



0001c Design Checklist - Communications

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00 Design principles

0.01 Main considerations

It is a requirement to undertake the [00 PLANNING AND DESIGN/0001R - DESIGN REFERENCE](#) and [GLOSSARY OF TERMS](#) information into all aspects of design, detailing and delivery when developing the content here within. Clear demonstration of adherence to these requirements is part of the services and will be called upon at key points in the project and during at the discretion of the Department of Education (DoE).

0.02 Communications Overview

NSW Department of Education (DoE) is moving towards Unified Communications Services (UCS). The UCS will incorporate some or all of the following services:

- Structured Cabling System
- Networking - Wired & Wireless
- Telephony
- Interactive Classroom

The above services will be either described in full or referenced to other DoE documents including those of the Information Technology Directorate (ITD) and should take into consideration the Whole of Life principles.

0.03 Structured Cabling System

General

The DoE Structured Cabling System (SCS) is compliant or exceeds the Australian Standard for Telecommunications Customer Premises Cabling (AS3080).

The SCS contains a Main Communications Room (MCR), previously referred to as the Campus Distributor (CD), remote Building Communications Room (BCR), previously referred to as a Building Distributor (BD) connecting to Telecommunications outlets (TO). The interconnection cabling is Campus Backbone Cabling (CBC) between distributors and Horizontal cabling from the MCR or BCR to the TO.

The primary location and quantities of distributors and outlets are defined within the EFSG and SCS along with the associated plans. Generally, as a guide the distance will be a radius of 70 metres between the outlet and the Communications cabinet in order to ensure a pathway no longer than 90 metres. If additional SCS are specified as part of the building works additional outlets will be defined as required of the service(s).

The NSW Department of Education's (DoE's) **Structured Cabling System Specification** defines the design plus the minimum quantity and quality of the components within the SCS. All communications cabling works performed for NSW DoE shall comply with this specification.

Civil and architectural requirements and business practices to cater for the installation of the SCS are described in the following sections.

Structured Cabling System Specification

The latest version of the NSW DOE Structured Cabling System Specification is available at the link below:

[NSW DOE Structured Cabling System Specification](#)

0.04 Pathways (General)

Campus/Building Pathways

Refer to the [NSW DOE Structured Cabling System Specification](#) for the provision of Campus/Building pathways.

- Conduits for external underground horizontal cabling shall be minimum 100mm diameter, white conduit marked by the manufacturer as being for communications use.
- To limit drawing forces, minimise the number of bends in the run.
- Install cable pits adjacent to the buildings for cable drawing purposes, or use a sweep to enter the building where it is impractical to install pits.
- Cables shall not be joined in cable pits.
- A star topology shall be used. Fibre shall be run in underground conduit with an inspection pit system.
- Provide pathways from this duct to the respective BD/BCR or CD/MCR to allow installed and future horizontal cabling to be installed.
- Connecting pathways should preferably be accessible ducts so installed and future cabling can be laid in. Provide 100% spare space.
- If conduits must be used, they shall be white communications conduit of minimum length and run with a minimum number of sweeps so cables can be drawn in without exceeding the maximum pulling force. Provide 100% spare conduits.
- Provide an adequate number of connections to the skirting/wall duct to ensure there is 100% spare space within the communications channel.

Duct for internal use

As part of new or refurbished buildings install duct for the voice/data cabling and socket outlets with the following specification:

- Select ducting from a range that has factory made accessories including dowels, fishplates (to achieve bends and tees) and cable retaining pieces.
- Provide cable retainers at maximum 900mm centres to hold the installed cables within the duct when a cover is removed.
- Duct design must ensure that any screws used for fabrication or cabling retention do not penetrate into the duct to avoid damage to the communications cabling.
- Two parallel continuous threaded screw flutes are required for fixing the cable retaining pieces.
- Allow for future cables to be run using lay-in technique.
- Provide each length of cover strip with points at both ends to allow removal of covers with a tool without damage to the paint finish. Alternatively, the cover is to be affixed by screws designed for the purpose and colour coded.

Finishes

The external surfaces for exposed duct are to be finished in baked powder coat enamel of selected colour.

Colours will be selected from the colour schedules specific to a project and more than a single colour may be required in a school.

