

GUIDE

MDU Building Design Guide – New Developments

Network Architecture and Technology

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1 About this document

| | |
|------------------------------|---|
| <p>Who is it for?</p> | <ul style="list-style-type: none"> • Greenfield site developers • Greenfield site designers • Building Contractors <p>This document, in conjunction with documents listed in Appendix B – Key Documents, provides guidelines for developers building Multi Dwelling Units (MDU).</p> |
| <p>Purpose</p> | <p>This document deals with the provision of appropriate pathways and spaces in vertical and horizontal Multi Dwelling Unit (MDUs) sites for the delivery of fibre to the premises infrastructure in new developments. This document outlines NBN Co's conduit and spatial requirements within MDUs in order for its fibre to the premises infrastructure to be deployed.</p> |

| | | |
|------------------------------|---|---|
| <p>Important Note</p> |  | <p>THIS DOCUMENT IS ONLY A GUIDE FOR CONTRACTORS PREPARING MULTI-DWELLING UNITS FOR INSTALLATION OF THE NATIONAL BROADBAND NETWORK IN GREENFEILD DEVELOPMENTS.</p> <p>This document should not be relied upon by any Contractor or any other person as a substitute for knowledge, experience, care and skill or any other legal or contractual obligation.</p> <p>It is the responsibility of all Contractors to become familiar and comply with all applicable laws and contractual obligations.</p> <p>Nothing in this document will affect any rights NBN Co has (whether at law or under contract), or any obligations or warranties given by the Contractors to NBN Co.</p> |
|------------------------------|---|---|

2 Introduction

The term Multi Dwelling Unit (MDU) refers to any development of two or more premises (also known as Living Units or dwellings) that are joined by a common wall or property boundary and are generally managed by a Body Corporate. Examples of MDUs include apartments, town houses, retirement villages, groups of strata title units and the like. They can also include a mix of retail and commercial premises.

NBN Co has identified three general types of MDUs:

- **Horizontal**

Two or more adjoining premises, where all premises have a ground floor.

- **Vertical**

Two or more premises where at least one does not have a ground floor, such as, a multi-storey apartment block or flats.

- **Hybrid**

A combination of horizontal and vertical buildings on the one site (eg:- a single development such as retirement village or walled garden estate.).

2.1 Scope

This document addresses the internal space requirements and minimum clearances required to assist in the implementation of the NBN Co fibre network build, specifically for new developments where a shared common building services entry (Lead-in) is utilised to access the street fibre network.

The intended audience are any of the following:-

- Developer or Designer
- Developers Consultant
- Developers Building Contractor
- NBN Co Designer or Planner

Figure 1 details the portion of the network incorporating MDUs.

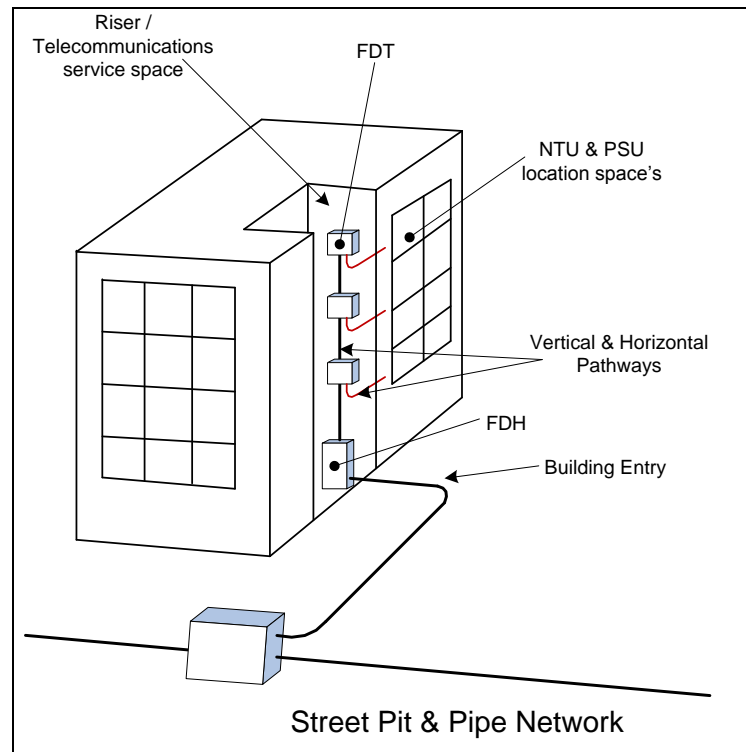


Figure 1 – Fibre to the Premises network – Basic network elements in relation to a typical MDU

