

Electrical & Mechanical Services
Schematic Design Report

UPGRADES TO DUNDAS PUBLIC SCHOOL

DUPS-NDY-XX-XX-RP-N-0001

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INTRODUCTION

Introduction

This Mechanical, Electrical Schematic design report has been prepared to support a Review of Environmental Factors (REF) for the Department of Education (DoE) for the upgrade of the Dundas Public School (DPS) (the activity). The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) as “development permitted without consent” on land carried out by or on behalf of a public authority under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37 of the T&I SEPP and in consideration of the stakeholder and community participation plan.

The proposed activity is for upgrades to the existing DPS at 85 Kissing Point Road, Dundas NSW 2117 (the site).

The purpose of this report is to provide recommended actions and observations in relation to the Electrical, AV, Communications, Security and Mechanical systems to accommodate the upgrades to Dundas Public School.

Proposed Activity Description

The proposed activity involves upgrades to the existing DPS, including the following:

- Creation of 6 new teaching spaces and 2 learning commons in a single-story building
- Installation of covered walkways connecting the new building to the existing school network
- Landscaping and external works around the new building and eastern entry
- Upgrades to site infrastructure and services to support the new building.

The intent of the activity is to increase the number of permanent teaching spaces (PTS) from 9 to 15 and students from 331 to 345.

Activity Site

DPS is located at 85 Kissing Point Road, Dundas. The school site is bound by Kissing Point Road to the north and Calder Road to the south. Kenworthy Street is located parallel to the site to the east as is Saint Andrews Street to the west. The site has an area of 1.99 ha and comprises 1 allotment legally known as Lot 3 DP 610.

The site currently comprises an existing co-education primary (K-6) public school with 9 permanent buildings, 6 demountable structures (1 demountable includes 2 classrooms), interconnected covered walkways, play areas, on-grade parking, sports court and green spaces with mature trees.

Majority of the buildings are 1 storey with only one 2-storey building being Building A (Admin/staff hub and amenities building). Buildings are clustered to the north of the site, with the southern part comprising of a large play area/informal sports oval and a sports court.



SCOPE

This report has been provided by Norman Disney & Young (NDY) to provide recommended actions and observations in relation to the Electrical, AV, Communications, Security and Mechanical systems to accommodate the upgrades to Dundas Public School.

Recommendations and observations in relation to the Electrical, AV, Communications, Security and Mechanical services are provided herein. This schematic design has been developed in line with the SINSW Standard Hub Layout and the Pattern Book.



