

Structured Cabling Systems Specifications and Standards

Flinders University



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Document Control

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1. General

1.1 Introduction

This document specifies the minimum standard for the design, installation, maintenance and removal of any communications cabling and infrastructure for Flinders University of South Australia.

This standard is to be used by Flinders staff, Engineers, Project Managers, and Installation Technicians in conjunction with the any relevant Australian laws and regulations (Reference A), information contained within should be dispersed to Architects, Designers and Engineers to ensure a design is produced, meeting all the requirements of these Standards.

All standard installations shall comply with the details as outlined in this document, any other works shall be completed in conjunction with this document and accordance with project specific documentation detailing scope of works and requirements.

Flinders University IT Network Team must be contacted prior to any cabling works commencing and for any elements of this document requiring clarification.

1.2 Definitions

All terms used in this document are as defined by the Australian Standard document AS/NZS 11801.x.

Acronym	Definition
FUSA	Flinders University of South Australia
CD	Campus Distributor
BD	Building Distributor
FD	Floor Distributor
TO	Termination Outlet
WAP	Wireless Access Point
CCMK	Communication Cabinet Master Key
RU	Rack Unit

Any items NOT specifically addressed in this document should meet the minimum requirements as laid out in the applicable Australian Standards.

1.3 Work Health and Safety

All contractors that perform work:

- must comply with the FUSA OHS&W policy which can found at <https://www.flinders.edu.au/policies#health>
- shall comply with Flinders Universities Supplementary Requirements of Contractors – refer Appendix A.

1.4 Workspaces

In work areas designated for Staff or Students with fixed installations, each workstation shall have a minimum of one category Cat6A communication data outlet installed

1.5 Communications Rooms

1.5.1 Locks

Communication rooms shall be designed and sized as per AS/NZS 11801. And must be lockable with a Flinders University (CCMK). Refer to Appendix B.

1.5.2 Size

The preferred minimum size of a floor distributor for Flinders University should be as follows:



Standard 2 rack communications room

1.5.3 Cabinets

All Cabinets that are used shall be of to 760 x 1080 mm x 42RU construction unless otherwise detailed, those used in publicly accessible areas must be lockable and re-keyed with a Flinders University (CCMK). Cabinet lay out refer Appendix G.

1.5.4 Cable Management

Vertical cable management is required to be installed on both sides of the full length of all communications cabinets.

Horizontal cable management shall be at least at the rate of 1 single RU cable minder per 48 ports.

1.5.5 Site Details

The contractor shall refer to the detailed design document for site installation requirement for specific site details.

1.6 Backbone Cabling (Analogue Services)

Category 3 cable shall be used to supply analogue services across the backbone cabling system if needed.

The contractor shall refer to the detailed design document for site installation requirement for specific site details.

All backbone cable shall be home run between the BD and FD on each floor. Cable pairs shall be terminated and tested for continuity (wire map).

Refer to detailed design document or scope of works for site requirements.

1.7 Optical Fibre Cabling

All optical fibre components shall be of the same manufacture of the new system that has been installed.

All fibre cables shall be terminated with standards compliant LC type connectors.

The use of Hybrid patch cords to accommodate the connection of active equipment is allowed.

All fibre termination shelves shall be labelled with laser radiation warning labels.

All fibre shall be single mode and OS 2 compliant fibre.

A minimum of 24 -core single mode fibre shall be installed for inter-building backbone cabling.

Refer to the scope of works or detailed design document for specific requirements.

1.8 Horizontal Distribution

1.8.1 Cable Run

Flinders University require that all cabling be run be in a home run configuration.

- From building / floor distributor to communication outlet, for horizontal cabling.
- From building distributor to floor distributor, for backbone cabling.

1.8.2 Cable Design

Flinders University have two Horizontal designs. that can be used as follows:

- An RJ45 interconnect design shall be used on all installations.
- There are existing installations that use SYSTIMAX VisiPatch or the Cat6A VisiPatch 360 system which uses reverse patch leads. Please liaise with Flinders IT Networks team to discuss options for these locations.

1.8.3 Cabling Install

All cables shall be run on standards compliant support structures, for example cable tray, Catenary wire, or J Hooks. Cables shall not be laid on ceiling tiles nor tied to ceiling supports in any way.