2.2 General Requirements

The Developer, Developers consultant or contractor are responsible for the following:-

- Provision of a suitable building entrance facility (lead-in) from the street network to the building entrance, through to any area designated for Telecommunications services. Where diversity or other special needs exist, an alternative entry location may also be required.
- Provision of suitable space and access for the installation, maintenance and repair of all NBN Co. network elements up to and including the Network Termination Unit (NTU) and Power Supply Unit (PSU).
- Provision of a minimum of P20 (23mm nominal inside diameter) communications conduit, from either the telecommunications room or riser/closet location to each NTU location.

NBN Co is responsible for:

- The cabling, installation and maintenance of all network elements up to and including the NTU and PSU. With the exception of the PSU batteries originally supplied at the time of installation.
- Compliance to the Building Code of Australia for all cabling and with reasonable directions provided by authorised developers, builders, owners, managers and customers in respect to building and fire authority requirements. In the cases where requests are received which are regarded as unreasonable, advice may be sought.

2.3 ACMA Wiring Rules

The ACMA wiring rules do not generally apply to cabling up to and including the network boundary point. Any cabling work performed on the customer side of the network boundary point is subject to ACMA requirements. Cabling work includes the connection, installation or maintenance (repair) of customer cabling.

2.4 Network Boundary Point

The Network boundary point will be at the service output ports on the NBN Co. NTU, ie, the data (UNI-D) and phone (UNI-V) service sockets on the rear of the NBN Co. NTU. (As per AS/ACIF S009 – 2006 the NTU is labelled as a Network Terminating Device (NTD)).

3 MDU Specifics

This section defines how to classify MDUs in accordance with NBN Co's categories, and the appropriate MDU size required to support the dwellings and services, including the dimensions and clearances for wall or Telecommunications Closet Riser/Cabinet installation.

3.1 NBN Co's MDU Categories

MDU's are classified by NBN Co. according to the types of buildings on a building site or development. Each MDU within a development can be categorised by one of the following definitions:

- Horizontal MDUs - Two or more adjoining premises with a single common building entrance, where all premises have a ground floor.
- Vertical MDUs - Two of more premises with a single common building entrance, where at least one premise does not have a ground floor.
- Hybrid MDU developments - A combination of Horizontal and Vertical MDUs on a single development.

| MDU Category | Characterisation |
|-------------------|--|
| Horizontal | Close resemblance to single dwelling units in a street. Buildings maybe clustered into semidetached or terrace arrangements, but the entry facility is common for at least two living units. Pathways between living units resemble those detailed in NBN guide NBN-NO-GDE-0010 [8]. |
| Vertical | Multiple floors, multiple living units per floor, likely to have several vertical spaces for services. Includes one or more telecommunications rooms/spaces as per AS/NZS 3084:2003 [5] |
| Hybrid | Multiple buildings on a site. Apartments in horizontal and vertical configurations that may have common access pathways between structures. Multiple access spaces are generally required. |

Table 1 – MDU Categories

3.2 MDU Size Classification

All buildings or sites are classified by NBN Co. based upon the passive optical fibre technology increments, that is, 12, 24, 48 and so on. In order to determine the appropriate MDU size:

1. Determine the number of living units or dwellings
2. Determine the additional services to be included, such as, Fire lines, Lift phones and so on
3. Add the number of units and services together, to obtain the total number of units
4. Refer to the table below to establish the MDU Size for the total number of units calculated:

| Total No Units including Services | MDU Size |
|-----------------------------------|----------------|
| 2-9 Units | Very small MDU |
| 10-30 Units | Small MDU |
| 31-60 Units | Medium MDU |
| 61-110 Units | Large MDU |
| 111 and above | FDA MDU |

Table 2 - MDU Size Classification Summary

3.3 MDU Space Requirements

This section specifies the minimum requirements for the various MDU types, however, these are standard guidelines only, please refer any concerns to NBN Co for non-standard installations or specific recommendations.