Campus Backbone cabling

The cable pathway installed for cabling can also be used for the cabling providing manufacturers' cable installation specifications (e.g. minimum bend radius) can be achieved. Ducts must be sized for the horizontal cabling, spare capacity and for the backbone.

Between buildings, conduits installed in the ground are the preferred pathways. Ducts installed in indoor-rated covered ways are an acceptable alternative.

Conduits used for the CBC are to be a minimum 100mm diameter white conduit marked by the manufacturer as being for communications use. To limit drawing forces, minimise the number of bends in the run. Install cable pits adjacent to the buildings for cable drawing purposes, or use a sweep to enter the building where it is impractical to install pits. Cables are not to be joined in cable pits. Provide minimum 2 x 50mm diameter white conduits from pit to the site Campus Distributor within a building and minimum 1x50mm diameter white conduits from pit to each Building Distributor within a building.

CBC cables installed underground in conduit must be classified by the manufacturer as suitable for external underground use.

0.05 Responsibilities

For new and refurbishing schools, the department's Information Technology Directorate (ITD) shall co-ordinate the procurement of network and telephony services. To facilitate ITD's responsibilities, the following action sheets have been developed:

- [Action and check sheet 1: Application for Telephone Service](#) – describes the process (including responsibilities and responsibility delegations) for procuring incoming telephone lines and their connection (Please see Related Resources).
- [Action and check sheet 2, part A: Tendering Design and Documentation](#) - describes the process (including responsibilities and responsibility delegations) for designing and procuring broadband and Local Area Network (LAN) equipment during the documentation phase (Please see Related Resources).
- [Action and check sheet 2, part B: Construction](#) – describes the process (including responsibilities and responsibility delegations) for procuring and installing broadband and LAN equipment during the construction phase (Please see Related Resources).

Information Technology Directorate

- Production of the [NSW DOE Structured Cabling System Specification](#).
- Providing preliminary advice on estimates of active equipment to be supplied, based on line drawing showing Campus Distributor (CD)/Master Control Room (MCR), Distributor/Building Control Room and numbers of TOs serviced by each distributor provided by Project Manager at time of tender documentation. For new school sites this will include a WAN device, eT4L server and UPS
- Advice will be refined based on detailed design and current standards. The project will purchase 12 weeks before commissioning based on quotation obtained by DoE ICT stakeholder.
- DoE ITD will provide a configured WAN device for installation within the CD/MCR directly to the contractor, on site.
- Payment for active equipment will be managed by the Foundations.T4L Project Manager (PM) and may be included as a PC item in the contract sum. Please Note: Asset Management Directorate will manage project funds necessary to fund the purchase of active equipment.

Designer/Documentation

- Provide ITD with a basic block diagram of the SCS showing CD/MCR, BD/BCR and numbers of TOs serviced by each distributor to permit the determination of active equipment requirements and a budget price.
- Include the latest version copy of DoE ITD Structured Cabling System Specification in the project specification.
- Ensure all checklists related to EFSG requirements (including, but not limited to the action sheet/sheets named above) are completed and forwarded as required.
- Ensure all requirements of DoE ITD Structured Cabling System Specification are incorporated into documentation.
- Ensure quantities are correct to EFSG requirements.
- The cabling solution for each site must be specifically designed to suit that site and appropriate allowance for future permanent or temporary buildings:
- For demountables, provide cabling and frame for expansion.
- For future permanent buildings, not scheduled in 5 years, provide cable pathways NOT cable.

NOTE: In projects where there are existing buildings that are not included in the building works, the extent of the structured cabling system must be determined in the preliminary design stages. In schools receiving new buildings they may require remedial works/equipment in the existing MCR to provision the new works. (Please see Section 05 for more information)

- Ensure correct location and space requirements for distributors and adequate pathways for installation of cabling. The CD/MCR and BD/BCR should ideally be centrally located and should align vertically or provide adequate pathways between floors. As a guide TO's should fall within a 70 meter horizontal radius of its BCR. Refer to SCS.
- Include, in the tender documents, a list of the active equipment to be supplied by the client
- Program active equipment ordering - the order needs to be placed a minimum of 12 weeks prior to installation, see Contractor Installer below

Contractor/Installer

- Design, supply, install, test and commission the structured cabling to be included in the contract documents. The installation of active equipment supplied by the client is included in this requirement.