1.9 Patch Cords and Fly Leads

All patch cords and fly leads shall match the category and design of the hardware used within the structured cabling system. Slimline patch leads are required to be used unless prior negotiations with the Flinders Networks IT team have taken place.

The contractor shall refer to the detailed design document for site installation requirement for specific site details.

Minimum quantities of patch leads, and fly leads are required for each new project. Patch cords refer to the floor distributor and fly leads refer to the outlet in the horizontal.

A patch lead count of 100% is required for each new outlet installed (1 x patch cord and 1 x fly lead)

1.10 Testing and Labelling

1.10.1 Installation Testing

The installation shall be thoroughly tested to ensure the as-built performance meets the requirements specified within the Detail Design document and other such specifications referenced either explicitly or implicitly.

The installation shall not be deemed complete until all wiring and equipment has been checked and tested to the satisfaction of the Flinders Networks IT Team or representative.

The Contractor shall supply all testing equipment.

At least 2 days' notice of any compliance tests shall be given to the Flinders Networks IT Team or representative, who shall witness such tests at their discretion.

1.10.2 Test Results / Reports

Test reports must be submitted to the Project Manager within two weeks of test completion.

Test results shall be supplied in an unaltered format; that is as they are printed from the test equipment with no alteration.

As a minimum one soft copy of test results and point locations shall be supplied per site.

1.10.3 Labelling

New outlet installations shall be clearly labelled in the following format:

- Communications Room Name / Termination number (e.g. CC1/F12)
- Each outlet shall also be individually labelled (refer Appendix F)

LABELLING EXAMPLE (for comms room and for data outlet)

1.11 Documentation

1.11.1 Checklist for Flinders University Networks Team

Please refer to Appendix I for a one-page document that is required to be completed prior to handover of any cabling works to the University.

1.11.2 System Documentation

Flinders University expects documentation to be supplied to the Flinders Networks IT Team prior to hand-over of any structured cabling system.

Please refer to Appendix C of examples of records that must be maintained in each FD.

As a minimum one soft copy of test results and point locations shall be supplied per site.

1.11.3 WAPs

All new WAP points must be added to existing documentation, this must be supplied in the appropriate format. Appendix D.

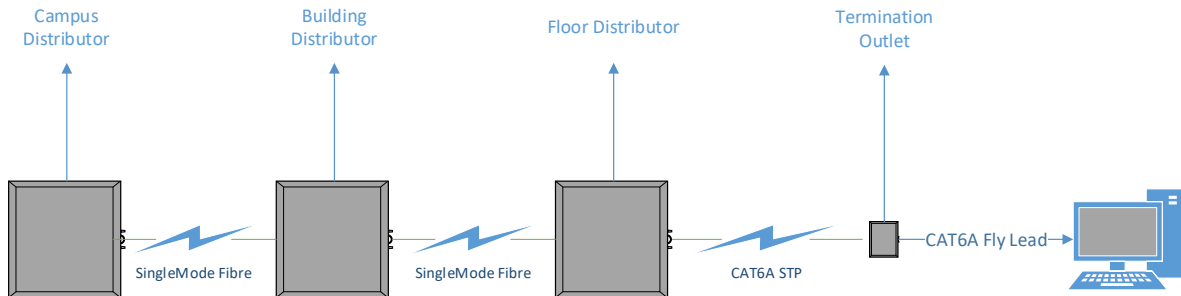
It is recommended that each FD shall be supplied with a Horizontal cabling plan view of where the outlets and WAP points are located.

1.12 New Buildings

All new structures must have provision to connect to the underground communications ducting network as part of the building construction. Appropriate space for communications equipment must be provided within the structure, and the communications conduits must be connected to the underground communications ducting network. Flinders Networks IT Team will specify the required ducting connections, which may not run in the same direction as the electrical conduit connections.

1.13 Topology

All installations shall comply with the following standard topology.



2. Specifications

2.1 Data Centre and Termination Types

2.1.1 Cable / Communication Minimum Standard

All new data cabling installations must meet a minimum standard Category 6A cable standard and be Shielded Twisted Pair (STP) construction type.