3.3.1 Basic Principles

The following installation principles apply:

- Space requirements must be applied in accordance with AS/NZS 3084:2003 [5], unless otherwise specified in this document.
- The NTU and PSU must be located in an area that is accessible by the end user at all times. For example, access maybe restricted if either the NTU and PSU are installed in a telecommunications cupboard/riser or adjacent unit – this is therefore not an acceptable solution.

3.3.2 Building Entry

Where Lead-in/Building entries apply:

- For **Very Small** and **Small MDU's** - NBN Co requires 1 x white 23 mm (nominal internal diameter) PVC conduit with a minimum wall thickness of 1.55mm
- For a **Medium or Larger MDU's** - NBN Co requires 1 x white 52 mm (nominal internal diameter) PVC conduit with a minimum wall thickness of 3.45mm

Building entry conduit must terminate at the same level and no more than 15 meters from the entry location.

3.3.3 Basement or Telecommunications Room

For Basement or Telecommunications room installation, the specific area and clearance requirements will depend upon the number of living units being supported. Refer to Figure 2 as an example of a Large Vertical MDU installation which could support 144 living units within a single structure.

This configuration may be replicated multiple times for very large developments, however it is recommended to refer the layout/design to NBN Co for each large installation to confirm compliance.

Refer to Figure 2 for the generic clearance/space requirements for larger MDU developments (Access clearances are defined in AS/ACIF S009:2006, figures D.2 and D.3 [7] and replicated here as appropriate for reference.).

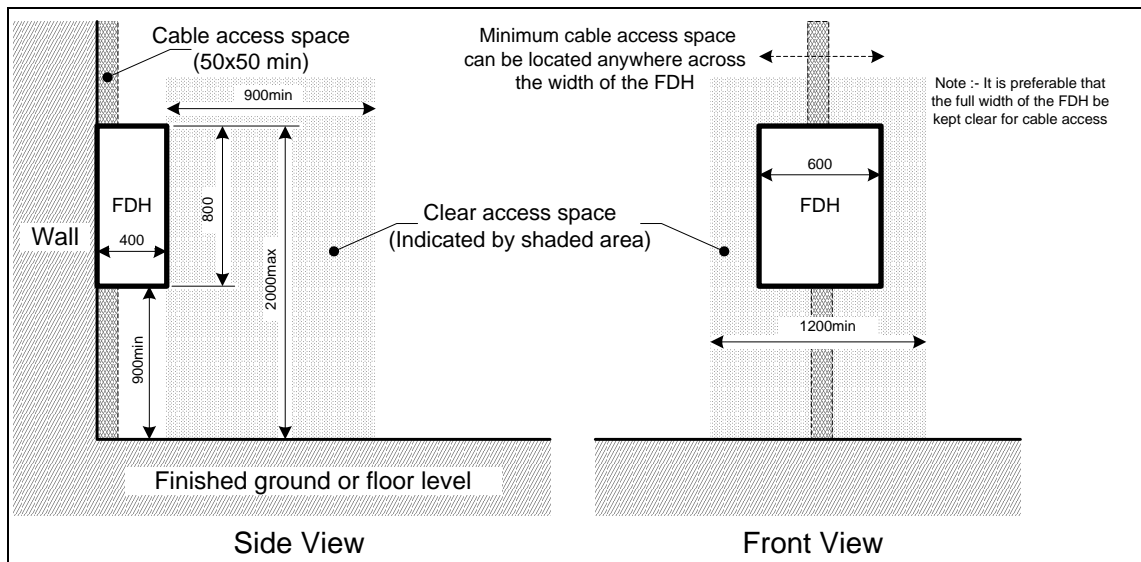


Figure 2 - Fibre Distribution Hub/Internal Locations Clearance Requirements

3.3.4 Telecommunications Riser/Closet

The Telecommunications Closet/Riser Cabinet for the NBN Co fibre distributor or collection point requires a minimum of 300x300x200mm with a minimum of a 50x50 mm floor slot or 1 x white telecommunications conduit cut nominally 25mm above or below the floor slab, as appropriate. If there are living units above and below the floor slab, bi-directional access is required. Refer the figures below for equipment dimensions and clearances for installing in a Telecommunications Riser/Closet. Note, the diagrams do not include the conduit or other pathway to units.