Electrical



Audio Visual



Mechanical

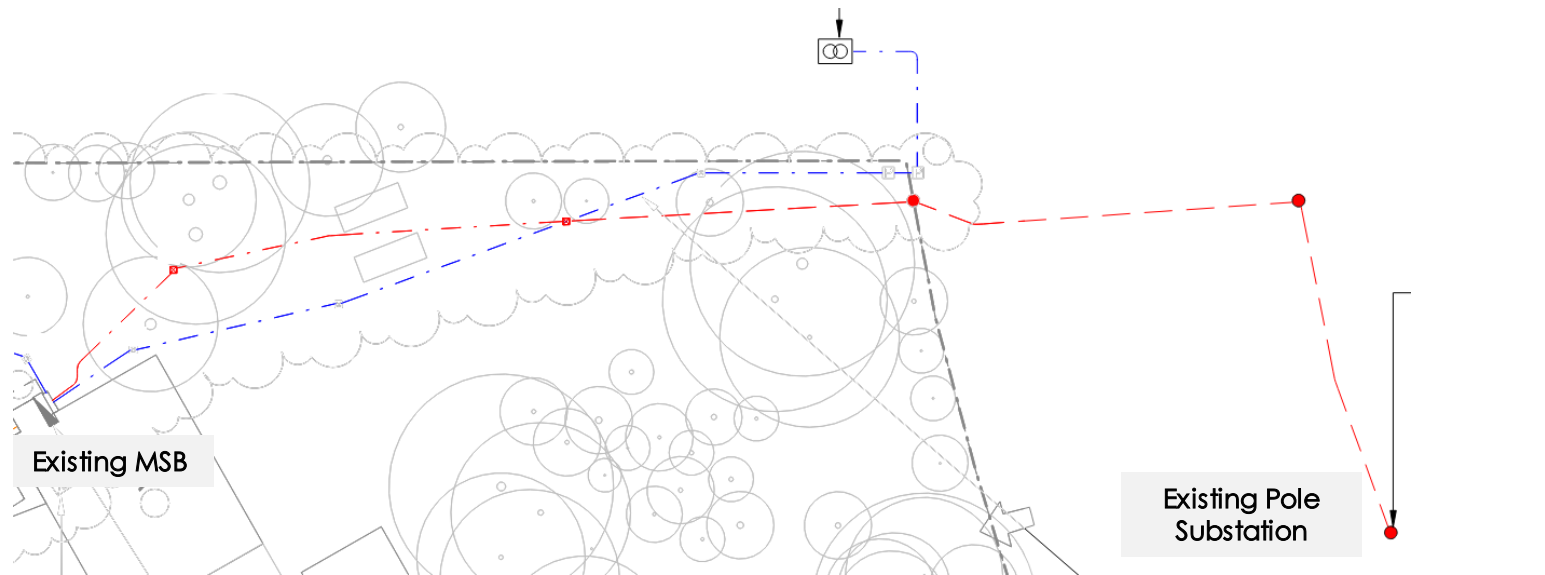


Security

ELECTRICAL SERVICES

Electrical Services

EXISTING ELECTRICAL SUPPLY



Dundas Public School (DUPS) is currently supplied by two low voltage connections.

The first point of supply is from pole-mounted substation 18932 on Kissing Point Road. This substation has a 315kVA transformer, which was recorded to have reached full capacity last year and is non-upgradeable.

The second point of supply is taken from pole-mounted substation 15719 on Saint Andrews Road. This substation has a 400kVA transformer, which also reached full capacity last year and is non-upgradeable.

The School contains one (1x) main switchboard located in an external enclosure outside Block A. This MSB supplies sub-distribution boards throughout the site via a network of pits and conduits. The board has the following characteristics:

- Built to AS3439.1
- Form 4Bih Separation
- 30kA fault rating
- Rated to 400A

Maximum demand for the site is 149A based on meter data.

Additionally, there is an existing 4.6 kW solar array on the roof of Building K.



Existing Pole Substation
(to be disconnected)



Existing MSB
(to be retained)

Electrical Services

ELECTRICAL LOAD ANALYSIS

Demand Component	Load (A)
Existing School Maximum Demand	149 A
Removal of Demountable Spaces	-18 A
New Works (Block L, A/C upgrades etc.)	80 A
Spare Capacity	32 A
Estimated New Maximum Demand with Spare Capacity	243 A

Capacity/Demand	Load (A)
Substation Connection Limit*	455 A
Existing Maximum Demand	149 A
Substation Spare Capacity Before Works*	0 A
Estimated New Maximum Demand with Spare Capacity	243 A
Substation Spare Capacity After Works	-94 A

**The LV distributor supplying the School is shared with other customers on Kissing Point Road. Endeavour Energy has advised that the existing pole-mounted substation has reached full capacity and is non-upgradeable.*

Based on preliminary maximum demand calculations and our understanding of the existing electrical supply, the School will need an increased supply size from the Endeavour Energy network.