-
- Provide the required patch and fly leads, quantities and lengths determined from the formula contained in the Design Guide.
 - Produce vendor endorsed working diagrams of the SCS to be submitted to the client a minimum 12 weeks prior to required delivery date to confirm the Active Equipment needed. Communications line for these submissions is to be:
 - Contractor to Foundations.T4L PM then;
 - The ITD School Network Solution Design Authority for approval.
 - The Foundations.T4L PM then submits the final SCS diagrams to;
 - AMU

Contact

Foundations.T4L, ITD

Email: Foundations.T4L@det.nsw.edu.au

School Network Solution Design Authority

Email: SNSDA@det.nsw.edu.au

NOTE: In D&C type contracts the Design Guide is included in the contract documents. The contractor takes on relevant design development responsibilities. The D&C construction documents must address the current Schools Design Guide and the DoE ITD Structured Cabling System Specification.

0.06 Existing school upgrades

Overview

This section aims to assist planners in determining the project brief for structured cabling, telephony, bell and PA systems as part of expand and refurbishment projects in existing schools. This section shall not to be applied in any way to the requirements for new school construction as described in other sections.

Expand and refurbishment projects require a project brief to be created that is directly applicable to the merging of the new works into the existing ICT infrastructure, structured cabling, telephony, bell and PA systems. Each site is unique, the scope will be determined by the Project Director in consultation with ITDs Foundation.T4L PMs, ICT Support Team Leaders and the Principal. Factors affecting the project brief include:

- impacts to existing voice and data, PA and bell system cabling to ensure ESFG standards and infrastructure compatibility across the site;
- suitability of existing ICT networking equipment and its compatibility with new equipment;
- suitability/expandability of any existing telephony, bell or PA systems through assessment based on age and future lifespan of the existing equipment;
- suitability of existing structured cabling and its compatibility with new standards;
- extent of the expansion and/or refurbishment;
- project budget;
- existing operational communication systems which the schools need to retain (e.g. distributed signage or video systems);
- planned future school expansion.

The Project Brief Template is available at the link below:

Provisioning of ICT in existing school : [Project Brief Template.](#)

General Requirements

New, upgraded or refurbished buildings must be delivered to current DoE requirements including communications services to the current Design Guide for a new school, including:

- Data network
- WiFi
- Telephony
- PA systems
- Bell systems
- Building Management and Monitoring systems including PV Solar systems
- Digital signage
- Security services routed over structured cabling such as CCTV.

Table 01: Communication systems upgrade strategies

Requirement	Example
Current communication systems deemed suitable for expansion	Expand into new or refurbished buildings

Requirement	Example
Current communication systems deemed suitable but affected by building works	Relocate and upgrade if necessary. Expand into the new or refurbished buildings
Current communication systems deemed unsuitable for expansion	Uplift/ Replace across the entire site
Provide extension of the communications system in a new or refurbished building to allow it to function.	Expand/replace structured cabling, telephony, Bell, PA cabling to the building. Expansion capabilities or replacement of these systems is to be assessed.
Extend existing operational communications systems required by the school to the new or refurbished buildings to maintain present coverage and provide common supportable infrastructure across the site.	Upgrade existing ICT infrastructure to accommodate new equipment that is being installed. Upgrade of existing WAP's and switches across the site for compatibility. Expand school's digital signage system to include new or refurbished building.
Relocate existing communications systems where their operation is affected by the additional accommodation project.	Relocate site ICT services to either new or refurbished MCR/BCR/Floor Distributors that are affected by the works. This may include Bell, PA and telephony systems.
Provide electrical and data schematic drawings detailing the location of backbone pathways, existing outlets, data cabinets and other associated systems and any proposed changes prior to design signoff.	Schematics for Expand and Refurbish projects must identify changes such as additions, removal and replacements of existing infrastructure along with new building inclusions. DoE ICT must be engaged in consultation

Note: The latest [NSW DOE Structured Cabling System Specification](#) shall be adhered to in all the above scenarios. In practice this may mean that the communications works may extend outside the area of the building works. Any required alterations to existing systems will form part of the scope for the specified work. This excludes repair or re-commissioning of existing defective systems which remains the responsibility of the school.

