

# UWE Estates Design Specification

## Chapter 8: IT & AV Infrastructure



**UWE  
Bristol**

University  
of the  
West of  
England

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### Change Control

Version Number	Date of Issue	Section Ref	Brief Description of Change(s)	Authored	Endorsed
2019	May 2019	ALL	All sections have changes, all separately itemised in 2019 version.	Jeni Stevenson	Nigel Cooper
2019	Nov 2019	ALL	Various updates all itemised in 2019 version.	Jeni Stevenson	Nigel Cooper
2021	Jan 2021	ALL	Various updates all itemised in 2021 version.	Jeni Stevenson	Nigel Cooper
2022	Jan 2022	ALL	Various updates all itemised in 2022 version.	Jeni Stevenson	Nigel Cooper
2023	Jan 2023	None	NO CHANGES	Jeni Stevenson	N/A
2024	Feb 2024	ALL	Chapter 10 AV incorporated into Chapter 8 IT. ALL sections updated, moved, and amended.	Jeni Stevenson	Alistair Brooke
2025	Jan 2025	ALL	Tidied generally throughout.	Jeni Stevenson	Alistair Brooke
2026	Feb 2026	4	Standards change for BS7671:2018+A2. Add Brady labels for underground cable identification in ducts.	Jeni Stevenson	Richard Kimber
2026	Mar 2026	ALL	Full review of content and order	Jeni Stevenson	Richard Kimber

### 0. Construction Check List

It may help using the below checklist to ensure all relevant considerations are made, further detail is available elsewhere in the chapter.

No.	Consideration	Complete
0	All redundant cable in the project area has been removed and decommissioned back to source.	✓ / ✗
1	Cable routes specified, internal primary and secondary containment. Including break out of building and break into existing ducts when required.	✓ / ✗
2	Comms Room placement agreed, taking account of cable lengths and containment routes	✓ / ✗
3	Comms Rooms specified, taking account of UWE requirements detailed in chapter	✓ / ✗
4	Contractor compound and plant equipment placements not restricting access to existing cable and other service ducts	✓ / ✗
5	Live data cables that are routed through an area that is being refurbished must be clearly marked or moved out of the way of any potential damage. UWE's incumbent cabling contractor must be used to do this work.	✓ / ✗
6	Any Wi-Fi access points that are in an area that is being refurbished must be removed and stored for safe keeping, again by UWE's incumbent cabling contractor.  Once building work is complete, the APs will be reinstalled in designated locations, agreed during the design phase	✓ / ✗
7	Any comms cabinet in an area being refurbished must be protected from dust or other contaminants without hindering the cooling of network equipment located in the cabinet. ITS must be consulted and verify that equipment is adequately protected before work begins	✓ / ✗
8	Comms Rooms in ready state (with power, lighting, secure door, ventilation or cooling as required) to enable commissioning of building management systems, etc.	✓ / ✗
9	3 <sup>rd</sup> party connections (via OpenReach) installed and configured	✓ / ✗
10	Fibre Optic cables installed and connected to the UWE core network switches.	✓ / ✗
11	Structured Copper Ethernet cables installed, terminated and labelled at the patch panel and outlet (see note below). All data cabling work must be done by UWE's incumbent cabling contractor, although they can be engaged as a sub-contractor of the M&E contractor on the build project	✓ / ✗
12	Network switches configured and installed	✓ / ✗
13	BMS, Access Control, CCTV, etc. devices installed and commissioned.  ITS infrastructure is required to install the network switches prior to the commissioning of building systems, access control, CCTV, etc. The commissioning schedule should be discussed with ITS infrastructure to ensure the building is delivered on time. Installation and commissioning of the network switches must take place 6 weeks prior to handover to allow for time to commission the building systems and configure network outlets.	✓ / ✗
14	Wi-Fi and AV equipment installed	✓ / ✗

### 1. UWE IT Infrastructure (Internal)

#### 1.1 Cabled Network (Copper & Fibre)

Most buildings will require two cables to enter the building from diverse routes. Fibre cables from the network switches located in the building's comms rooms will need to run through diverse duct routes to the core network nodes, which are 2B11 and 2D86 at Frenchay Campus, 0F5 and 0B4 at Bower Ashton and 1B31 and BH047 at Glenside.

Diverse duct routes will usually be required to provide resilience. A member of the ITS infrastructure team should be involved in pre-construction design.

Named Manufacturer	Incumbent Maintenance Provider	Incumbent Installer
<b>CommScope (Systimax) - Copper</b>	<b>Sceptre Networking Limited</b> 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770	<b>Sceptre Networking Limited</b> 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770
<b>Fibre</b>	<b>Sceptre Networking Limited</b> 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770	<b>Sceptre Networking Limited</b> 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770

All new cabling must be CAT 6a U/FTP – Unshielded outer shell/Foil Shielded Twisted Pair as a minimum with terminations and installation carried out in accordance with the manufacturer's guidelines by a certified installer and covered by a 25-year manufacturer warranty.

Cables and SCS components must be easily identifiable with manufacturing batch information printed directly on to the cable jacket or component surface.

Cable lengths for installed permanent link should be no greater than 90m. Any installs where more than 90m is required, it should be designed out. There are alternate cable types that can be considered, but each occasion must be pre-approved because it may not work with some equipment or items.