All new installations shall be 8 position, 8 pin RJ45 terminations unless otherwise specified. The termination method shall comply with manufacturer specifications and be of T568A termination method, refer Appendix E

All communications rooms have designated cabling zones, all cabling installations shall be a maximum 90 metres in length and return to the locally zoned communications room. Data cabling servicing campus critical devices may not always run to the local termination point, such installations will require clarification from Flinders Networks IT Team, to ensure redundancy requirements are met.

2.1.2 Cable Termination

Communications rooms with existing patch panels of the same manufacture type, should be fully populated prior to the installation of additional patch panels.

2.2 Optical Fibre Cable Types and Sizes

All optic fibre installations should include a minimum of 5 metres of coiled spare fibre.

Cables and termination shall be cleared labelled, including cable type/size and destination.

A minimum of 24 cores shall be installed from any floor distributor to building distributor.

A minimum of 48 cores between buildings.

Minimum of 6 cores for non-communication room connections.

Flinders University does not currently provide "Fibre to the Desktop" connections. Any installation of this type requires written confirmation from Flinders University Network Team.

2.3 Wireless Access Point Installation

The installation of all WAPs must be authorised by Flinders University IT staff.

WAP hardware will only be provided by Flinders University IT.

All WAPs are to be installed on the underside of any ceilings fixed or suspended. Data outlets for WAPs however are to be installed within ceiling spaces where applicable and clearly labelled (Appendix H). All install details must be provided prior to handover as listed Appendix D.

2.4 Demolition

Any spaces identified for demolition or refurbishment requires any obsolete cables to be removed in their entirety. Removal of obsolete cabling involves the removal of the full length of cabling along with the removal of terminations and any associated hardware.

2.5 Cable Pathways and Infrastructure

This section describes the minimum requirements in terms of quality of workmanship for passive cabling installations.

2.5.1 Civil Works

Excavation shall be the responsibility of the Contractor unless explicitly specified to the contrary.

The Contractor shall be responsible for all excavation, cable protection, back fill, surface restoration and the installation of cable markers.

All excavation and back fill works shall be carried out with the use of hand tools. The use of mechanical or power-assisted tools shall be permitted only when specifically stated in the contract documents or authorised in writing by the assigned Project Manager.

Before proceeding with any excavation work, the Contractor shall ascertain details of any underground services in the area.

Where excavations are required near footings, foundations, concrete floors etc, the Contractor shall ensure that the earthworks do not interfere with these structures and backfill is well consolidated.

Unless otherwise agreed by the Project Manager, the Contractor shall arrange the installation so that all trenches are excavated and back filled on the same day.

The Contractor shall ensure that the specified safety precautions are observed at all excavations by the provision of safety barriers, warning notices, shoring, work authority requirements are obtained and any other items as deemed necessary are provided.

2.5.2 Cable Installation (Outdoors)

Cables installed in outdoor areas must comply with ACMA Australian Standard requirements. All Cable types, depths, identifications, segregation, conduits, and mechanical protection must meet the minimum of these Australian Standards.

All underground cable will be contained within 1 x 100mm or 2 x 80mm conduits minimum. The installation of the conduit and pit system is defined in this document.

All conduits shall be sealed to prevent rodent occupation.

2.5.3 Communication Pits

When required pits shall be installed every 90 metres or at every change in direction. The Contractor shall install a pit having adequate dimensions to contain loops of cabling while maintaining the manufacturers, minimum bend radius requirements.

Pits shall be minimum 600mm X 600mm

Each pit shall be provided with a seepage hole cast into the bottom surface to allow the disbursement of any accumulated water.

Pits shall be provided with trafficable lids. Clearly identifiable as "FUSA".

Pit lids should be capable of being locked to prevent unauthorised entry. Entry points shall be sealed to prevent rodent occupation.

All pit installation shall comply in full to the manufacturer installation guidelines.

A minimum of 1m coil of slack shall be left in each pit.

2.5.4 Reinstatement of Penetrations

The Contractor shall effectively seal all openings (made or provided) in or through building walls, floors, etc. after cable reticulation.

The Contractor shall effectively fireproof any openings (made or provided) in or through building walls, floors, etc. with approved fire-retardant materials where such sealing is deemed necessary.

Before making a penetration through a beam or floor, liaise with Flinders University Project Manager to arrange an Engineering report before coring of floors or beams. Engineers will specify hole size and spacing.

The Contractor shall effectively seal all cable duct openings above ground level, and all cable entries into trenches in buildings to prevent the ingress of moisture and the entry of rodents.

