLIMETRES**



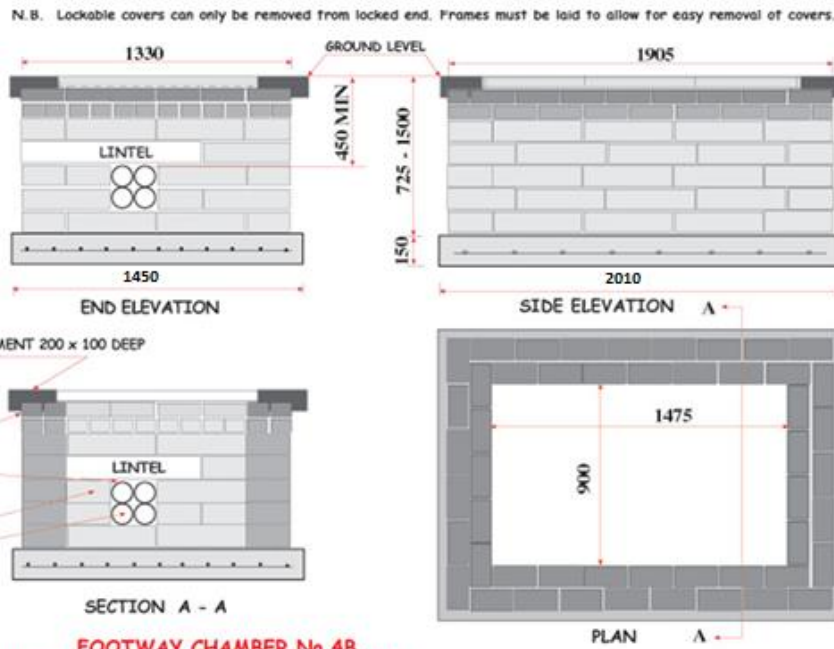
JB4A Flat 2 Ducts



JB4A Upright 4 Ducts



**JB4B
Flat
4 Ducts**

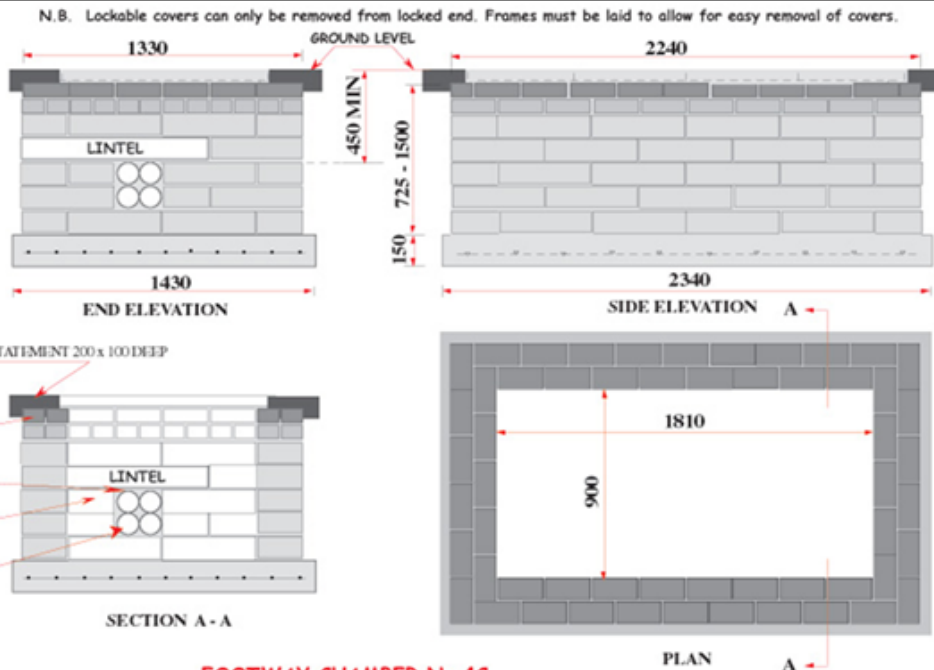


**FOOTWAY CHAMBER No 4B
(FOUR 100mm DUCTS, TWO OVER TWO.)
9" BLOCKWORK**

FOR SPECIFICATION SEE U6 793 sh.2
FOR REINSTATEMENT DETAILS SEE U6 763

Ref: Hq. Drawing Office U6. 793 Sh.1 Up Dated: AS AT MAY 2000

**JB4C
Flat**

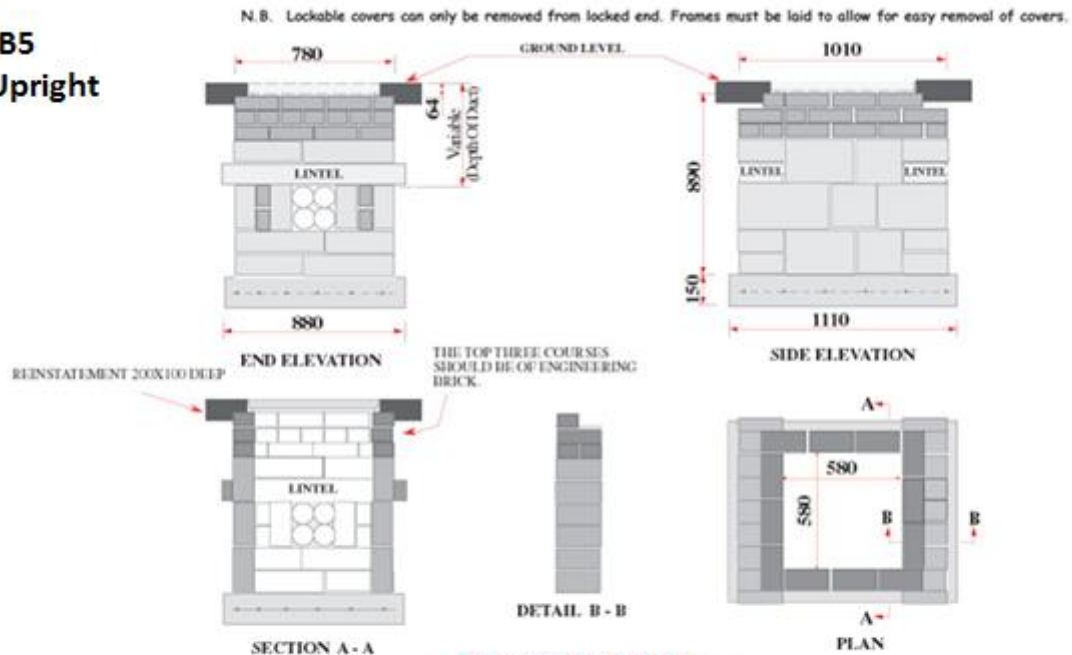


**FOOTWAY CHAMBER No 4C
(FOUR 100mm DUCTS,
TWO OVER TWO.)
9" BLOCKWORK**

FOR SPECIFICATION SEE U6 766 sh.2
FOR REINSTATEMENT DETAILS SEE U6 763

Ref. H.Q. Drawing Office U6.766 sh.1 UP DATED: AS AT MAY 2000

