NSW STATE EMERGENCY SERVICE

NSW SES ICT INFRASTRUCTURE REQUIREMENTS

Table of Contents

1. Preliminaries and General Conditions

1.1. Intent

This specification outlines the scope of electrical and voice/data works and details of the quality of the materials and installation. This specification shall be read in conjunction with any associated drawings. If there are any contradictions between this specification and the drawings, the drawings shall take precedence.

1.2. Site Inspection

Where possible, each party shall attend site to determine conditions and factors that affect the installation time and costs.

1.3. Performance and Guarantee

The Contractor shall guarantee that the completed installation meets all the stated performance requirements either mentioned or implied in this specification. The performance details submitted during tender shall be considered as a minimum provision.

Notwithstanding the fact that the Consultant has perused the said performance details, any subsequent adjustments to achieve the required performance shall be affected by the Contractor at no additional cost to the project.

The Contractor shall include a statement in his tender should he have any doubt in any way with the suitability of the envisaged types of mechanical systems for the various areas.

1.4. Installation Quality and Conditions of Materials

All components shall be as specified within the design; no alternatives shall be accepted. All equipment, outlets, cable, lights, accessories, and components shall be new, undamaged and of good quality.

Check space requirements of equipment and services which are indicated diagrammatically in the contract documents. Select equipment with dimensions and handing to suit the available space. All installed equipment and services to be accessible for operation, maintenance, and replacement and so as not to interfere with access to other installations. Make offsets as necessary.

The installation shall be of good workmanship and shall be completed by suitable qualified personnel. The installation shall comply with the relevant Australian Standards, supply authority regulations and manufacturer's recommendations and requirements. All sub quality installations shall be corrected by the Electrical Contractor as soon as practical.

All cables shall be hidden from view except when documented on the drawings that exposed cables, or cables in surface mounted conduit are to be installed.

The locations shown for the outlets and luminaires are indicative and the Contractor is to liaise with the other trades and Builder to review the architectural drawings prior to the final installation.

All cables shall be roughed in to allow for some local variation (i.e., to within 1 metre) of the nominated locations.

The locations of the outlets as shown on the drawings are to be confirmed on site prior to installation. Outlets shall be installed in alignment with adjacent outlets or fixtures. Where the installation is to be completed in an area that is under the control of a base building owner, the installation shall comply with all the requirements of the building fit out guide and the requirements of the building management.

All part numbers listed are correct at the time of preparing this document. Items which are superseded, are to be replaced with approved items from manufacturer.

1.5. Testing and Commissioning

The electrical, voice/data installation is to be commissioned and tested prior to practical completion and hand over. Copies of all tests are to be included in the maintenance manuals.

The Contractor shall allow to complete all training necessary for the Client to effectively use all aspects of the installation.

The Electrical Contractor is to allow to return to site after the Client has occupied the project to answer questions and provide additional explanation of systems, adjustment of outlets and luminaires and additional training as necessary.

The Electrical Contractor shall remove all rubbish and packaging associated with the electrical materials and installation during the project. At practical completion all components of the installation shall be clean and in a correct and workable fashion to the satisfaction of the Builder and Principal.

The Electrical Contractor shall complete operation and maintenance manuals and as built drawings. These shall be available three weeks from practical completion of the project. Three copies of the maintenance manuals and as built drawings shall be submitted once the initial set have been approved by the principal.

1.6. Operation and Maintenance Manual

The operation and maintenance manuals shall be bound, A4 in size and include the following, where relevant:

- Front cover with details of the project, the Electrical Contractor company details including a mobile phone contact number for emergencies
- Table of contents
- An outline of the project and the electrical systems installed
- All test results and certificates
- Copies of manufacturer's warranties
- Separate documentation for each electrical system including power, communications, security, MATV, building uninterruptable power supply (UPS), antenna and smoke detection.
- List and description of all main items installed such as outlets, cables luminaires, lamps, distribution boards, patch panels, etc.
- All operating instructions for the Client to effectively use the installation
- All maintenance details including spare parts (lamps, fuses, circuit breakers) and preventative maintenance measures
- As built drawings

2. Scope of Works

The works required for this project, as detailed on the drawings, and specified within this document comprise of the following.