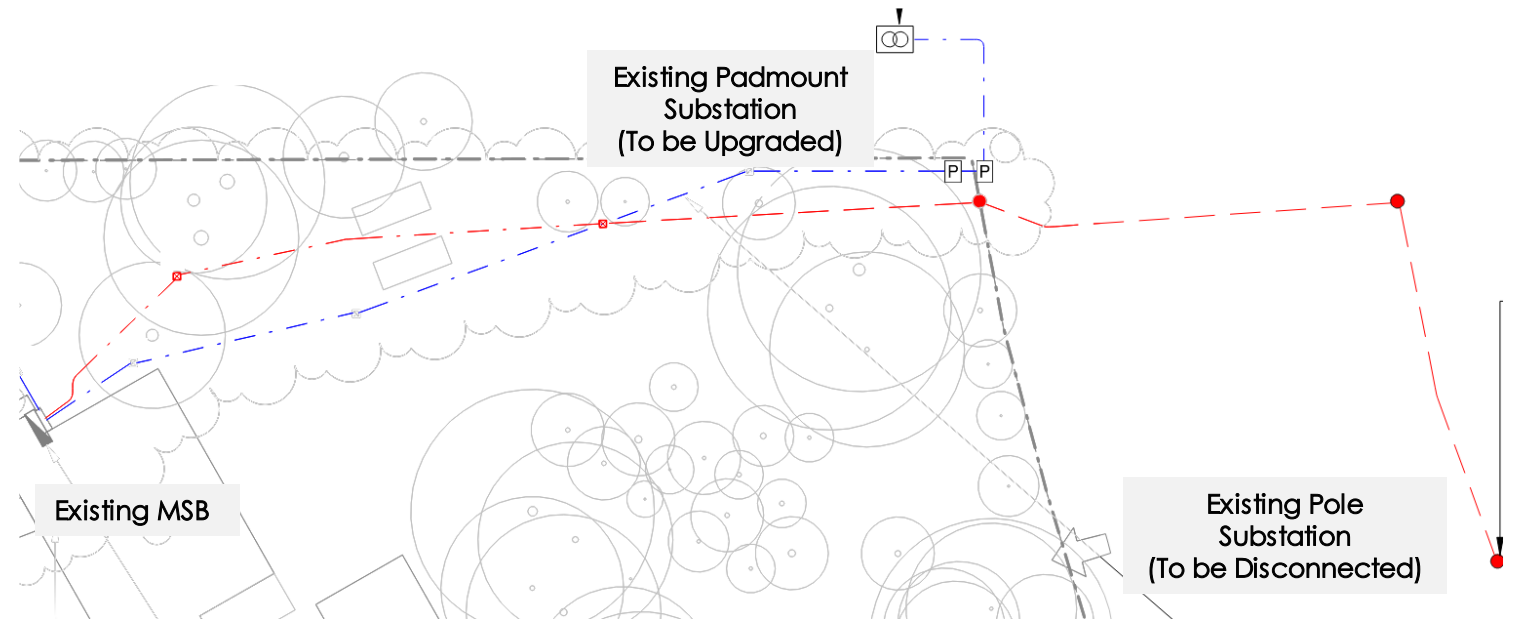
- The existing MSB is suitable for re-use for the following reasons:
- The board is rated to 400A, which can accommodate the increased load and spare.
 - There are sufficient spare poles to connect a new outgoing submain to Block L

Applicable Standards & Guidelines
The services concepts have been developed on the basis of the following:

- NCC 2022
- EFSG v1 & 2
- AS3000
- AS/NZS 1680
- AS/NZS 2293.1
- AS/NZS 1158
- NSW Department of Education Pattern book