Structured Cabling works

Refurbished buildings shall be provided with structured cabling as for new school construction. Installers should follow the structured cabling system described in this Design Guide. All cabling work requires documentation including test results and "as built" diagrams, as per the Structured Cabling Systems Specifications.

Key elements include:

- Schools network is to remain functioning during the constructions works. This may require temporary installations, or staged works to ensure the school remains operational with minimal interruptions.
- Voice tie cabling may be required to connect via the existing block cabling to any existing analogue/digital (non VOIP capable) PABX.
- Any MCR or BCR's impacted by the project must meet EFSG requirements for new school construction.
- Where there is additional equipment being installed in existing MCRs and BCRs, e.g. fibre backbone, horizontal cabling, phone controllers, CCTV head equipment, PA-Bell Controllers, etc, there may be a requirement to increase the room size, providing there is sufficient space to extend. The number and size of cabinets will also need to increase to accommodate the new services/equipment. Where possible SCS room layouts should be adhered to.
- Make provision in the design for the structured cabling system to be extended to planned future buildings. This is critical for underground pit and conduit systems.
- New campus backbone cabling is to be installed to current standards (pit and conduit system) and not utilise existing non-standard pathways. E.G conduits on covered walkways.
- New horizontal cabling is to utilise cable tray system as per current standards.
- Where existing data cabling is retained in a refurbished building (requires ITD approval), the cabling must comply with current SCSS standards.
- Frequently the existing cabling will not have capacity for the extension and will require replacement.
- Schematics must be provided for refurbished spaces indicating existing, new and changed data and power within the spaces.

NOTE: Heritage buildings require specific solutions be developed in consultation with a heritage architect and shall be included in the developed brief.

Telephony equipment

The PABX should utilise VoiP for internal handsets where possible. During the construction of the brief, the existing phone system is to be assessed. A determination will be made on expansion, upgrading or replacement depending on requirements and available PABX options for the site.

Reticulated Public Address (internal and external) and Period Bells

During the construction of the brief any existing services will be assessed. Should either system exist and be in use, its functionality must be retained or enhanced by the refurbishment accommodation work. This may involve upgrade or replacement of existing systems to accommodate project works, or relocation of the microphone and amplifier or period bell timer to a new administration block. As well as retaining existing system/s, outlets are required to new or refurbished buildings in accordance with DoE requirements for new buildings.

0.07 Certification and prequalification

Manufacturer's Certification

The manufacturer is required to certify that the cabling system meets specification, including the specified performance levels.

In addition, the manufacturer is to provide a written warranty certification for a minimum period of twenty (20) years.

NSW ICT Services Scheme – SCM0020

The installation of the system must be by a contractor currently pre-qualified under the NSW iCT Services Scheme- SCM0020 accreditation for site cabling under category- F02 Network Operations including delivery “as a service”.

0.08 Patch and fly lead allocation

Provide sufficient patch and fly leads for connection of TOs, as detailed:

- Supply UTP patch leads for each active Telecommunications Outlet contained in the CD/MCR and/or BD/BCR.
- Provide UTP fly leads for 100% of the total number of TOs installed. With the following numbers being:
 - 33% at 2 metres long
 - 33 % at 3 metres long
 - 34% at lengths pertinent to furniture placement
- Provide fibre optic patch leads for the commissioning and operation of all active equipment being installed as part of the contract. The connector types on the leads may vary depending on the equipment supplied by DoE. Hence contractors are to be mindful of this and ensure the correct type of leads are supplied. Civil and

architectural requirements and business practices to cater for the installation of the SCS are described in the following sections.

0.09 Telecommunications outlets

Telecommunications Outlets (TOs) are the connection points between the SCS and the user's equipment, i.e. computers, telephones, AV monitors or PA loudspeakers. Each TO consists of single RJ45 modular outlet, with spring loaded shutters to reduce the risk of physical damage and ingress of contaminants.

Modular outlets are mounted in pairs on the same escutcheon plate (a double telecommunications outlet), with the outlets side by side in a single gang horizontal plate, not one above the other. Thus, a room designated as showing "2x2" communications outlets will have two 2-gang plates in it, a total of four RJ45 outlets.

Label each outlet with engraved plastic labels, glued and pinned. The other end of each 4-pair cable shall be the MCR/BCR to correspond.