2.1. Electrical

- Consumer Mains and liaison with Supply Authorities
- Main switchboard and metering
- Distribution boards
- Submain cabling
- General purpose outlets
- Isolators, switches, dimmers, hardwired connections, and accessories
- Luminaires including lamps, wiring and controls
- Emergency and exit luminaires
- Trenching and conduit works including back fill and reinstating of surface
- All required fixing and supports including conduits, catenary wires, cable trays and ducts
- Terminations and labelling

2.2. Communications

- Incoming telecommunications cabling, including lead-ins and field outlets
- Category 6a cabling to all Category 6a RJ45 outlets
- Communications distribution frames
- Communications racks
- Patch and fly leads
- Copper tie cabling
- Trenching, pits, and conduit works including back fill and reinstating of surface
- Submissions to NBNCo are to be completed by contractor –
    - https://www.nbnco.com.au/develop-or-plan-with-the-nbn/new-developments

2.3. Radio Equipment

Cabling

- RG214 or LDF4-50 coax cable to each radio location
    - 1 x run installed at the comms rack using brush plate
    - 1 x run Installed at the location of the radio at a desk using brush plate – final location to be discussed with local contact if not identified on floor plans

Antenna

- SMD4-67 Dipole Antenna 400-520 Mhz

Mounting

- Option 1 (preferred) - 1 x hockey stick fascia mount bracket
- Option 2 (if required for additional height) - 1 x duralumin pole with guy wires for roof-top mounting
- Mount to suit SMD4-67 antenna with option 1 or 2

Connectors

- 1 x N-type male RG214/LDF4-50 connector for connection to antenna
- For APX7500 Consolette - 1 x additional N-type male RG214/LDF4-50 connector for connection to radio

Ancillaries

- Stainless steel cable ties
- Stainless steel cable braid for bird protection

2.4. Carrier Mobile Connection

- Supply and install externally mounted antenna and suitable cabling for cellular connectivity.
    - Yagi, omni or panel (preferably a MiMO) – based on area:
    - Frequency to include:
        - Telstra 4GX (700MHz)
        - Optus 4G+ (700 MHz)
        - Telstra Next-G™(850MHz)
    - Terminate on wall plate using SMA female connector
- For recommended solution specific to the site, please refer to specialised vendor for recommendations such, but no limited to: https://www.telcoantennas.com.au/

2.5. Security

- Intercom system
- CCTV
- Access control system
- Intruder Alarm

2.6. Audio Visual

- MATV (Master Antenna Television)
    - Free to Air Arial, RF outlets and amplifiers/boosters as required
    - Locations behind Display screens or where specified on floorplans
- Public Address Systems
    - 1RU rack mounted PA system and speakers to suit
    - Speakers qty and location as per floorplans
        - IP rated in areas outside general office spaces
    - https://www.australianmonitor.com.au/products/es60 or similar
    - multi conductor twisted pair speaker cable terminated on wall plates. near radio installations and comms rack using female RCA connectors. This is to facilitate audio signal into PA system.
- Audio Visual Technology (AVT)
    - 2 x Network cables for each display between Operations Room Floor Box and Wall plate adjacent to MATV points are terminated

2.7. Uninterruptable Power Supply (UPS)

- Supply and install (and maintenance service plan) a UPS to facilitate 30min runtime for the following equipment:
    - CCTV system
    - Security system
    - Communications Rack dependant on sizes defined in 5.1.2
- UPS to be connected via Automatic Transfer Switch (ASCO series ATS).