Any fire stopping requirements for penetrations of the walls, floors or ceilings must be installed in accordance with the Building Code of Australia (BCA) [9]

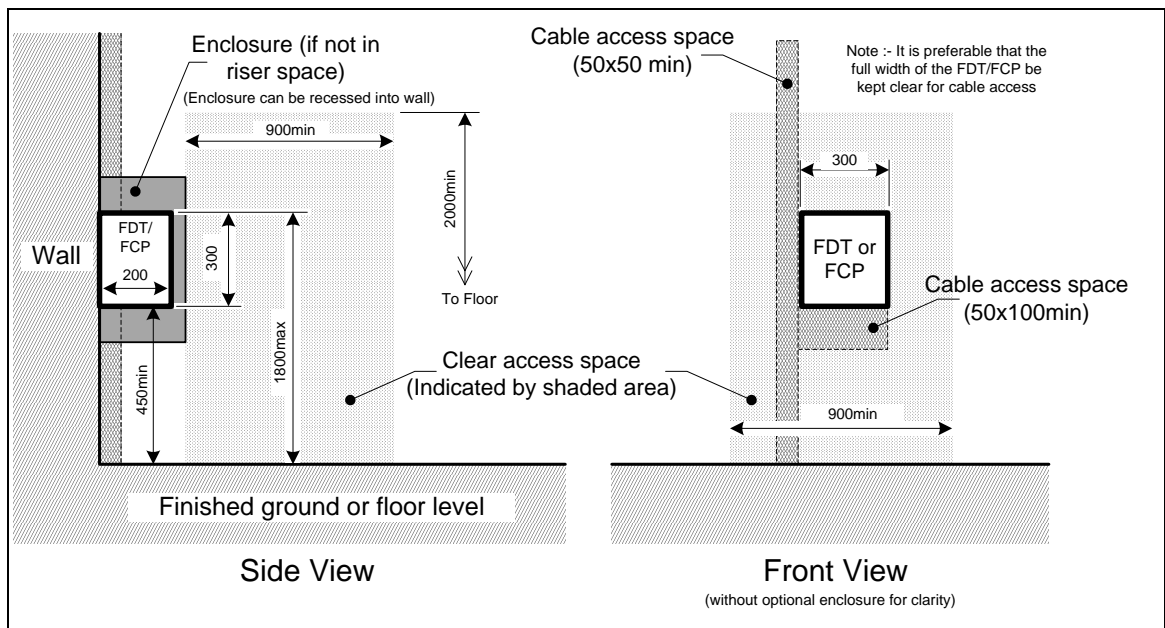


Figure 3 - Telecommunications Riser/Closet – FDT or FCP space requirements

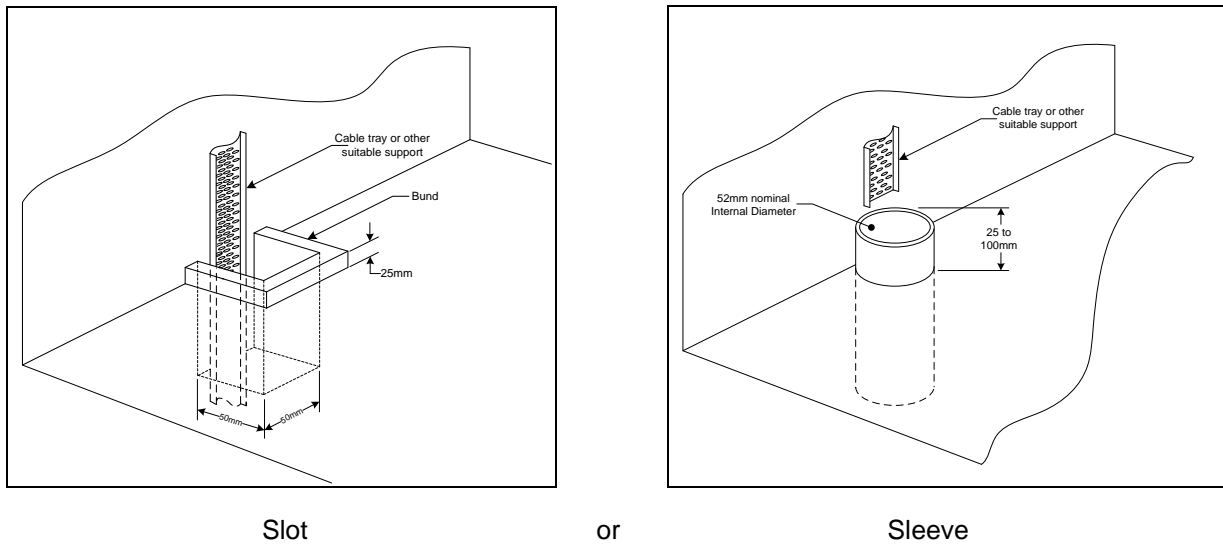


Figure 4 – Telecommunications Riser/Closet Floor or Ceiling entry

- For vertical pathways between floors, as a minimum the ability to anchor cables every 800mm is required.

3.3.5 From Telecommunications Riser/Closet to Living Unit

Cabling from the Living Unit to the Telecommunications Riser/Closet requires a minimum of a 23mm inside diameter rigid communication conduit with a draw rope from the Telecommunications Riser or Closet location to each NTU location within a premises.

No section of conduit shall be longer than 50 meters between pull/draw points and contain the equivalent of no more than three 90° 300mm radius bends.