No intermediate splices or patch panels should be used in the cable runs. The minimum bend radius should not be exceeded during installation and when the cables are in their final operating position.

The University often has installs audited by CommScope, this is to ensure that the installation meets the standards required for the warranty of 25 years. If a project or install requires a manufacturer audit, then access should be provided to the site (fair warning and notice will be provided)

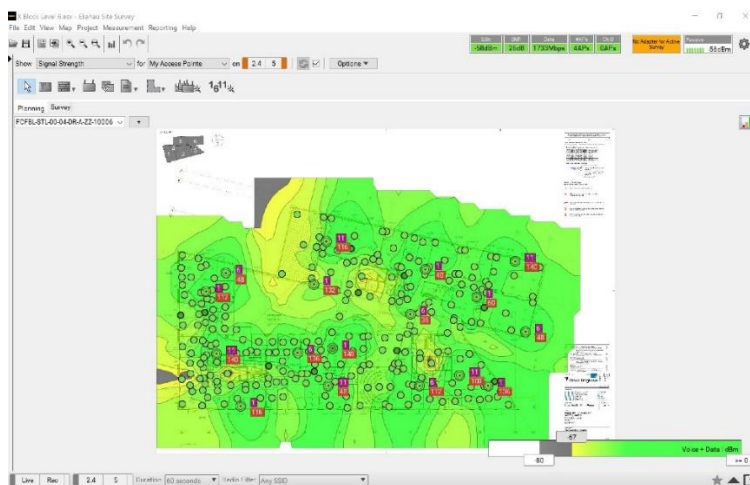
#### 1.2 Wi-Fi Network & Access Points

All buildings should have a Wi-Fi network installed.

Named Manufacturer	Incumbent Maintenance Provider	Incumbent Installer
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<b>Aruba</b>	<b>UWE IT Services</b>	<b>Sceptre Networking Limited</b> 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770
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1. Where refurbishment works are planned in an area that already contains Wi-Fi Access Points, the units must be removed by UWE's incumbent cabling contractor and given to UWE ITS for safe keeping before any building works start. Following completion of works, the process steps 7 and onwards apply. Unless extensive changes to fabric design.
2. UWE IT Services should be provided with each iteration of building drawings in .dwg format as soon as they are available. The .dwg drawings should include occupancy numbers for each room and the room number designations (if known).
3. UWE IT Services staff need to meet with the UWE Estates PM, Architect and UWE's incumbent cabling contractor to further understand the design. In particular...
  - Planned usage of each room – Social, GPT (General Purpose Teaching), etc.
  - Footfall figures in each area
  - Materials used in building fabric – walls, floors, windows
  - Type of ceiling – suspended, raft, open/industrial
  - Any other potential interference sources, i.e. microwave ovens, PIR Sensors
  - Any design anomalies or aspirations
4. UWE IT Services will create a predictive Wi-Fi coverage survey (see screenshot below) using Ekahau modelling software, based on the building drawings and requirements. The predictive survey determines the type of Wi-Fi access points required and their optimum location. UWE IT Services will always provide Wi-Fi Access point that meet the latest IEEE ratified standard.



5. UWE IT Services will provide a building drawing marked with the Wi-Fi access point locations. It is then the responsibility of the project team to determine the most appropriate containment routes, cable runs, etc. to the Access Point locations, ensuring that cable

lengths are within specifications. *Any deviation from the planned location must be agreed in writing with the ITS Network Team before installation and final locations should be marked in the BIM model.*

6. The installation options on Wi-Fi access points are as follows:

a. Option 1 – Ceiling Mounted (1<sup>st</sup> preference)

i. Beneath suspended ceiling tiles



ii. Structural Beams



iii. Building Fabric



b. Option 2 – Semi exposed ceiling

APs should be mounted on ceiling tile “rafters” or “Islands”



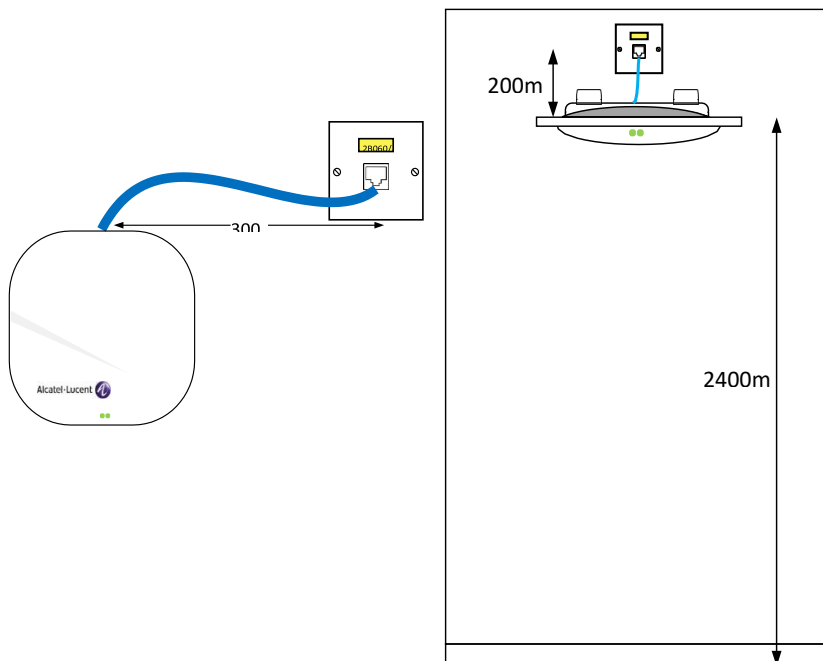
- c. Option 3 – Mount to containment



- d. Option 4 – Wall Mounted (to only be considered if all others are not possible)  
This is the least effective solution of AP mounting.