- The UPS features internal bypass and input power factor correction be supported by manufacturer warranty - 3 years repair or replace (excluding battery) and 2 years for battery

2.8. Surge Protection

- All power supplied to the communications rack be covered by sufficient surge protection

3. Electrical Services Specifications

3.1. General

The electrical installation shall be completed in accordance with the current version of the following relevant Standards;

- The National Construction Code NCC
- The Supply Authority rules relevant to the location of the installation (i.e., Endeavour Energy, Ausgrid etc)
- Service and Installation Rules of New South Wales
- AS 3000 SAA Wiring Rules
- AS 3008 Electrical Installations – Selection of Cables
- AS 2293 Emergency escape lighting and exit signs for buildings
- AS 1680 Interior Lighting
- AS 2052 Metallic conduits and fittings
- AS 2053 Non-metal conduits and fittings
- AS 3112 Plugs and Plug sockets
- Workplace health and safety act and regulations

4. Communications Services Specifications

4.1. Compliance

Carry out all work strictly in accordance with the correct regulations and requirements of the Australian Communications Authority (ACA).

Work not covered by the requirements of Statutory Authorities shall comply with the latest edition of the appropriate publication from the Standards Association of Australia.

Provide certification that the works meets the detailed standard. Compliance is required and consists of the following standards;

- NBN Co Requirements
- AS 3000 SAA Wiring Rules
- AS/NZS 3080 Integrated Requirements for Customer Cabling (Wiring Rules)
- AS 3084 Telecommunications Installations – Telecommunications Pathways and Spaces for Commercial Buildings
- AS/NZS 3085.1 Administration of Communications Cabling Systems
- AS/ACIF 5009-2006 Installation Requirements for Customer Cabling (Wiring Rules)
- AS/ACIF S008 Technical Standard for Authorised Cabling Products
- AS/ACIF S009 Installation Requirements for Customer Cabling

4.2. Requirements for Twisted Pair Cabling

4.2.1. Cable Performance

- All twisted pair cables feeding indoor telecommunication outlets shall be Category 6A.
- All twisted pair cables feeding telecommunication outlets via underground shall be Category 6A underground cable.
- All underground cables shall be approved by Clipsal to maintain the manufacturer's warranty.
- All twisted pair cables linking distributors shall be Category 6A.
- All twisted pair cables linking distributors via underground shall be Category 6A underground cable.
- All twisted pair cables linking wireless access points shall be Category 6A.
- Any twisted pair cables feeding active building automation equipment shall be Category 6A.

4.2.2. Construction Type

- All twisted pair cables feeding telecommunication outlets shall be Clipsal Category 6A UTP - 2D4P6AIPV3B-BU.
- All twisted pair cables feeding telecommunication outlets via underground shall be UTP underground cable meeting the water penetration test and be UV stabilised.
- All twisted pair cables linking distributors shall be Clipsal Category 6A UTP - 2D4P6AIPV3B-BU.
- All twisted pair cables linking distributors via underground shall be UTP underground cable meeting the water penetration test and be UV stabilised.
- All twisted pair cables linking wireless access points shall be Category 6A F/UTP – 2D4P6ALSF3R-BU or Category 7 F/FTP – ACTTG4P7FFLS3RWE.
- Any twisted pair cables feeding active building automation equipment shall be Category 6A - F/UTP – 2D4P6ALSF3R-BU or Category 7 F/FTP – ACTTG4P7FFLS3RWE.