The numbers of Telecommunications Outlets (TOs) for every space in the school are shown in the EFSG as a Double Telecommunications Outlet (DTO).

All TOs shall be installed as a dual TO on a single plate, i.e. as a DTO.

0.10 Labelling and records

Provide a logical identification system for all components of the SCS. The identifying letters or numbers shall relate to those used on the building blocks. The system shall individually identify all distributors, both ends of all cables, the TO and the patching outlets. It shall also provide an overall site layout to allow easy recognition of the location of items.

Flexible nylon, machine printed labels are the minimum acceptable standard.

0.11 Manuals and training

DoE requires a 4-hour on-site training session for up to four persons on the use of the SCS. Training is to be accompanied by appropriate documentation and a video that demonstrates operation of the system and its components, including patching, cable management for voice, video and data of the SCS installed on site. Include explanation of detailed drawings left on site. The video / CD ROM may be generated from the on-site training for future use by DoE school staff.

The Project Manager will, in consultation with the School Principal, nominate the timing of this session together with the number of attendees.

Manuals are to be handed to the school during the training session. Include in copies of all cabling test reports and the (minimum) 20-year warranty certificate the manual.

As built documentation, manufacturer's warranty and test results are required.

0.12 Main Communications Room

A main communications room will be required in new and some upgrade projects approved projects. For details of the cabinets refer to [NSW DOE Structured Cabling System Specification](#) and EFSG drawings: PS502.21, HS501.19 and SSP502.21.

Allow for cabinets 1, 2 & 3 as below and additional space and power for cabinet 4:

- 45RU cabinet nominal 800mm wide by 900mm deep as the ITD ICT Services cabinet.
- 45RU cabinet nominal 800mm wide by 900mm deep as the campus and building distributors.
- 45RU cabinet nominal 800mm wide by 900mm deep with a sever shelf for file servers

Cabinet 1 shall be located nearest to the wall. It will house the carrier passive and active equipment, wireless controllers and any ITD supplied servers and supporting equipment

Cabinet 2 shall be located adjacent to Cabinet 1. This cabinet will house the Campus Backbone Cabling and the horizontal cabling for the Library. It will also house the LAN equipment.

Cabinet 3 is required for server installation.

Cabinet 4 may be required and is dependent on the cabling density to the MCR.

A managed pathway for copper and fibre patch leads between the cabinets is required.

0.13 Networking - wired and wireless

Please refer to the latest [NSW DOE Structured Cabling System Specification](#) before undertaking any networking works.

Wired networking – Backbone cabling

- Optical fibre cable is the only medium to be used to carry campus and building backbone networks services.

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- The optical fibre cabling used in campus and building backbone cabling is to be a minimum of 12 core, single mode fibre.
 - Any increase to fibre backbones is to be in multiples of 12 cores.

Wired Networking - Horizontal cabling

- Twisted pair cabling is to be used to carry network and telephone services and will be Category 6A.
- The cable construction is to be rated as “Low Smoke Zero Halogen” for all internal grade Cat6A cabling.
- Connector security and protection is mandatory in all school locations and protection is to be provided by shuttered outlets and tamper proof faceplates or protective covers.

Wireless Networking

New buildings and refurbishments are required to provide a common wireless solution compatible across the school, providing a consistent user experience and support mechanism. This involves the replacement of existing legacy wireless equipment, such as wireless access points and site switches. This replacement shall be coordinated by the project manager, with the ICT stakeholder and the School Principal.

0.14 Telephony

Voice over Internet Protocol (VoIP) and National Broadband Network (NBN) connections

The department only approves the use of local Private Automatic Branch Exchange (PABX) systems at school sites.

The local PABX system shall be compatible with SIP trunks and Public Switched Telephone Network (PTSN) over NBN telephony services.

Where possible, NBN connections are being implemented into schools and may be used to deliver carrier services.

Connection orders

The Foundations.T4L Project Manager (PM) shall manage contact with the department's Information Technology Telecommunications Manager to confirm the carrier service type and requirement, and to assist with the NBN process.