7. Cabling between outlets and access points should be as follows:



- 8. All Wi-Fi Access Points are purchased via UWE IT Services. A project cost-code should be provided for these works.
- 9. Following a successful trace and test by the cabling contractor of the network outlets

designated for the Access Points, UWE IT Services will configure the outlets, and prepare the Access Points. Each Access Point is labelled with a location and outlet identifier.

10. Access Points will be installed by the cabling contractor. It is imperative that the cabling contractor install the correct Access Point in its associated location.
  - a. The incumbent cabling contractor will install the Access Points once the building is dust free and network outlets / Access Points are configured and labelled. Following successful installation, the cabling contractor must inform UWE IT Services, who will bring the units into service.
  - b. UWE IT Services will carry out a post installation survey using Ekahau modelling software. This survey verifies that the Wi-Fi installation delivers the required service and coverage detailed in the predictive survey. To perform the survey UWE IT Services will require access to all rooms within the new building/refurbishment project. Therefore the post installation survey should take place after building handover from the principal contractor but before occupation
  
11. If all Wi-Fi coverage is as required, the coverage maps are published internally. If there are areas of limited or no coverage, UWE IT Services will work with the Estate PM to retro fit additional Access Points.

### 1.3 Comms Rooms

UWE Comms Room construction must:

- a. be at least 3m x 3m of clear space, free of protrusions into the room. Note the 3000mm size is clear space. Pillars, containment for other services, ladders for roof access, and any encroachment is not permitted.
- b. be air conditioned (unless otherwise ventilated)
- c. contain a 42U floor standing data cabinet (unless otherwise stipulated). Note: if a non-UWE entity is installing equipment in a UWE comms room, a co-lo cabinet must be installed.
- d. have two 32amp commando sockets at a height of approximately 2m.
- e. be secure with access control (and a kaba 1513 lock fitted prior to commissioning. Note: the Kaba 1513 lock that needs to be fitted prior to the access control being commissioned needs to be ordered by the UWE Estates Project Manager in good time – 5 or 6 weeks prior to the room completion date)
- f. clear of other equipment, including access controller panels

Layout Diagrams

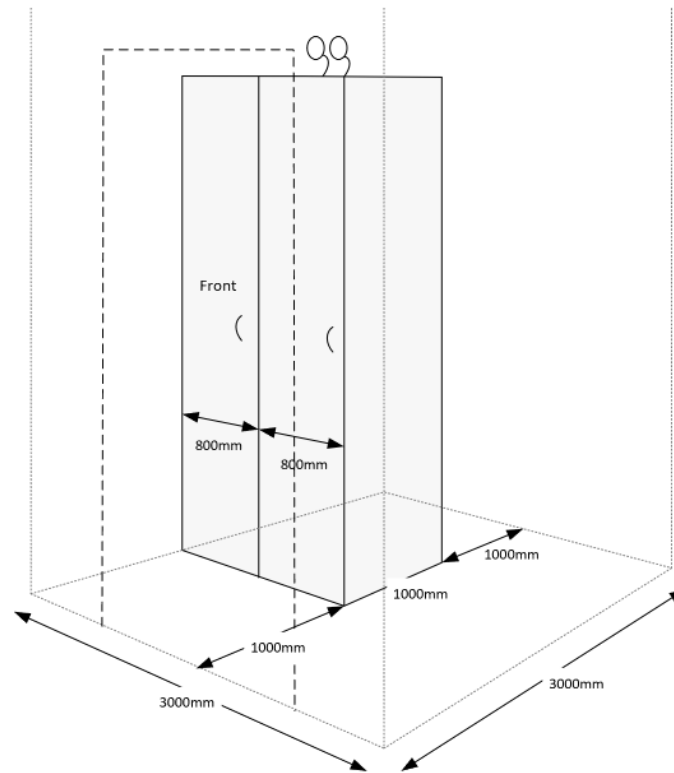
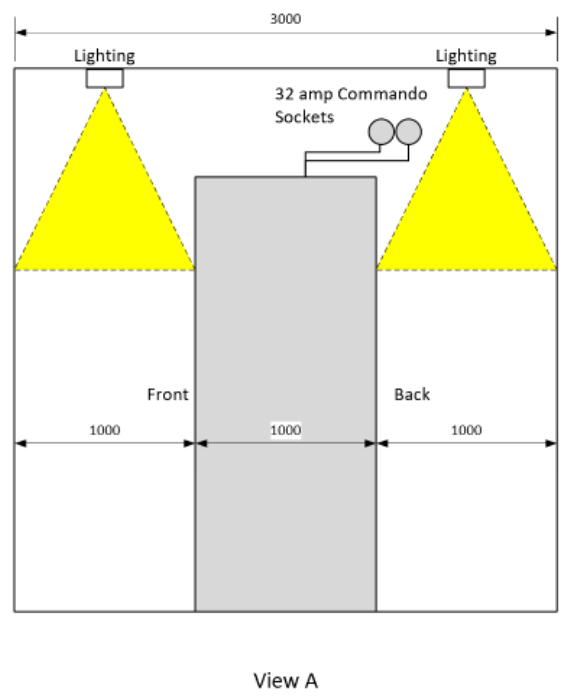
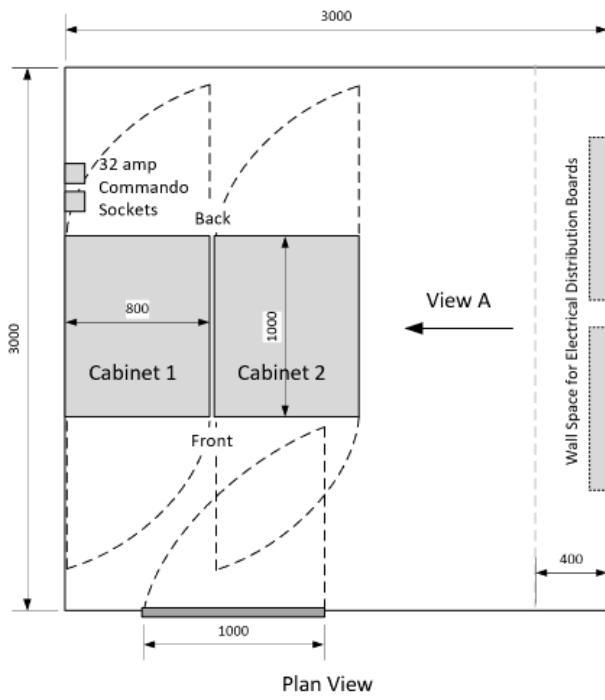