4.2.3. Patch Panels and Telecommunication Outlet Requirements

- Patch panels and telecommunications outlets for horizontal cabling shall be Clipsal Category 6A – RJ6AU/24PP & 30RJ45SMA6A-WE.
- Patch panels and telecommunications outlets for underground cable shall be Clipsal Category 6A – RJ6AU/24PP & 30RJ45SMA6A-WE.
- Patch panels and telecommunications outlets linking distributors shall be Clipsal Category 6A – RJ6AU/24PP & 30RJ45SMA6A-WE.
- Patch panels and telecommunications outlets for linking distributors via underground shall be Clipsal Category 6A – RJ6AU/24PP & 30RJ45SMA6AWE.
- Patch panels and telecommunications outlets linking wireless access points shall be Clipsal Category 6A Shielded – RJ6AF/24PP & 30RJ45SM6AF.
- Patch panels and telecommunications outlets feeding active building automation equipment shall be Clipsal Category 6A - FTP – RJ6AF/24PP & 30RJ45SM6AF.
- Telecommunications outlets and patch panels for Category 6A Unshielded and Shielded shall be a modular outlet as specified in IEC 60603-7 (an RJ45).
- A manufacturer's statement shall be included for alien crosstalk conformance to the standard. Note, an application warranty statement does not meet this requirement. Electrical Specification SES Headquarters Job Number: 160120 30 of 52

4.2.4. Link Performance

- All twisted pair cables feeding telecommunication outlets shall be Class EA permanent link.
- All Permanent links shall not exceed 90 metres
- All twisted pair cables feeding telecommunication outlets via underground shall be a Class EA permanent links.
- All twisted pair cables linking distributors shall be Class EA permanent links.
- All twisted pair cables linking distributors via underground shall be Class EA permanent links.
- All twisted pair cables linking wireless access points shall be Class EA permanent links.
- Any twisted pair cables feeding active building automation equipment shall be Class EA permanent links.

4.2.5. Wiring Sequence

- Terminations on RJ45 outlets shall be wired to **T568A** colour code.
- Shielded cabling systems shall have a contiguous shield bonded to earth in accordance with the cabling manufacturer's recommendations.
- Shielded cables shall be tested for shield continuity.

4.2.6. Field Outlets

- Lightning Gas Arrestors KP-10 or equivalent to be fitted on Incoming Line Modules where applicable.
- Wall Outlets complete with Shutter Mechs or Surface Mount
  - Single/Dual/Triple/Quad to suit

4.2.7. Tie Cable –

- MDF to be installed in compliance with standards AS/CA S009:2013 50
- Termination of Tie cable to New/Existing MDF to be double (as a minimum) of the incoming Services (scaled up to the nearest multiple of 10
- Scale table as per below

Total Incoming Services	Tie Cable Termination at MDF	Termination
1 – 10	10	50
11 – 20	20	50
21 – 30	30	50
31-40	40	50

4.3. Cabinets and Enclosures

4.3.1. General Requirements

- All cabinets, racks and enclosures shall be branded Clipsal, Schneider Electric or APC.
- Cable management to the rack using cabling tray fixed to the rear wall
- All cabinets, racks and enclosures shall meet the requirements of AS/CA S008.

4.3.2. Construction Type

- Cabinets and enclosures that are installed in a room without temperature control shall contain a fan tray with a minimum of two fans.
- Free standing cabinets shall contain:
  - clear front door,
  - dual perforated rear door.
  - lockable
  - Removable side panels
  - Vertical power rails with standard connections female GPO 20Amp with 20Amp circuit breakers
  - Horizontal power rails rear mounted with standard connections female GPO 20Amp with 20Amp circuit breakers
  - 4 x castor wheels
  - 600 deep