Contact

Enquiries about the NBN rollout to existing DoE school sites can be made through:

DoE NBN Project Team - Managing the NBN rollout to all DoE sites

Corporate Telephony Team

Address: 105 Phillip St, Parramatta, NSW 2150

Telephone: 02 7814 3777

Email: nbnproject@det.nsw.edu.au

All carrier service creation, and change requests shall be directed to the Foundations.T4L PM. SIP orders and NBN new development and/or relocation applications will be placed by the Corporate Telephony Team.

Supply and install

Service suppliers shall supply and install:

- the complete PABX;
- the lead-in cable;
- the Main Distribution Frame (MDF) and;
- handsets.

Service suppliers shall coordinate connection to the SIP Trunk or PSTN over NSB service with the client and network service provider. The system shall be operational before handover. Coordination of activities and scoping is the responsibility of the Schools Infrastructure NSW Project Director (SINSW PD).

The telephone system shall:

- operate over the site structured cabling system utilising VoIP;
- be able to be patched to operate on any outlet and;
- include an analogue card or similar to service that allows for single power failover extensions to be installed into the main administration area of the school.

Any existing analogue or digital handsets requiring direct copper cabling from the PABX to the handset location shall have cabling ties installed as required by the department's current NSW DOE Structured Cabling System Specification.

PABX telephony

Supply and install

Service suppliers shall supply and install:

- the complete PABX or key system,
- lead-in cable,
- MDF and
- handsets.

Service suppliers shall coordinate connection to the PTSN with the client and network service provider.

The telephone system shall operate over the SCS and must be able to be patched to operate on any outlet. The system must be operational prior to handover.

MDF and PABX location

The MDF and PABX shall be installed adjacent to the Campus Distributor (CD)/Master Control Room (MCR) and then wired to the PABX voice section of the CD/MCR. The operator's console shall be placed in the administration/clerical office.

Incoming carrier services

For all schools, incoming carrier services consist of:

- A telephone service, providing voice and fax.
- Connection into the department's Wide Area Network (WAN) service, a fibre optic Multi-Protocol Label Switching (MPLS) service (a small number of schools use a satellite link), used to deliver SIP carrier services.

For new and refurbished schools, SIP Trunk is the preferred carrier service.

In exceptional circumstances, PSTN over NBN may be an acceptable option. Please check with the Foundations.T4L PM, who will confirm with the department's Information Technology Telecommunications Manager before proceeding.

For all incoming carrier services:

- The contractor shall submit the Action and check sheet 1: Application for Telephone Service to the Foundations.T4L PM (This form will be incorporated into project documentation), informing them of:
 - The services required and;
 - The date that connection of the service/services is required.

NOTE: The department requires a minimum of 15 weeks advance notice of the date the service/services are required to be connected.

- The contractor shall liaise with the carrier/s to ensure that lead-in cables suitable for the required services are installed.
- The contractor shall be required to make provision for the service/services to be connected (Typically facilities for conduit entry to the communications room and trenching from the site boundary).

Line-Work installation

Some network service providers may be required to install line-work (i.e. lead-in cables, external conduit, pits and cabling). In these cases, PDs and/PMs shall:

- request a cost estimate for the required work from the appropriate regional office and;
- ensure that any fees or charges incurred by the supplier for this work are paid.

Exchange Lines

All voice exchange lines shall be connected to the school's telephone system. Connect directory, and one (1) other exchange line are to be connected in rotary where possible.

PABX performance/capability requirements

The PABX/Key system is to be equipped with the following capabilities:

- Centralised call answering during normal school hours.
- Ability to enable each extension to be programmed with internal communication capability and access or barring to external exchange lines.
- Ability to enable exchange line access for each permitted extension, programmed for either direct access or via operator access.
- Privacy for all internal and external calls.
- Programmable for night mode operation.
- One nominated extension with priority break-in facility to an exchange line.
- Ability to program numbers for abbreviated dialling.
- To be capable of future extension by at least 50% above the numbers of lines and working extensions tabulated above.
- Voice mail facility.

-
- Option for cordless extensions.
 - Power fail option.
 - Provide one handset for each working extension.
 - One loose analogue power fail handset for emergency use. (Provide cabling and patching for installation of the power fail handset in the school clerical office).

Systems, which apply voltage pulses to the signal lines during operation or standby, shall not be used without the written agreement of the SCS manufacturer.

