



# **Guidelines for NBI End Users when laying Ducting to facilitate the installation of Fibre Networks on private property**

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## Document Overview

### Amendment Record

Revision No.	Changes	Author	Date
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### Terms & Definitions

Term		Definition
	Access Box	An access box (sometimes called a small access chamber) is a plastic or concrete structure set below ground with a lid flush to the surrounding surface to facilitate the installation and maintenance of the telecoms duct and fibre cable.
	Cable / Duct Marker Warning Tape	A length of plastic tape laid above the duct along its entire length indicating the presence of the duct below the tape.
	Cat and Genny	The cable avoidance tool, or CAT, is used to locate cables on groundwork, excavation, and construction sites so that they can be avoided. The CAT can detect the signals that radiate naturally from metallic services; it works in combination with a Genny that utilises a unique signal that the CAT can detect.
	Draw Wire	(Sometimes called the Draw Rope.) A rope, usually 6mm nylon (polypropylene), inserted in a duct for the purpose of pulling a cable through the duct during service installation or maintenance.
ETU	External Termination Unit	Telecoms connection box installed in the external wall of the premises generally when the premises is initially being constructed. (IP66 rated external junction box of dimension W 150mm x H 230mm x D 150mm.)
FTTH	Fibre to the home	Fibre broadband service which is delivered into the premises via a fibre optic cable.
	Network Touch Point	The Network Touch Point is the point near the premises boundary where customer ducting infrastructure meets the NBI network infrastructure.
ONT	Optical Network Terminal	The equipment in the End User's premises which converts the optical signals into electrical signals and vice-versa.

	Optical Distribution Point (ODP)	The point on the NBI network from where service will be delivered. It can be a telephone pole or an underground box or chamber.
	P-gravel	P-gravel is small, rounded stones usually ranging in size up to 10mm in diameter.
	Slow Bend	A preformed, graduated 90 degree bend used to connect two lengths of duct at a bend and reduces the stress on the cable when it is being pulled into the duct.

Table 1: Terms and definitions

## Introduction

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The purpose of this document is to provide homeowners, builders, and architects with information regarding the specifications for underground duct that is considered suitable for NBI to utilise for the installation of a fibre connection. Existing underground duct must meet the specifications outlined in order to be used by NBI. Homeowners or builders planning on installing underground duct for future use should ensure that it meets the criteria as outlined in this document.

NBI are currently surveying all premises within the Intervention Area to determine the most suitable delivery method for each individual premises. The majority of End User connections to the NBI Fibre network will be delivered via an overhead span meaning the connection into your premises will be served from the connection point (ODP) into your premises across new or existing pole infrastructure. Where pre-existing telecommunications connection already exists and is delivered underground, the NBI Fibre services may utilise this ducting infrastructure, if suitable.

When planning a new development, the designer/engineer/architect should contact NBI to establish details of potential network connection points.

It is NBI's standard policy to connect homes by means of overhead cable.

### Underground duct installations:

Existing or new duct must be used exclusively for telecommunications infrastructure (cables) and must always be installed by a competent, qualified person or contractor.

### Duct Overview:

A telecommunications duct will facilitate ease of installation and maintenance of telecommunications infrastructure in the premises. For an existing duct to be viable for NBI Fibre installation, it must be installed in a location and manner which minimizes the possibility of accidental damage, irrespective of cause. Selecting the optimum duct size and location for the duct route, away from the driveway etc. will reduce the visual impact of the access boxes and also reduce the need for, and cost of maintenance, should it be required in the future. The duct should always have a Draw Wire inserted. Extreme caution and consideration must be taken when deciding the duct route to fully establish the location of all buried services and plant such as sewers, drains, and electrical and gas connections. Inadvertently striking buried services can cause severe harm to persons and property.

### Duct Installation Guidelines

Conditions may vary from site to site, but the following guidelines must be followed for a duct to be of suitable quality to house an NBI Fibre connection:

- The duct will extend from the desired cable entry point at the premises to the Network Touch Point nearest the property boundary. If it is not possible to reach the Network Touch Point, then sufficient duct to reach the Network Touch Point must be left safely coiled outside the property boundary.
- A Draw Wire must be inserted that is continuous from end to end. A minimum of 1 metre of slack rope should be safely secured at each end.
- Sharing of the telecommunications duct with other services is not permitted.
- Where possible, the duct route must be located at least 300 mm lateral distance from existing infrastructure or service.
- The duct should be laid flat and in a straight line with as few curves (either sideways or up and down) as possible. If a sharp change of direction (90 degree or so) is necessary, then a suitable

Access Box must be installed at the point where the direction changes to facilitate ease of cable installation.