4.3.3. General Requirements

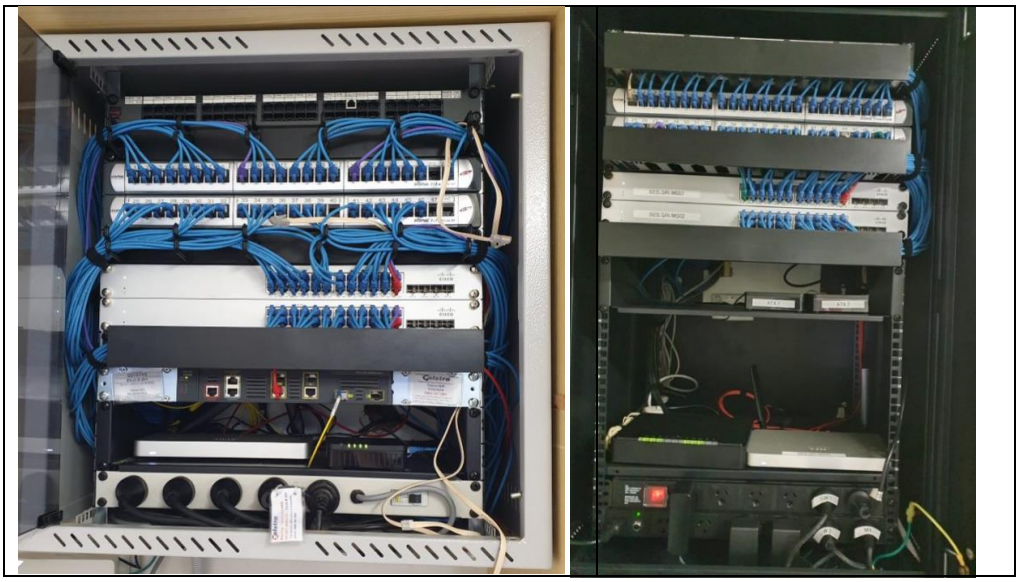
- All labels irrespective of their use shall meet the legible and durable requirements of AS/CA S008.
- Each telecommunications room, rack and panel shall be labelled with a unique identifier.
- All patch panels and cables supporting backbone cabling shall be labelled to identify as a minimum the designation and performance level of the cable and the core count (for optical fibre cable)
- Cables supporting telecommunications outlets shall be labelled at both ends with machine printed labels showing the unique source distributor identifier and the telecommunications outlet identifier.
- All telecommunications outlets shall be labelled with a unique identifier for each outlet and the source distributor identifier.
- The labels for telecommunications outlets shall be machine printed.