Table 3 details the allowable pathway solutions in order of preference by NBN Co.

| Cable Pathway Type |
|---|
| 23mm nominal internal diameter rigid communications conduit |
| Cable tray |
| Duct (other than rigid conduit) |
| Catenery |

Table 3 – Allowable Telecommunications Riser/closet to premises/living unit optical cabling pathways

3.3.6 Living Unit

The minimum space required for the installation of NBN Co's NTU, PSU and FWO is set out below. (Figure 5)

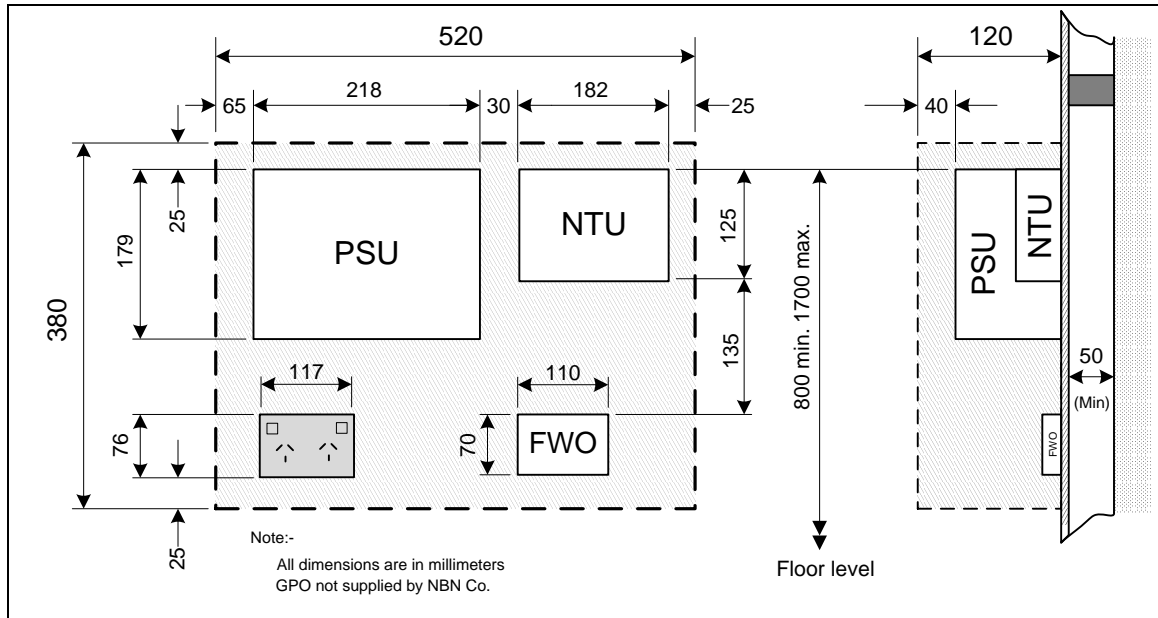



Figure 5 - NBN Co NTU and PSU dimensions and clearance requirements

| | | |
|------------------------------|---|--|
| <p>Important Note</p> |  | <p>NBN Co prefers that the NBN equipment is co-located with the home wiring distributor, however, individual unit pairs (FWO/NTU and the PSU/GPO) can be in different locations, provided they are no more than 20 meters apart.</p> |
|------------------------------|---|--|