- Access boxes must be placed at intervals of between 50 m and 200 m depending on duct size, route and conditions.

Please see Table 2 for the recommended spacing for access boxes, depending on duct diameter.

Duct Size	Access box spacing
<50 mm	50 m
50 mm	100 m
100 mm	250 m

Table 2: Spacing for access boxes

The route for the duct must be selected to:

- Avoid traffic passing over it to reduce the potential for future crushing damage.
- Minimize the possibility of damage to the duct due to future excavations.
- Reduce the cost of repairing or replacing the duct should it be required.
- Reduce the potential visual impact due to the Access box lids.

When digging a trench care must be taken not to damage any existing underground services located along or across the proposed duct route. Note should be taken of any existing cables, sewers, drains, waterlines, Electrical cables, or gas supply lines close to along or across the proposed duct route. Only a competent person qualified by the construction skills certification scheme in the location of underground services should be utilized to identify service routes and depths. (CSCS LUGS)

The diameter of the installed duct will need to increase with the length of the duct run., i.e. the greater the distance from the Network Touch Point to the premises the larger the duct diameter must be.

If for any reason some of these guidelines cannot be fully implemented alternative measures must be employed to ensure the duct is not liable to damage from any source and existing infrastructure is not damaged in the process.

The Draw Wire should always run freely within the duct.

## Duct Specification Guidelines

- Suitable duct for most installations will be on a coil of 100m - 150m Hydrodare type pipe with a minimum internal diameter of 32 mm in diameter (50mm or 100mm pipe will be required for long distance ducts)
- It is always preferable to lay duct in a continuous length but for long distances where more than one length of duct is necessary, “access boxes” must be installed between each section of duct, see Table 2. (An access box should be installed at any location where there is a sharp bend). Such boxes should typically be 300mm by 300mm and 450mm deep. Minimum depth of cover above the duct should be 450 mm. The maximum bending radius should be 450mm.
- The duct should enter the box to the side thereby allowing maximum space in the box to manage and support the cable radius within the chamber
- If the duct is being joined without the provision of an access box at that location, a proper duct coupler (designed for use with the duct to form a water blocking seal) Care must be taken to avoid leaving any sharp edges which could snag the cable during installation.
- The duct must be laid in a trench minimum 450 mm below ground level. If for any reason the duct cannot be laid at the required depth it must be laid in a location where it will not be crushed, and adequate measures must be deployed to prevent crushing. In some instances, the chamber will need to be deeper than 450mm to, for example, accommodate 550 mm depth of cover over a 100mm duct. Depth of cover on underground apparatus is included so as to reduce the likelihood of damage to the equipment while engaging in routine activities such as gardening etc. Knowing the depth of cover and line of the trench also helps to locate the equipment at a future date as may be required.
- Ducting should be covered with sand or p-gravel (or equivalent substrate) to a depth of 100 mm before back filling the trench to avoid damage by sharp stones or back fill aggregate material.
- A record should be kept of the duct route and marker wire, outside the pipe, used to enable tracing. A cable/duct marker warning tape should be placed along the length of the duct at half depth before completing the back fill to help avoid future damage in the event of further excavation in the vicinity of the duct.
- Shallow duct should be protected by plates and or cable marker/duct marker warning tape at half depth before back fill.
- Where the duct must be laid under a driveway it is important that the duct is either laid deep enough to include >600mm depth of cover or suitably protected to ensure it does not suffer crushing damage over time due to the weight of the vehicles traversing over it.

Hyrodare comes in 100m - 150m coils and will want to return to its coiled shape therefore it will need to be restrained to keep it flat otherwise the internal resistance (friction) will be very high. Where Hydrodare is to be rolled off a coil and placed in a trench, the trench must be prepared to ensure that the pipe can be laid level and even along its length so as to minimise lateral deflection and deflection from grade. The pipe must be supported in its location by surrounding it with primary initial backfill of sand.

## Duct Installation at the premises

There are two options for the duct to terminate at the premises. (1) the use of an external termination unit, with the duct going in through the cavity (ETU) or (2) to left on the outside wall

- The duct must extend into the ETU (Figure 3)
- For premises without an ETU the End User / property owner should select the location on the external wall where the duct will terminate. If this location is not the preferred cable entry point, the cable can then be run externally on the wall to the selected cable entry point.
- Locate the duct on a convenient external wall to a height of 600 mm above ground level if an ETU cannot be provided. (Figure 1)
- If the duct size used is greater than 50 mm an access box should be located close to the premises and a 32 mm duct extended to the premises (Figure 2).
- The duct must have a removable end cap (or bung) fitted at both ends to prevent ingress of debris in advance of cable installation. (Figure 2)
- For both options, a building entry hole should be drilled, lined with a pipe (typically of 12mm internal diameter) and sealed inside and outside to ensure building integrity is maintained. This pipe should be roped. When installing the fibre optic cable, the seals will be removed, and the cable sealed at both ends with mastic. This should be above the damp course and should not interfere with any building regulations or seals.