The Contractor shall ensure that all openings through roofs and external walls are made weatherproof including the installation of flashing and/or rain hoods to prevent the entry of driving rain, seepage, etc.

3. Appendices

3.1 Appendix A

3.1.1 Supplementary Requirements of Contractors

In addition to matters specifically referred to in the specification contractors will be required to observe the following requirements. Failure to observe these requirements may jeopardise the award of future contracts to the contractor. The Contractor shall be responsible for all employees, subcontractors and employees of subcontractors engaged by the Contractor. The supplementary requirements of contractor's policy can be found at:

<https://www.flinders.edu.au/content/dam/documents/staff/policies/health-safety/contractor-safety-management-procedures.pdf>

3.2 Appendix B

3.2.1 Communication Rooms

AS/NZS 11801, Communications Pathways and Spaces for Commercial Buildings.

Communication rooms (Floor Distributors) shall be able to contain communication equipment, cable terminations and associated cross connect cables. Communications room shall be appropriately cooled and free from dust and debris to meet requirements of the active hardware installed.

The communication room should be located as close as practical to the centre of the area being served and preferably in the core area. Horizontal pathways should terminate in the communications room located on the same floor as the area being served.

Size and spacing requirements:

Serving Area (sq.m)	Recommended Room Dimensions (mm)	Minimum Internal Area (sq.m)
1000-1500	3000 x 3400	10
800- 999	3000 x 2800	8
500-799	3000 x 2200	6

3.3 Appendix C

3.3.1 Patch Record Examples

Hand-over Documentation Requirements

The Contractor shall maintain on site, a set of drawings including the Customers Name construction drawings and all others that the Contractor produces for installation, progressively marked up to cover the actual “as-built” installation.

24 PATCH PANEL RECORDS

LOCATION:.....

Panel ID:.....												
Room/Ext												
Patch	1	2	3	4	5	6	7	8	9	10	11	12
Patched To												
Room												
Patch	13	14	15	16	17	18	19	20	21	22	23	24
Patched To												

Panel ID:.....												
Room/Ext												
Patch	1	2	3	4	5	6	7	8	9	10	11	12
Patched To												
Room/Ext												
Patch	13	14	15	16	17	18	19	20	21	22	23	24
Patched To												

Panel ID:.....												
Room/Ext												
Patch	1	2	3	4	5	6	7	8	9	10	11	12
Patched To												
Room/Ext												
Patch	13	14	15	16	17	18	19	20	21	22	23	24
Patched To												