Electrical Services

PROPOSED SUPPLY MODIFICATIONS



Existing substation to be upgraded for proposed new connection

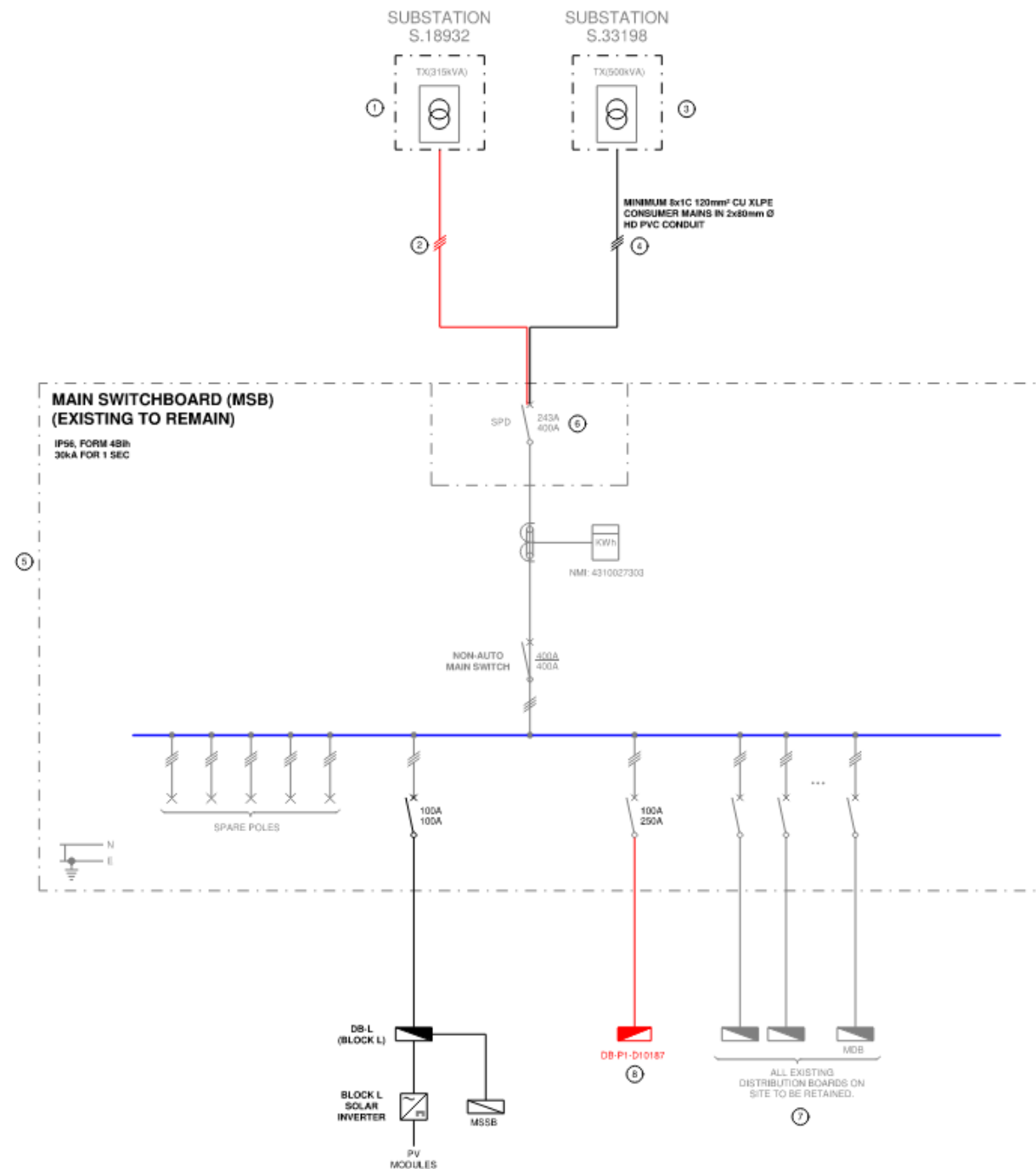
A formal load application was lodged with Endeavour Energy on 15/11/2024 for a new total load for the School of 243A. A standard connection offer was provided by Endeavour Energy on 25/11/2024, indicating that the existing pole substation connection on Kissing Point Road can be replaced with a new connection on an existing padmount substation. This existing padmount substation is upgradeable and will require an increase of transformer size from 315kVA to 500kVA to cater for the additional load.

This new substation connection shall feed the existing main switchboard (MSB) which will be fitted with an adjustable circuit breaker set at no greater than 243A per phase. The Endeavour Energy connection offer is valid for a period of 12 months from the date it was received.

The existing MSB located outside Block A is to be retained. A new outgoing submain will be connected to this MSB that will supply Block L.

New consumer mains cabling is to be reticulated between a new electrical pillar at the property boundary and the existing MSB using in-ground conduits. The new consumer mains will be sufficiently sized to accommodate the increased electrical supply.