Figure 1

### 1.3.1 UWE Comms Room Detailed Specification

Room Configuration	Specific element	Implementation to be defined by the project, but must meet the minimum requirements as per diagram below
Electrical	Distribution Boards	<p>New Comms Rooms must have dedicated electrical circuits for</p> <ul style="list-style-type: none"> <li>• Racks</li> <li>• Lighting</li> <li>• Cooling</li> </ul> <p>Each circuit should be individually protected to avoid problems affecting other circuits.</p>
	Small Power	<ul style="list-style-type: none"> <li>• 2x 32amp Commando Sockets located as per the UWE Comms room diagram</li> <li>• Patch Panel and Data Cabinet both need to be earthed to ensure ESD compliance.</li> <li>• Rack mounted sequencing PDU strips with the network connection patched into the patch panel.</li> <li>• 1 x 13amp double socket should be installed within each communications room. These are to power temporary equipment such as laptop, therefore the position should accommodate the ability to work at the front of the data cabinet.</li> <li>• All small power MUST be labelled with reference to the DB board and circuit breaker.</li> </ul>
	Lighting	<p>Lighting must comply with BS EN 12464-1 and ensure average maintained horizontal illuminance (EM) of 500 lux at floor level and a vertical illuminance of 200 lux onto the front and rear of the data cabinet up to 1m from the floor level. It may be necessary to place lighting off centre or have strip lights front and rear of the room.</p>
	Containment	<p>Determined on a project-by-project basis. Cable entry from above the cabinet is preferable. See details regarding ceilings below</p>
	Fire Detection	<p>As specified by UWE building specifications</p>
	Environment	<p>Temperatures in the Comms Rooms must never exceed 26°C. Humidity levels should be kept between 20 and 60% RH</p>
Mechanical	Cooling	<p>Free cooling / air conditioning systems should be used. Free- cooling should take preference. Type of free cooling should be dependent upon number of switches.</p> <p>Mechanical cooling if required must be N+1 if there are more than 2 cabs of switches.</p> <p>Where AC is required, wall mounted split units should be installed on the wall facing the front of the cabinet. UWE is investigating the possibility/ technical solutions for reducing the temperature to 22°C if an operative is working in the room.</p> <p>Where air conditioning is installed, leak detection units must be included and monitored via BMS link.</p> <p>Monitoring of the AC, room temperatures and the ability to control the units remotely by the UWE Facilities Department and IT Services should be incorporated into the design.</p>
	Pipework	<p>Pipework containing liquid of any kind or drains should not be above or below Comms Rooms.</p>

Fabric	Room Placement	<p>Unimpeded access to the Comms Rooms is an essential requirement. It must be possible to access the Comms Room from circulation or open access space and without going through or via another room.</p> <p>The comms room must not be an access route to any other room or space, including riser cupboards, since any doors other than the entrance would restrict usable space and cabinet positioning.</p>
	Security	Comms Rooms must be fitted with the UWE standard door access control, but also have a bypass key override facility in the event of power failure.
	Cabinet Sizes	Standard 42U full size floor standing data cabinets 800x1000mm is required
	Network Switches	Access layer switches will be specified, sourced and installed by UWE IT Services.
	Cabinet Placement	The final position of data cabinets must be agreed on site with the IT Infrastructure Team.
	Ceiling	False Ceilings should not be fitted to Comms rooms. The fitting of a ceiling impedes the installation of network cables, and the use of cable trays and other containment.
	Flooring	<ul style="list-style-type: none"> <li>- Flooring finish should not be a carpet.</li> <li>- Flooring should be sealed if concrete</li> <li>- Raised floors (tiles) should have a vinyl finish</li> </ul>
Technical Information	Cabling	<p>Comms Rooms should be positioned so that cables between the Comms Room and data outlets do not exceed 90m.</p> <p>Single Mode Fibre to cabinets must originate from both of the core network nodes and travel along diverse routes and enter the building at different locations. The locations of the core network nodes connections must be confirmed by UWE IT Services.</p>
	UPS Requirements	Where UPS is required for Business continuity, the UPS should be specified by IT Services. Where UPS is required the need to keep the batteries cool is very important, this ensures their longevity. In this case the room temperature should be kept below and not exceed 25 degrees C.
	Patching	All outlets must be patched into network switches using 20cm patch leads.
Good Practice		<b>E22 IT and Comms Room Energy Consumption</b> - Dedicated IT and communication rooms have a calculated DCIE (data centre infrastructure efficiency) of 70% or greater.