Note: For a Fibre to the Home installation the cable should enter the premises at a location where it is convenient for the customer to access or use the Service / ONT. Suitable electrical power sockets (preferably 2) are required adjacent to the cable entry point.

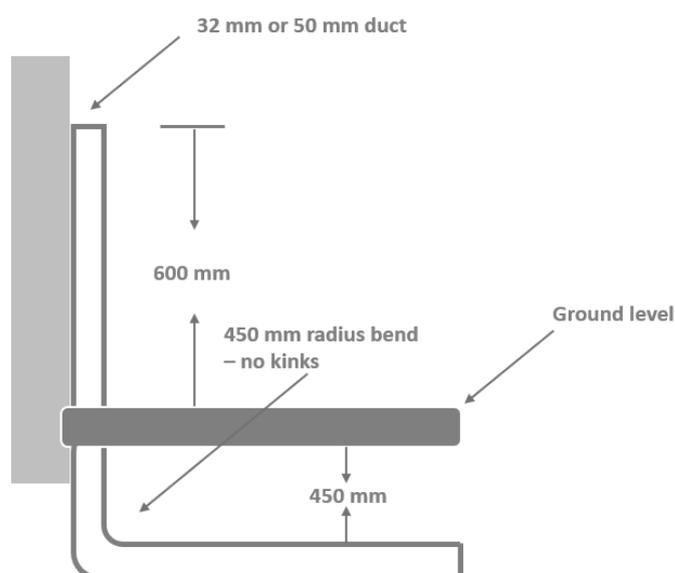


Figure 1: External duct without ETU

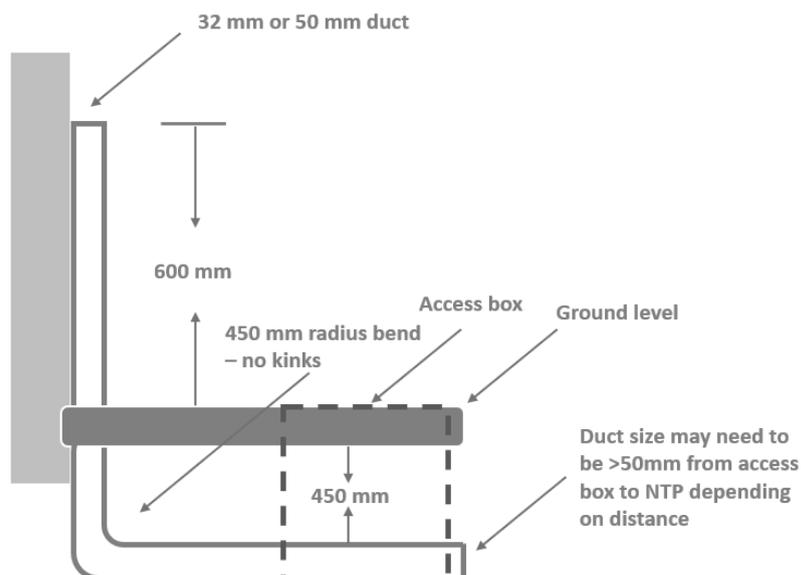


Figure 2: Alternative option for external duct without ETU

## Duct Installation at the Network Touch Point (e.g. telecoms utility pole or underground box).

- The duct will extend beyond the property boundary.
- If there is a telephone pole located at the property boundary the duct should be long enough to reach up the pole and extend the pole for 2 metres
- If there is an NBI ODP located at the property boundary the duct must be long enough to reach this box.

NOTE: If no telephone pole or ODP currently exists at the property boundary it may be necessary for NBI to install a pole to deliver service. In this circumstance the duct should extend to a location where it is convenient to install the pole. The pole will not be erected adjacent to electricity lines or electricity poles and must not be obstructed by trees, overhanging branches, or other obstacles. The duct should be left safely coiled and sealed outside the property boundary.

## Additional Recommendations

- If a 100mm duct is used and a bend is required, a ‘slow bend’ can be used if an access box cannot be installed at this point.
- It is advisable to record the route of the duct should this detail be required in the future. Triangulated measurements taken from fixed structures would be recommended.
- Another draw wire must be installed with the telecoms cable at the time of cable installation. This will ensure that there is a draw wire present in the duct always should it be required in the future.