ELECTRICAL DISTRIBUTION – SITE LEVEL



Dundas Public School - Single Line Diagram

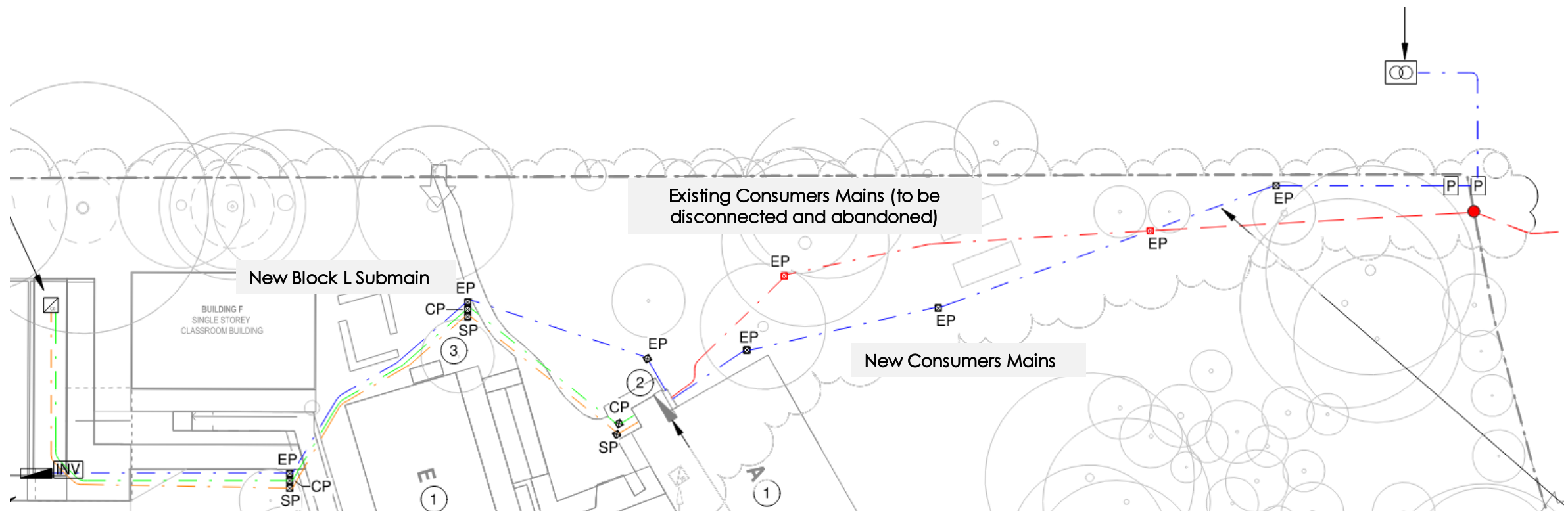
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ELECTRICAL DISTRIBUTION

The existing pit and conduit network will be expanded to allow for additional cable pathways to the new building and new LV supply. These pathways will require new in-ground conduits to be installed with cable pits at 30m intervals and at changes in direction. All new in-ground conduits will include spare capacity as required by the EFSG to facilitate future upgrade works if required.

New consumers mains cabling is to be installed within in-ground conduits between the existing MSB and the connection point on the Kissing Point Road Boundary (see below). The existing consumers mains cabling shall be disconnected and removed, with the associated in-ground conduits to remain in-situ to avoid unnecessary earthworks.