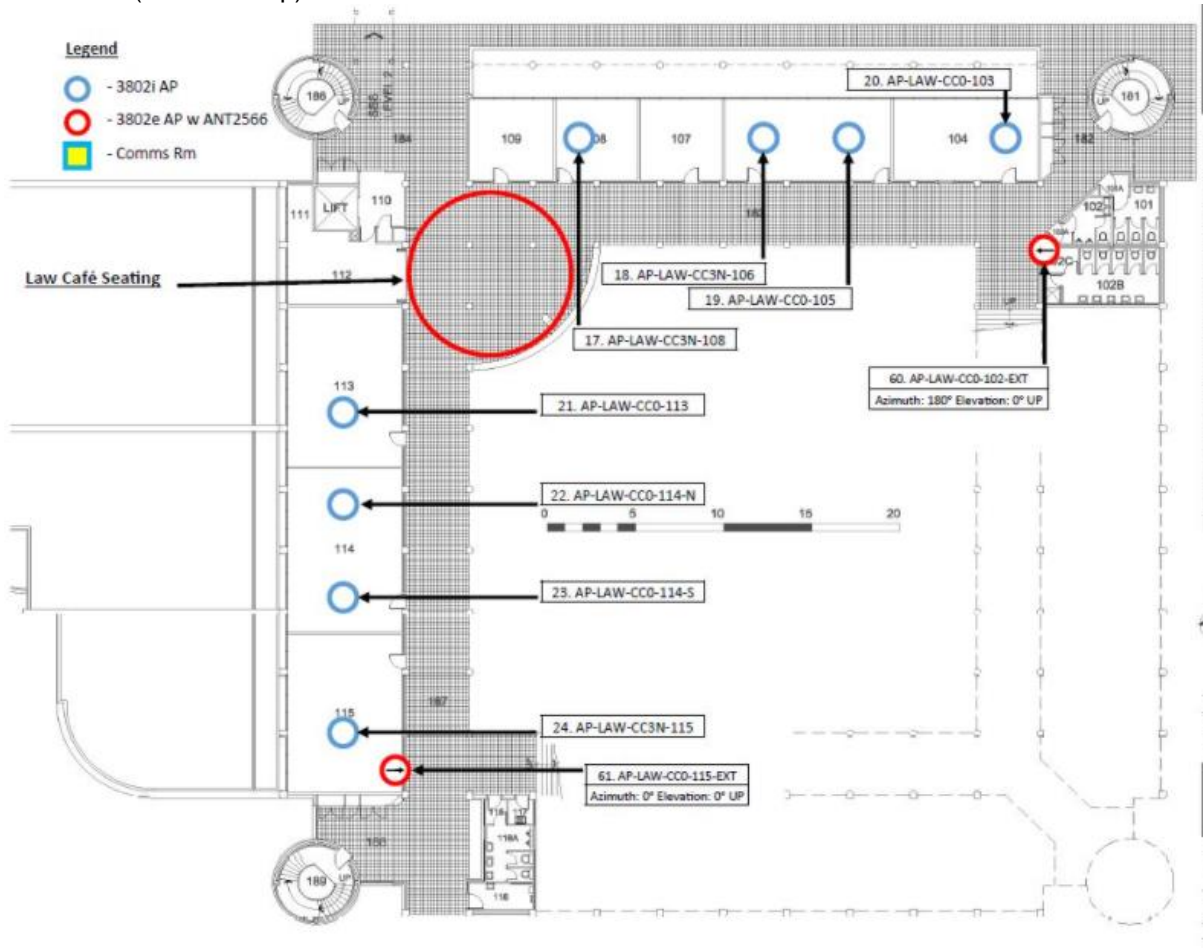
3.4 Appendix D

3.4.1 Wireless Access Point Documentation

Contractors are to provide the following details at the completion of any wireless access point installation.

Examples of requirements:

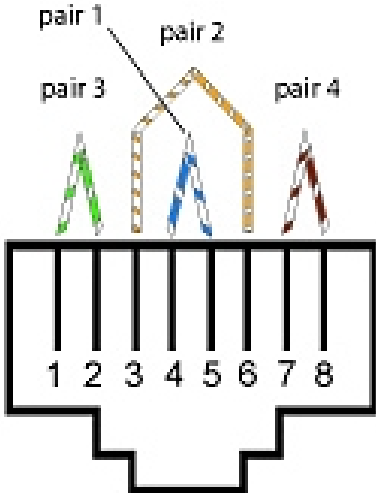
Floor Plan (with mark-up)



AP	AP Name	Location	Serial No	MAC Address	Data Outlet No	Switch Detail	GPS LOCATION
1	AP-LAW-CCO-NTH4-NW	Level 0	FGL2150A0ZT	00:a7:42:98:7e:de	CCO/B-187	10.1.36.11 2/0/48	35°1'38.9"S 138°34'27"E
2	AP-LAW-CCO-NTH4-NE	Level 0	FGL2150A0QY	00:a7:42:b7:63:c6	CCO/B-183	10.1.36.11 2/0/39	35°1'38.9"S 138°34'27.3"E
3	AP-LAW-CCO-NTH4-C	Level 0	FGL2150A0KH	00:a7:42:b7:b8:88	CCO/B-185	10.1.36.11 2/0/40	35°1'39"S 138°34'27.1"E
4	AP-LAW-CCO-NTH4-SW	Level 0	FGL2150A0N7	00:a7:42:98:78:f8	CCO/B-186	10.1.36.11 2/0/41	35°1'39.1"S 138°34'26.8"E
5	AP-LAW-CCO-NTH4-SE	Level 0	FGL2150A0J2	00:5d:73:44:56:28	CCO/B-184	10.1.36.11 1/0/45	35°1'39.1"S 138°34'27.3"E
6	AP-LAW-CCO-NTH5-NW	Level 0	FGL2150A0HZ	00:a7:42:c3:58:e2	CCO/B-180	10.1.36.11 1/0/48	35°1'39.4"S 138°34'26.9"E
7	AP-LAW-CCO-NTH5-NE	Level 0	FGL2150A0JL	00:5d:73:44:56:b8	CCO/B-181	10.1.36.11 1/0/41	35°1'39.4"S 138°34'27.4"E
8	AP-LAW-CCO-NTH5-C	Level 0	FGL2150A0Q4	00:a7:42:f1:6f:e4	CCO/B-179	10.1.36.11 4/0/31	35°1'39.5"S 138°34'27.1"E
9	AP-LAW-CCO-NTH5-SW	Level 0	FGL2150A1YW	00:a7:42:f1:71:d8	CCO/B-178	10.1.36.11 4/0/30	35°1'39.6"S 138°34'27"E
10	AP-LAW-CCO-NTH5-SE	Level 0	FGL2150A0H7	00:5d:73:44:56:f6	CCO/B-177	10.1.36.11 4/0/29	35°1'39.6"S 138°34'27.4"E
11	AP-LAW-CCO-MOOT-N	Level 0	FGL2150A0QT	00:a7:42:98:81:68	CCO/B-174	10.1.36.11 4/0/26	35°1'39.7"S 138°34'27.2"E