3.3.7 Additional In-Building Telecommunication Services

Building/common services such as fire lines and lift phones also require the same installation dimensions and clearances as defined in 7 above. Note each NTU has the capability to deliver 2 voice grade services (UNI-V) and 4 data services (UNI-D).

Appendix A – Key Terms

| Term | Description |
|--------------------|---|
| ACMA | Australian Communications and Media Authority. It is the Federal Government body that licenses Australia's telecommunications carriers and regulates fixed line and mobile telecommunications. |
| BCA | Building Code of Australia |
| FCP | Fibre Collection Point |
| FDA | Fibre Distribution Area. The area served via a single Fibre Distribution Hub (FDH) |
| FDH | Fibre Distribution Hub |
| FDT | Fibre Distribution Terminal |
| FWO | Fibre Wall Outlet |
| FSA | Fibre Serving Area |
| FSAM | Fibre Serving Area Module |
| GPO | General Purpose Power Outlet |
| LFN | Local Fibre Network |
| Living Unit | A valid physical address in the Geocoded National Address File (GNAF) provided by PSMA Australia Limited. |
| MDU | Multi Dwelling Unit. Typically refers to blocks of flats, apartments etc. but can include a mix of retail and commercial premises. |
| NTD | Network Terminating Device |
| NTU | Network Termination Unit. The NTU is an active device that terminates the optical signal from the NBN and then provides one or more Service Delivery Points (SDPs) as physical electrical interfaces. |
| ODF | Optical Distribution Frame. A passive device which terminates cables, allowing arbitrary interconnections to be made. |
| OLT | Optical Line Termination. The terminal equipment to provide the Gigabit Passive Optical Network (GPON) signals to each of the Fibre Distribution Areas (FDAs). |
| ONT | Optical Network Terminal. Generic term for the device at the user / customer end of an optical communication network – referred in NBN documentation as an NTU. |
| PCD | Premises Connection Device. A connection-point; box, or connector where drop fibre cable finishes and Premises fibre cable commences. May incorporate 'slack' cable storage. A convenient place to cease build drop activity and commence customer connection activity. |

| Term | Description |
|-----------------|---|
| Premises | Residence, Unit, House, Occupancy, Tenancy, Retail, Shop Front, Hotel, Hostel, Doctor, Medical, Clinic, Medical Imaging Centre, Laboratory, Living Unit etc. 'Premises' is not the singular form of Premises. A valid physical address in the Geocoded National Address File (GNAF) provided by PSMA Australia Limited. |
| POI | Point of Interconnect |
| PSU | Power Supply Unit |

Table 4 - Acronym Definitions

Appendix B – Key Documents

The following documents were used as reference when writing this document, or are related to this document.

| Document Ref | Document No | Document Title | Owner/Link |
|--------------|-------------------|--|--|
| [1] | AS/NZS 1477:2006 | PVC pipes and fittings for pressure applications | Standards Australia |
| [2] | AS/NZS 2032:2006 | Installation of PVC pipe systems | Standards Australia |
| [3] | AS/NZS 2053:2001 | Conduits and fittings for electrical installations | Standards Australia |
| [4] | AS/NZS 3080:2003 | Telecommunications installations – Generic Cabling for commercial premises | Standards Australia |
| [5] | AS/NZS 3084:2003 | Telecommunications pathways and spaces for commercial buildings | Standards Australia |
| [6] | AS/ACIF S008:2006 | Requirements for customer cabling | Australian Communications Industry Forum |
| [7] | AS/ACIF S009:2006 | Installation requirements for customer cabling | Australian Communications Industry Forum |
| [8] | NBN-NO-GDE-0010 | Installing Pit and Conduit Infrastructure – Guidelines for Developers | CTO/NAT |
| [9] | | Building Code of Australia | www.abcb.gov.au/ |