### 1.3.2 Comms Room Ready Condition

Network equipment will only be installed once the Comms Room is in a ready condition. Due to the security risks associated with IT networks, only authorized UWE IT staff can install network equipment, and only when the following conditions are met:

1. The comms room door must be secure using a UWE standard plant room Kaba lock. (Please note that use of a Kaba lock is as an interim before the access control system is commissioned)
2. Power to the comms room is constant, there are no fluctuations or outages beyond what constitutes everyday tolerances. (If contractors are aware that further planned power

outages will be necessary in a given Comms Room after the network equipment has been installed, UWE IT Services must be informed at least 2 working days in advance to schedule a power down of equipment.)

3. The specified data cabinet/s are installed and fibres are terminated and labelled at both the cabinet end and the Core network ends.
4. Lighting is installed and provides illumination to the required level of both the front and back of the cabinet.
5. Cooling, if required, is installed, tested and shown to provide the specified temperatures.
6. Comms room must be dust free at the point of handover and there must be no further works that will generate significant levels of dust within the room. The University will not install network equipment into a Comms room which has any dust, debris or other rubbish.
7. Patch panels must be labelled as per the UWE IT Infrastructure labelling convention using machine printed labels.
8. UWE's incumbent cabling contractor will connect the cabinet located in the comms room to the core network nodes fibre cables. They will also terminate the copper Ethernet cables to patch panels in the comms cabinet, ensure that comms cabinet rails have been located to accommodate the network switches and install the required power distribution units.

### 1.3.3 Switch Design

Named Manufacturer	Incumbent Maintenance Provider	Incumbent Installer
<b>Juniper</b>	<b>IT Services</b> Telephone:	<b>IT Services</b> Telephone:

### 1.3.4 Cabinet Design

Named Manufacturer	Incumbent Maintenance Provider	Incumbent Installer
<b>Excel</b>	<b>Sceptre Networking Limited</b> 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770	<b>Sceptre Networking Limited</b> 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770

A suitable data cabinet should be installed as per requirements.

The two standard data cabinet are as follows:



### Single compartment / user

- Used in most instances across all University campuses
- 800mm width x 1000mm depth
- 42U (27U may be used for certain applications but must be agreed with the ITS Infrastructure Team)
- Lockable Mesh doors front and rear
- Horizontal metal cable management
- Adjustable vertical mounting rails to enable equipment to be set back to give clearance of at least 100mm between equipment and inside of the door.

Image^: Single Compartment / User Cabinet



### Co-Location / multiple users

- Used where multiple users exist, such as UWE and the Accommodation Network provider.
- 800mm width x 1000mm depth
- 42U (the number of compartments to be agreed with the ITS Infrastructure Team).
- Lockable Mesh doors front and rear
- Patch Panels delivered to relevant compartment
- Horizontal metal cable management
- Adjustable vertical mounting rails to enable equipment to be set back to give clearance of at least 100mm between equipment and inside of the door.

Image^: Co-location / Multiple Users cabinet

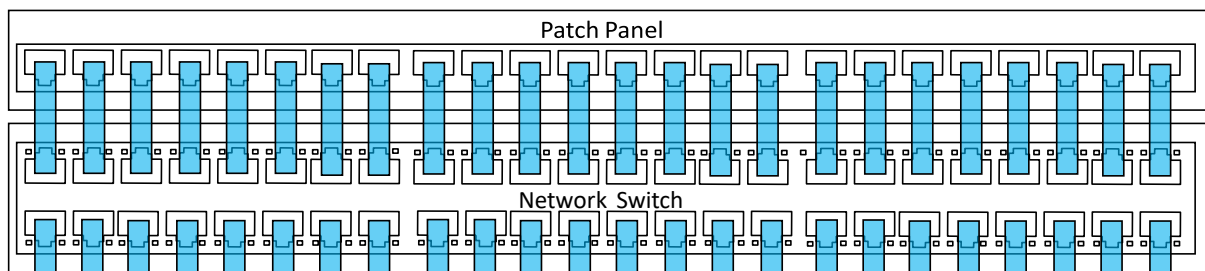
## 1.3.5 Cabinet Layout:

Typical Layout for a cabinet is as follows:

U	Nox - Front		Nox - Rear
42	Empty		
41	Modular Patch Panel with 2 * 6 LC Duplex Modules		
40	Cable Mgt		
39	Empty		
38	Cat6a 24 Port Patch Panel		
37	Switch - 0		
36	Cat6a 24 Port Patch Panel		
35	Cat6a 24 Port Patch Panel		
34	Switch - 1		
33	Cat6a 24 Port Patch Panel		
32	Cat6a 24 Port Patch Panel		
31	Switch - 2		
30	Cat6a 24 Port Patch Panel		
29	Cat6a 24 Port Patch Panel		
28	Switch - 3		
27	Cat6a 24 Port Patch Panel		
26	Cat6a 24 Port Patch Panel		
25	Switch - 4		
24	Cat6a 24 Port Patch Panel		
23	EMPTY - Temp Shelf when needed		EMPTY - Temp Shelf when needed
22	Cat6a 24 Port Patch Panel		
21	Switch - 5		
20	Cat6a 24 Port Patch Panel		HORIZONTAL Monitored PDU Where required
19	Cat6a 24 Port Patch Panel		
18	Switch - 6		
17	Cat6a 24 Port Patch Panel		
16	Cat6a 24 Port Patch Panel		
15	Switch - 7		
14	Cat6a 24 Port Patch Panel		
13	Cat6a 24 Port Patch Panel		
12	Switch - 8		
11	Cat6a 24 Port Patch Panel		
10	Cat6a 24 Port Patch Panel		
9	Switch - 9		
8	Cat6a 24 Port Patch Panel		
7			
6			
5			
4			
3	Analogue Telephony Patch		
2	Empty		
1	Empty		

## 1.3.5 Short Patching

A Short Patching policy has been adopted for access layer network switches in all UWE ITS comms rooms. Short patching is a one patch panel port to one switch port arrangement that enables quick identification of port numbers and reduces the time to configure and make ports available for users. A one-to-one arrangement means for the number of outlets installed, there needs to be a corresponding number of network switch ports available. The installation of fifty network outlets into a building will necessitate the installation of two 48 port switches.



Each patch panel must be labelled using machine printed label using the convention outlined later in the document. The label should be clearly legible and be suitable for use in comms rooms that have air conditioning.

### 1.4 Data Centres

There are several locations at UWE (Frenchay) that are considered “machine rooms” or “data centres”. When working in buildings with data centres particular considerations there can be no outages and must be both accessible and always running.

Works affecting data centres, and outages cannot be avoided, must be pre-planned with ITS consultation and completed on pre-arranged IT shutdown weekends.

#### 1.4.1 Redundancy

Construction of new data centres must consider the redundancy of all aspects:

##### **Power**

Both UPS and Generator must be provided.

UPS will allow devices to run in the short term, and then generator will take-over for longer outages.

Calculations for UPS battery provision should be based on 4hrs of full use

Detection should be installed for UPS installs, as hydrogen can be detected on degrading lithium-ion batteries.

##### **Cooling**

There must be alternative cooling provision to primary method. And this should be tied into the back-up power provision.

Hot and cool isle should be considered as UWEs first preference.

##### **Security**

Data centres must have intruder alarm installed, this must be a dedicated zone and not part of a wider building alarm.

Access control must be provided, as we must be able to see who entered the room

### 2. IT infrastructure (external)

The university has deployed a fibre ring around the Frenchay campus with access via the use of feeder pillars. This will allow any new builds / refurbishments to break into ducts that feed into the fibre ring.

Therefore:

1. Connections to new builds / refurbishments to break out of buildings into ducts connected to the fibre ring
2. Connections to new builds / refurbishments will use 4 conduit fibre tube with 12 fibres occupying one of the tubes. Variations need to be approved by IT Services.
3. Each of the two new connections from the comms room using diverse routes will terminate in two different feeder pillars which form the fibre ring. Here they can be patched back to the main core routers in 2B0011 and 2D086.  
(Please check with IT Services with regards to which feeder pillars to use)

The university is going through a process of mapping all duct routes, capacities and fibre routes using BIM and a product called Patch Manager. For this to be effective it is imperative that all cables are clearly labelled.

#### 2.1 Ducts & Chambers

Capacity of ducts should be checked before starting on site as part of the design process, it should not be assumed that there is capacity to run fresh cables. Some systems may require dedicated cabling (such as fire systems)

All cable and fibre run through ducts should be anti-rodent and should be labelled at every chamber passed through, identifying destination and source.

All IT infrastructure installs via ducts and chambers must be recorded in Patch Manager.

#### 2.2 Feeder Pillars

Specification for feeder pillars can be found in Design guide chapter XXX (Electrical installations)

However, when a feeder pillar is required for IT infrastructure these should be independent of any power provision. Futureproof capacity should be considered.

All IT infrastructure installs must be recorded in Patch Manager.

#### 2.3 BT & OpenReach Connections

For new remote sites the Project must request ITS to engage with a service provider such as BT OpenReach to provide a leased fibre link to the boundary of the remote site from UWE main server room in Frenchay 2B11. ITS will then instruct the incumbent cabling contractor to install fibre within the boundary of the remote site to the designated server room.

For services that are primarily non-UWE (even if they are University services e.g. NHS Dr Surgery; Outsourced Services) it will be necessary to also have a BT/OpenReach connection. As 3<sup>rd</sup> parties cannot run via the University network.

### 3. UWE Audio-Visual Infrastructure

#### 3.1 Design Requirements

UWE IT Services must be consulted on any adaptation that requires changes to Audio Visual equipment, they will meet with UWE Estates PM but will need to fully understand:

- Planned use of the room
- Any specialist aspirations for the space
- Assistive technology requirements
- Location of teaching lectern

UWE ordinarily use a sole AV supplier to fulfil the requirements of the brief. But depending on availability, cost and specialisms this can be changed.