5. Appendices

5.1. Appendix A – Standard Equipment Requirements

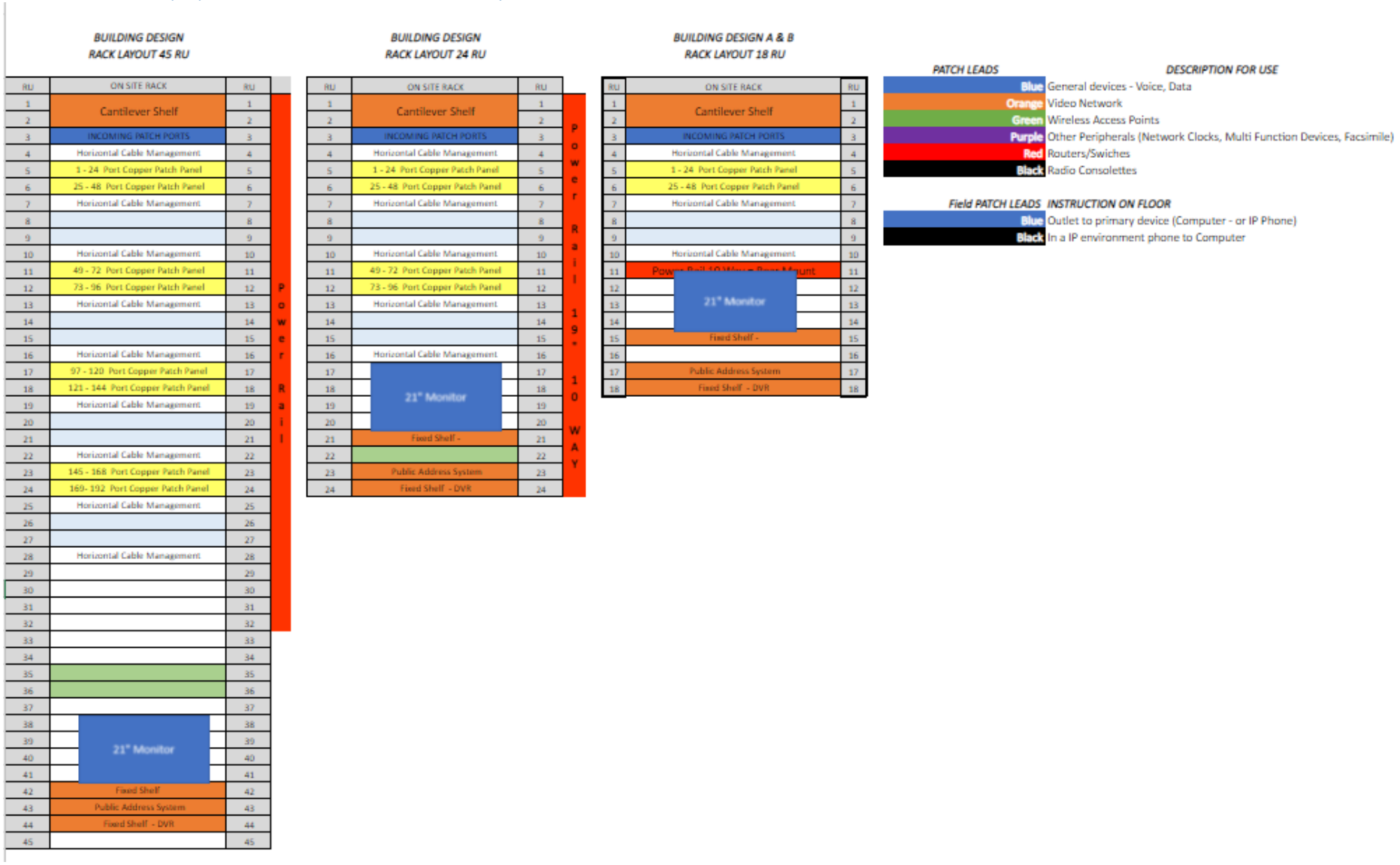
5.1.1. Equipment Cabinet

- Provision 2 M cable slack to move the rack outside the Comms Room.
- Carrier services termination on Krone frame or NTU to be mounted 1800 from floor on rear wall.



NSW SES to provide a final rack layout design for any non-standard works refer to template

5.1.2. Equipment Cabinet standard layout



BUILDING DESIGN
RACK LAYOUT 45 RU

RU	ON SITE RACK	RU
1	Cantilever Shelf	1
2		2
3	INCOMING PATCH PORTS	3
4	Horizontal Cable Management	4
5	1 - 24 Port Copper Patch Panel	5
6	25 - 48 Port Copper Patch Panel	6
7	Horizontal Cable Management	7
8		8
9		9
10	Horizontal Cable Management	10
11	49 - 72 Port Copper Patch Panel	11
12	73 - 96 Port Copper Patch Panel	12
13	Horizontal Cable Management	13
14		14
15		15
16	Horizontal Cable Management	16
17	97 - 120 Port Copper Patch Panel	17
18	121 - 144 Port Copper Patch Panel	18
19	Horizontal Cable Management	19
20		20
21		21
22	Horizontal Cable Management	22
23	145 - 168 Port Copper Patch Panel	23
24	169- 192 Port Copper Patch Panel	24
25	Horizontal Cable Management	25
26		26
27		27
28	Horizontal Cable Management	28
29		29
30		30
31		31
32		32
33		33
34		34
35		35
36		36
37		37
38	21" Monitor	38
39		39
40		40
41		41
42	Fixed Shelf	42
43	Public Address System	43
44	Fixed Shelf - DVR	44
45		45

Power Rail

BUILDING DESIGN
RACK LAYOUT 24 RU

RU	ON SITE RACK	RU
1	Cantilever Shelf	1
2		2
3	INCOMING PATCH PORTS	3
4	Horizontal Cable Management	4
5	1 - 24 Port Copper Patch Panel	5
6	25 - 48 Port Copper Patch Panel	6
7	Horizontal Cable Management	7
8		8
9		9
10	Horizontal Cable Management	10
11	49 - 72 Port Copper Patch Panel	11
12	73 - 96 Port Copper Patch Panel	12
13	Horizontal Cable Management	13
14		14
15		15
16	Horizontal Cable Management	16
17	21" Monitor	17
18		18
19		19
20		20
21	Fixed Shelf -	21
22		22
23	Public Address System	23
24	Fixed Shelf - DVR	24