Program the system to operate in the following manner:

- All exchange lines to have STD access and IDD barring
- STD access to Principal and Clerical office operator extensions only
- Program direct out-dial access to Principal and Deputy Principal extensions and restrict all other extensions to exchange line access via the operator.
- Each extension to have access to emergency and school business numbers by abbreviated dialling to programmed locations.
- Night mode to restrict access to emergency and school business numbers only.
- System barring as follows:
 - a) Total Barring: All extensions totally barred to 0011, 0055, 0100, 0176, 0173, 0103, 0101, 0102, 1291, 0108, 0107.
 - b) STD to have access to all areas other than those listed in (a) above.

Department of Education to advise which outlets are to be programmed for use.

Handsets

Service providers shall:

- Provide and install handsets (Handset installation locations shall be determined by the client).
- Carry out all patching within the CD and BDs to enable the system to operate on handover.

Cable termination

The cable from the TPF to the active telephone patch panel in the CD may be terminated as 1 pair per outlet (i.e. 1 pair to be terminated onto Pr 1). However, some PABX systems may require additional pairs per termination.

Note that all Voice grade cables installed as part of the backbone is to be terminated both ends into modular (RJ45) outlets with 4 pairs terminated in every modular outlet.

Training of staff

There shall be a minimum of 4 hours training of nominated staff in the care and operation of the PABX/Key system. Training is to be accompanied by adequate documentation. The Project Manager shall nominate the timing of this session, together with the number of attendees in consultation with the School Principal.

Lift Phone

Service providers shall organise the supply and installation of a 4G/5G compatible dual sim GMS gateway (Please see SG1011.4.4 for more information).

Backup mobile phone solution

SIP Trunk and PSTN over NBN services are reliant on power being supplied and will not remain fully operational during a power failure or loss of carrier service. A robust backup mobile phone plan should be considered in the event that the SIP Trunk or PSTN over NBN services are out of service.

Table 02: Required Telephone lines – Primary Schools

No. of Students	Incoming lines	Working extensions (incl. handsets)
Primary Schools		
1 HB		
2 - 4 HBs	1	3
5 - 7 HBs (Core 7)	2	4
8 - 14 HBs (Core 14)	2	8
15 - 21 HBs (Core 21)	3	10
22+ HBs	3	10

Table 03: Required Telephone lines – Central Schools

No. of Students	Incoming lines	Working extensions (incl. handsets)
Central Schools		
30 - 112	30 - 112	30 - 112
113 - 159	113 - 159	113 - 159
160 - 240	160 - 240	160 - 240

No. of Students	Incoming lines	Working extensions (incl. handsets)
241 - 450	241 - 450	241 - 450
451+	451+	451+

Table 04: Required Telephone lines – Secondary Schools

No. of Students	Incoming lines	Working extensions (incl. handsets)
Secondary Schools		
Streams 1 - 3	Streams 1 - 3	Streams 1 - 3
Stream 4	Stream 4	Stream 4
Stream 5	Stream 5	Stream 5
Stream 6	Stream 6	Stream 6
Stream 7	Stream 7	Stream 7

0.15 School audio-visual (AV) device

This document provides the minimum standard required for key equipment, power and communications required for each NSW DoE learning space. Exact measurements, quantities, equipment locations, and other room aspects such as equipment installation methods will vary from project to project.

The school audio-visual (AV) standards for school main learning displays (MLDs) include a single display panel of varying size as specified by the requirements of the learning space in which the Audio-Visual equipment is being installed (please see Appendix A: Display Sizing for further information). The school audio-visual standards for school main learning displays considers the mobility requirements that are essential for modern, configurable learning spaces.

The document will also provide the minimum standard installation requirements for learning displays in school communal halls and gymnasiums of all sizes.

All components are available and shall be purchased from approved DoE suppliers (Please note, some components including the T4L interactive multi-media PC and video/audio conferencing unit will need to be purchased separately) by the Project Manager (a DoE Employee). These components shall then be integrated into a standard Main Learning Display (MLD) by the AV Contractor, in consultation with the Project Manager.

School audio-visual device specification

The latest version of the NSW DoE school audio-visual standards for school learning displays is available at the link below:

[NSW DoE school AV for learning displays standard](#)

The latest version of the NSW DoE audio-visual standards for school communal halls and gymnasiums is available at the link below:

[NSW DoE AV standards for school communal halls and gymnasiums.](#)