3.5 Appendix E

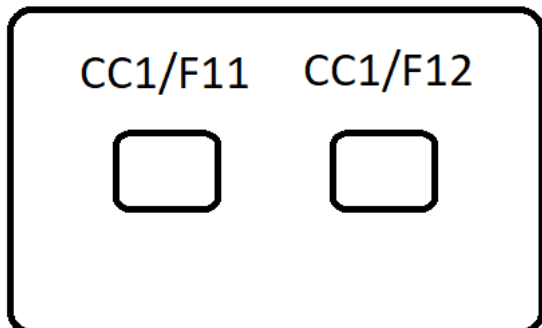
3.5.1 T568A Wiring Scheme



3.6 Appendix F

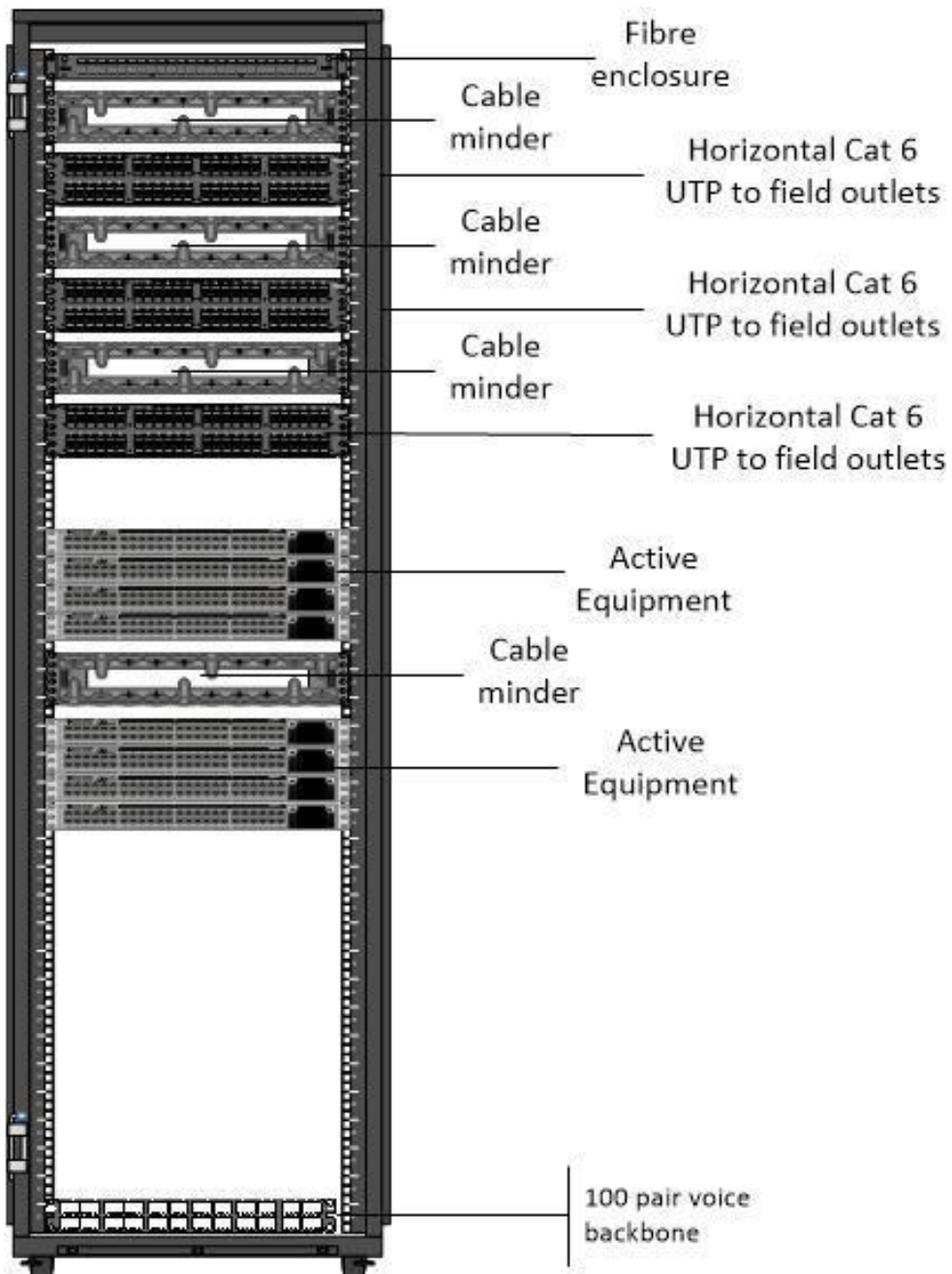
3.6.1 Standard Data Outlet Labelling

Communications Room Name / Termination number



3.7 Appendix G

3.7.1 Standard Rack Layout



3.8 Appendix H


3.8.1 Wireless Access Point Installation and Labelling



3.9 Appendix I

3.9.1 Network/Cabling Checklist Document

To be completed prior to handover of any cabling works.

Flinders University IDS – Network/Cabling Checklist	
	
<p>As part of any building works across Flinders University we request that the following be undertaken to allow for the planning, installation and handover of all network/cabling components:</p>	
<ul style="list-style-type: none">• Prior to any work starting, an on-site meeting between IDS Networks, Cabling/Data contractor and the Project Coordinator to discuss proposed and ongoing works, in particular:<ul style="list-style-type: none">○ Cable runs and preferred communication room(s)○ Preferred termination method in communication room(s)○ Labelling and data point naming conventions○ Clarification and documentation of any other uncertainties	
Job Details	
Job Description	
Project Coordinator	
Contractors Name and contact details	
Deliverable Checklist	
<ul style="list-style-type: none">• Example documentation can be supplied upon request• All documentation must be in electronic form• Each deliverable needs to be completed prior to occupation of project space• Any questions or uncertainties, please contact the Networks Team for clarification	