Named Manufacturer	Incumbent Maintenance Provider	Incumbent Installer
Case by Case	UWE IT Services	<b>GVAV</b> Unit C, Mushroom Road, Hill Barton Business Park, Exeter Devon EX5 1SB Telephone: 01392 499399

#### 3.2 Cabling & Containment Standards

Once the equipment has been specified then this should be fed back into the design process, so that there is co-ordination. Cable routes must be decided and ensure that appropriate containment is provided to meet the proposed AV installation.

Please see: Design Chapter XX for information on fire stopping requirements.

##### 3.2.1 Underfloor Containment

Wherever possible cable covers over the floor should be avoided and designed out, so where possible underfloor containment should be considered.

##### 3.2.2 Riser Containment

Containment should be in the presentation wall wherever practicable.

- External dado will be considered, especially in rooms where cabling is being delivered via dado (i.e. not underfloor).
- If use of dado has been agreed by UWE, it is preferable that the riser is not on the teaching wall but is as close to the lectern as is practicable.
- Containment should not be less than 50mm x 50mm (or 50mm diameter) but may be larger depending on room type and use.
- Rigid containment will be used (such as Copex but alternative, comparable systems may be used with ITS approval).
- Where containment is hidden or inaccessible, draw cords will be required.
- Exposed containment should complement the design of the room.
- Containment will be Cat 6E compliant.

### 3.2.3 Ceiling Containment

- A cable basket of suitable capacity must run from the top of the riser to the projector/speakers/camera/microphones etc.
- Where it is exposed, the basket must be in keeping with the design of the room.
- The basket should follow the most practicable, shortest route.
- AV cables can be mounted in baskets supplying other services.
- Ceilings must be capable of holding a mounting plate for the projector and the weight of the projector.

### 3.3 Room Type Considerations

There are several AV considerations listed below:

AV Item:	Room Type:	Meeting Room	General Teaching	Lecture Theatre	PC Lab	Open Access Learning
Room Booking Tablet		Yes	Yes	No	Yes	No
Signage Screens		No	No	Yes	No	Yes
Teaching Position/Lectern		No	Yes	Yes	Yes	No
Lecture Capture/Event Capture		No	Yes	Yes	Yes	No
Projectors		No	Yes*	Yes*	Yes*	No
Projection Screens		No	Yes*	Yes*	Yes*	No
Display Screens		Yes	Yes*	Yes*	Yes*	Yes
Hearing Loops		No	No	Yes	No	No
Microphone		Yes	Yes	Yes	Yes	No
Speakers		Yes	Yes	Yes	Yes	No

#### 3.3.1 Room Booking Tablet

Where a room booking tablet is required ensure the following is included in the specification:

- Data Point (For Network and PoE)

For lecture theatres, a signage screen is to be used instead of a room booking tablet. This allows for more diverse use on open days etc...

#### 3.3.2 Teaching Position

Depending on the type of display there could be differing requirements for the teaching position.

1. For single projection the teaching position will be:
  - a. off to one side furthest from the door with sufficient space between the teaching wall and the lectern for wheelchair access.
2. For Dual projection the teaching position will be:
  - a. Centred between the projection screens with sufficient space between the teaching wall and the lectern for wheelchair access.

#### 3.3.3 Lecture Capture

Where lecture capture is required, current standard specs can be supplied via ITS when required but generally will consist of a camera and single microphone.

Note: cable route to point of control will be required.

### 3.3.4 Projectors and Display Screens

ITS will help design the optimal AV solution, and this could be either projector solution or a display screen solution. And may consider dual displays depending on room orientation.

Projector installs should consider:

- a. To be minimum of 1.8m from the presentation wall
- b. To be central to the screen(s)
- c. Securely mounted to the ceiling
- d. Ceiling should be capable of holding approx. 18kgs held vertically
- e. Services will not obstruct projection sight lines or mounting.

Projector Screen installs should consider:

- a. Projection screen will be TK Team wet wipe board or equivalent  
Approx. weight: 2.4m x 1.8m – 30kg

Display Screen installs should consider:

- a. Suitable wall construction and patressing will be required for large screen monitors.  
Approx. weights:
  - a. 42" – 16.9 Kg
  - b. 55" - 26.5 Kg
  - c. 80" – 61 Kg

### 3.3.5 Hearing Loops

These are required as standard in Lecture Theatres, and there is further detail in design guide chapter XX (electrical)

### 3.3.6 Microphone

As part of the teaching position, should consist of goose neck mic.

Where capacity is likely to be over 50, then further considerations must be made for a lapel mic and a handheld for voice reinforcement.

### 3.3.6 Speaker

In teaching environments:

- a. Program sound at either side of the presentation wall only.
- b. Speakers will be wall mounted usually under 10 kg
- c. Where voice reinforcement is required, these will be ceiling mounted unless agreed as an exception.

In Meeting environments, it is likely that speakers will be mounted alongside the display screen.