Power Rail 19" 10 WAY

BUILDING DESIGN A & B
RACK LAYOUT 18 RU

RU	ON SITE RACK	RU
1	Cantilever Shelf	1
2		2
3	INCOMING PATCH PORTS	3
4	Horizontal Cable Management	4
5	1 - 24 Port Copper Patch Panel	5
6	25 - 48 Port Copper Patch Panel	6
7	Horizontal Cable Management	7
8		8
9		9
10	Horizontal Cable Management	10
11	Power Rail 19 Way - Rear Mount	11
12		12
13	21" Monitor	13
14		14
15	Fixed Shelf -	15
16		16
17	Public Address System	17
18	Fixed Shelf - DVR	18

PATCH LEADS	DESCRIPTION FOR USE
Blue	General devices - Voice, Data
Orange	Video Network
Green	Wireless Access Points
Purple	Other Peripherals (Network Clocks, Multi Function Devices, Facsimile)
Red	Routers/Swiches
Black	Radio Consolettes

Field PATCH LEADS	INSTRUCTION ON FLOOR
Blue	Outlet to primary device (Computer - or IP Phone)
Black	In a IP environment phone to Computer

5.2. Appendix B – Patching/Service Records

Onsite book to be updated as per ACMA requirements

NAME: _____

COMPLETED BY: _____ COMPLETED DATE: _____

SERVICE NUMBER	MDF		CABINET	
	INCOMING	JUMPERED	INCOMING	OUTGOING
E.g., 02 9999 9054	*A1*	*A50*	*1*	*5*
			1	
			2	
			3	
			4	
			5	
			6	
			7	
			8	
			9	
			10	
			11	
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			48	
			49	
			50	

5.3. Appendix C – SES Internal Business Requirements - *NSW SES internal use*

5.3.1. *Site Bill of Materials Standard*

Equipment	Building Concept			Comments
	Quantity			
	A & B	TBA	TBA	
Desk Phones – Primary	1			
Desk Phones - Secondary	2			
Ringer (Bell)	1			
Cordless IP				
Computer -	3			
Monitors -	6			
Laptop -	1			
MDF - Small	1			
MFD – Medium				
MFD - Large				
WAP	1			
Switch	1			
Router	1			
Modem	1			
Radio – Consolette				
Radio - Desk	1			
Radio Antenna	1			SMD4-67 stainless steel folded dipole antenna (400-520MHz)
Display Monitor (Situational Awareness)				
PA Integration	1			Interface between PA system and Radio Equipment using Accessory Plug

Choose an item.

SES General Technical Contact	
Position Title	
Phone number	0242516244
Email address	comms@ses.nsw.gov.au

6. Document Control

Title	ICT Infrastructure Requirements
Current Version	4.0
Directorate	Information and Communications Technology
Owner	Senior Manager Operational Support
Sponsor	Director Information and Communications Technology
Effective date	19/06/2018
Next Review Date	30/02/2022
Rescinds	Scope of Works Infrastructure
Topic	
Function	ICT Recommendations reference document for SES facilities
Key Words	infrastructure, cabling

Version History

VERSION	DATE	NOTES	POSITION
0.1	19/06/2018	Initial draft	Comms Officer
0.2	11//07/2018	Minor adjustments	Comms Officer
0.3	19/07/2018	Consultation	Snr Communications Officer
1.0	06/08/2018	Final	Senior Communications Officer
2.0	27/09/2019	Review- Comms racks update	IT Communications Administrator
3.0	03/03/2021	Added internal business requirements	IT Communications Administrator
4.0	30/09/2021	Updated document in Consultation with Facilities	IT Communications Administrator
5.0	16/11/2021	Added UPS and surge protection requirements	A/IT Communications Administrator