Description of Deliverable	Completed
As-built documentation detailing the exact location and labelling of each new/modified data outlet <i>Note: Building maps are available upon request</i>	
Documentation detailing the cable runs and termination locations	
Test results for each data outlet or fibre run <i>Note: The test results must be completed by a Fluke Network Testing tool or equivalent type hardware.</i>	
All data outlets are to be patched into Flinders active infrastructure in communications room and complete patching schedule to be supplied <i>NOTE: All patch leads need to be supplied as part of the project</i>	
As-built documentation detailing the exact location of any hardware installed (new or refurbished), particularly Wireless Access Points (WAPs). Please see attachment for expected level of documentation <i>Note: includes MAC addresses, data outlet numbers, GPS coordinates</i>	
Flinders University Network Team Contact Details:	
(08) 72218300 network.services@dl.flinders.edu.au	

4. Reference A

Standard	Description
AS/NZS 3000:2018	Standards Australia Wiring Rules
AS/NZS 11801-1	General requirements
AS/NZS ISO/IEC 11801-2	Office premises
AS/NZS ISO/IEC 11801-3	Industrial premises
AS/NZS ISO/IEC 11801-4	Homes
AS/NZS ISO/IEC 11801-5	Data Centres
AS/NZS ISO/IEC 11801-6	Distributed building services
AS/NZS 4703:2007	Electrical wiring in furniture
AS/CA S008:2020	Customer cabling products
AS/CA S009:2013	Installation customer cabling