JB5 Upright



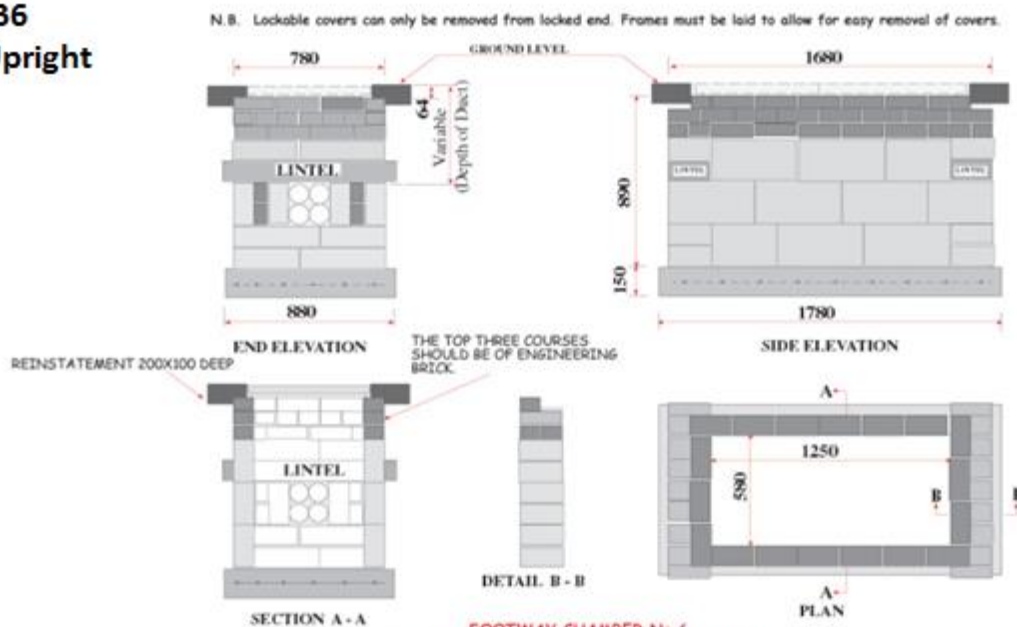
FOR SPECIFICATION SEE UG 787 sh.2
FOR REINSTATEMENT DETAILS SEE UG 763



FOOTWAY CHAMBER No 5
(TWO OR FOUR 100mm Dia. DUCTS)
4" BLOCKWORK
(SIDE WALLS UPRIGHT)
(for side walls flat see UG 787 sh.1.1)

Ref. H.Q. Drawing Office UG.787 sh.1 UP DATED: AS AT MAY 2000

JB6 Upright



FOR SPECIFICATION SEE UG 750 sh.2
FOR REINSTATEMENT DETAILS SEE UG 763



FOOTWAY CHAMBER No 6
(FOUR 100mm Dia. DUCTS TWO OVER TWO)
4" BLOCKWORK
(SIDE WALLS UPRIGHT)
(for side walls flat see UG 750 sh.1.1)

Ref. H.Q. Drawing Office UG.750 sh.1 UP DATED: AS AT MAY 2000