## New Build

Where a new building or premises is being built, an ETU should be inserted into the external wall at a convenient location in accordance with the building specification shown below in Figure 3:

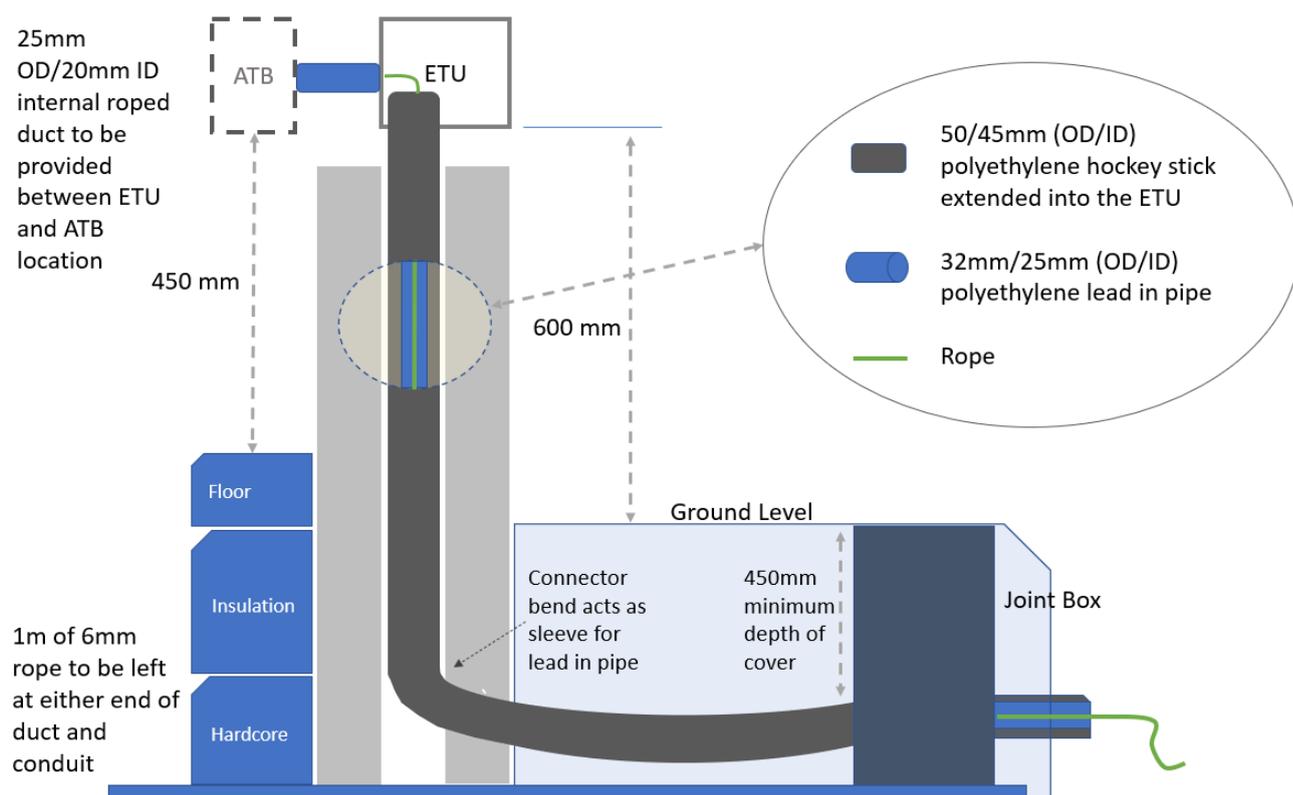


Figure 3: Technical specification for ETU installation

## Summary

- The duct should extend from the Network Touch Point nearest the property boundary to the End User's premises.
- The duct should be laid straight and flat and avoiding any sharp bends or kinks. Where a sharp change of direction is required an access box should be fitted. The duct route, location, and manner should be carefully chosen to reduce or eliminate the possibility of damage in the future.
- **Minimum depth of cover required is 450 mm**
- A free moving draw wire must be installed end to end.
- All ducts should be sealed prior to and after cable installation.

## Disclaimer

Please note that this document has been produced to assist you, the reader, by providing guidance on practical and technical issues concerned with laying ducting for fibre networks on private property. The document does not purport to provide guidance on the law, and if the reader has any queries about any legal issues relating to the document, the reader is advised to seek legal or other professional advice. In addition, where the document refers to an interpretation of any law, the reader should not rely on that interpretation without seeking advice from an appropriate source. To the fullest extent permissible by law, [NBI] (including its members of its boards, officers and employees) does not accept liability or responsibility for any loss or damage occasioned to any person acting or refraining from acting on any information contained in this document.