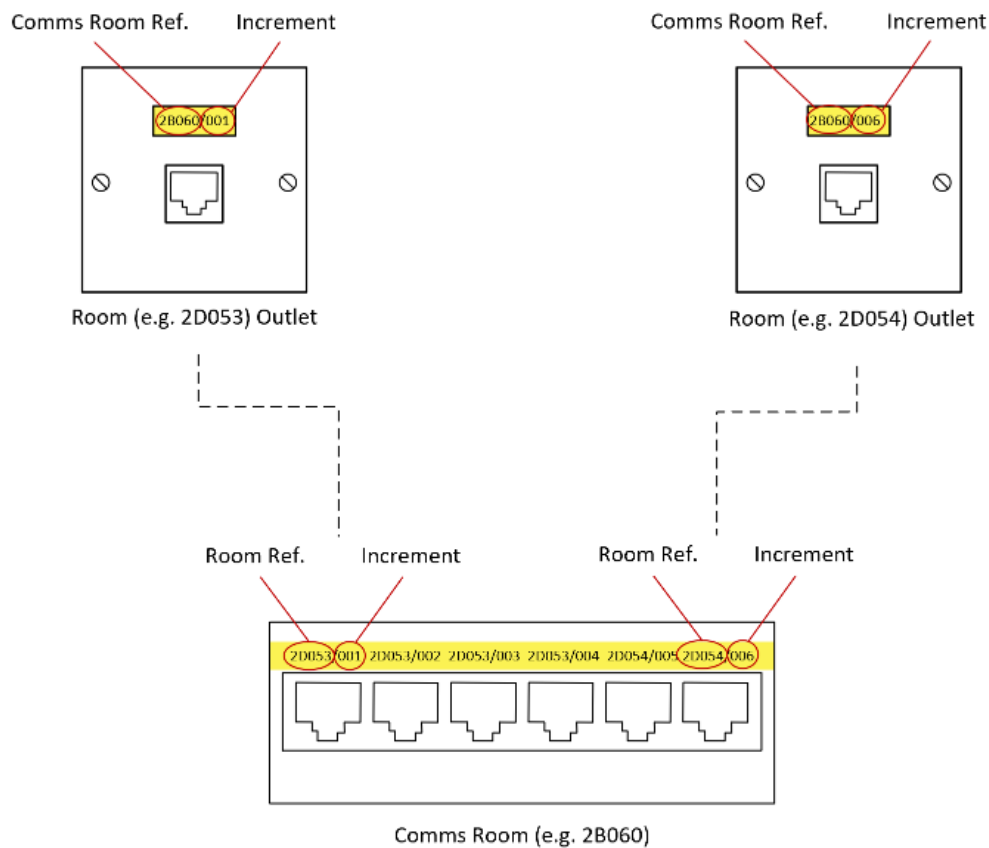
## 3.4 Under Desk Extension Cable Systems

Full specification and requirements are in Chapter 7, section 7.3.16

### 4. Labelling Standards

#### 4.3 Outlet and Patch Panels

Each network and patch panel outlet must be labelled (black text on yellow label) with a unique reference, as illustrated below:



- The label should be clearly legible and be suitable for use in comms rooms that have air conditioning.
- At the Comms Room end, the unique reference should be the name of the room containing the outlet, and the increment number. The increment number is a three-digit number with leading zeroes, assigned by the cable installer and identifying the actual outlet within the room.
- At the outlet end, the unique reference should be the name of the Comms Room where the cable to the outlet is patched, and the same increment.
- for the 6th network connection in Comms Room 2B060, where the outlet is positioned in room 2D054, at the outlet end the label will read 2B060/006 and at the Comms Room end the label will read 2D054/006
- for each comms room within a building the suffix label can begin with '/001' as it is unique when combined with the comms room ID

**Note:** there is no difference between the labelling of data outlets and telephone outlets. Data and telephone cables are patched to different locations within the Comms Room, but labels should still fit in with, and remain unique to, the data outlet labelling. For example, if an outlet in room 2D054

designated for telephone use is the 71st outlet in comms room 2D060, it will still be labelled 2D060/071 at the outlet end and 2D054/071 at the comms room end.

It should also be noted that, for each comms room within a building, the labelling can start with other end/001 since the uniqueness comes at the outlet end where the comms room is specified as part of the label.

### 4.4 Chambers and Ducting

All chambers are marked/labelled as per requirements from estates and in turn added to BIM and Patch Manager with location.

All new ducts are uniquely numbered at either end for easy identification.

### 4.5 Loose Fibre & Blow Fibre

All loose tube fibre and blown fibre tubes labelled with source and destination at each chamber location using Brady Polyurethane Tags (BM71-10X75-7643-YL) or equivalent.

The labelling convention for the fibre tubes is as follows

<SOURCE ROOM><CAB NOx> to <DESTINATION ROOM / Pillar><CAB NOx / Panel Ref>

For e.g.

FR-2B01/NO1 to W-Block Pillar/1a

Or

FR-2D086/NO3 to FR-1D008/NO1



to fibre patch panel at 1310nm and 1550nm for single mode fibre. Tests should be carried out as per IEC 61280-4-2 as a minimum.

Named Manufacturer	Incumbent Maintenance Provider	Incumbent Installer
<b>CommScope (Systemax) - Copper</b>	<b>Sceptre Networking Limited</b> 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770	<b>Sceptre Networking Limited</b> 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770
<b>Fibre</b>	<b>Sceptre Networking Limited</b> 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770	<b>Sceptre Networking Limited</b> 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770