A new submain shall run within in-ground conduits between the existing MSB and the new EDB in Block L



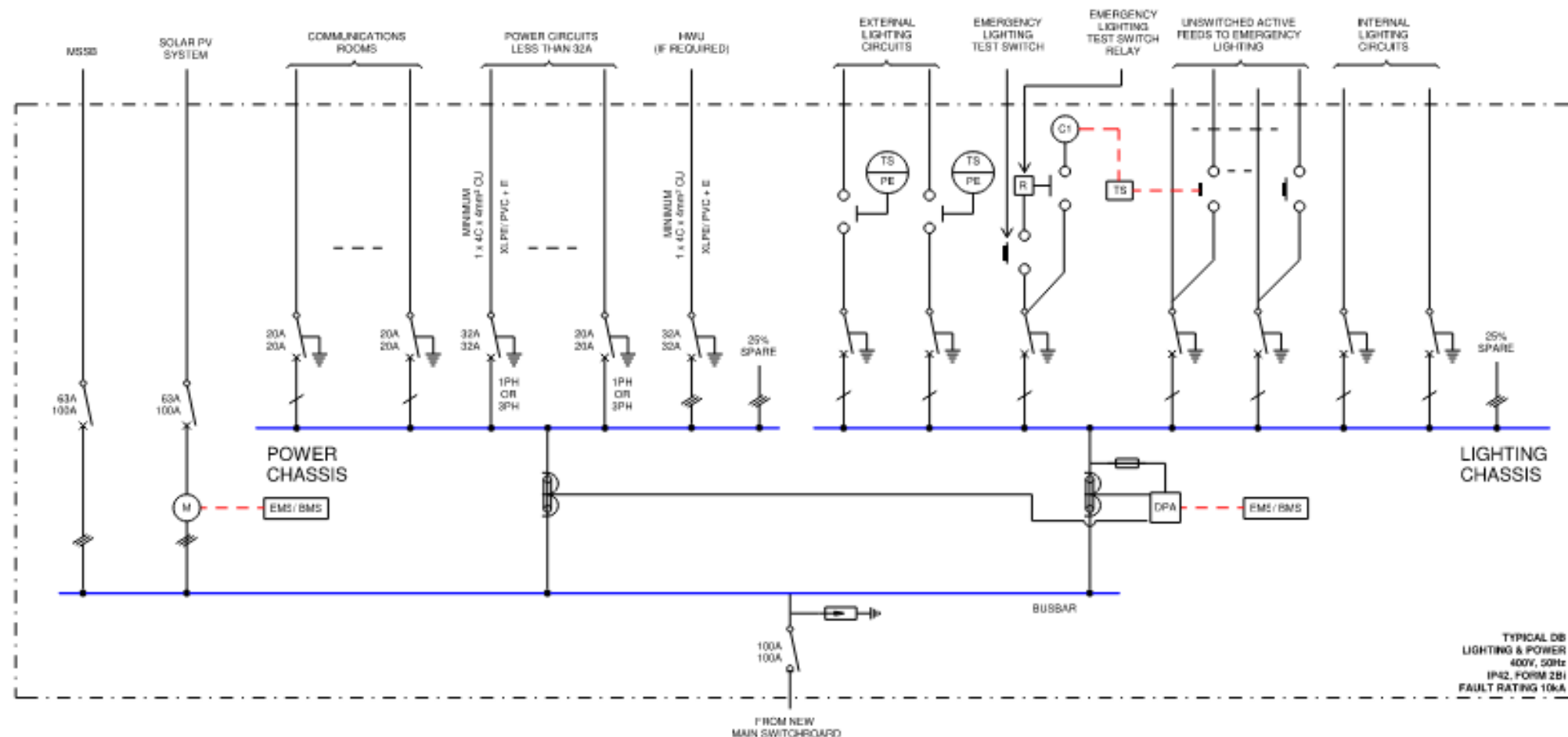
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ELECTRICAL DISTRIBUTION PROPOSED NEW BUILDING – BLOCK L

The proposed new building, Block L, will be supplied by a new electrical distribution board (EDB) contained in a purpose-built cupboard located within the services core. This cupboard will be 60-minute fire-rated, and smoke-sealed as per the EFSG.

The electrical cupboard will include an EDB and inverter for the proposed new solar PV system. The EDB will include separate sections for power and lighting as well as surge protection. This EDB will supply spaces in Block L and the MSSB located in the plant area.

The electrical cupboard will be ventilated using intumescent door grilles at high level to prevent heat and moisture build-up.



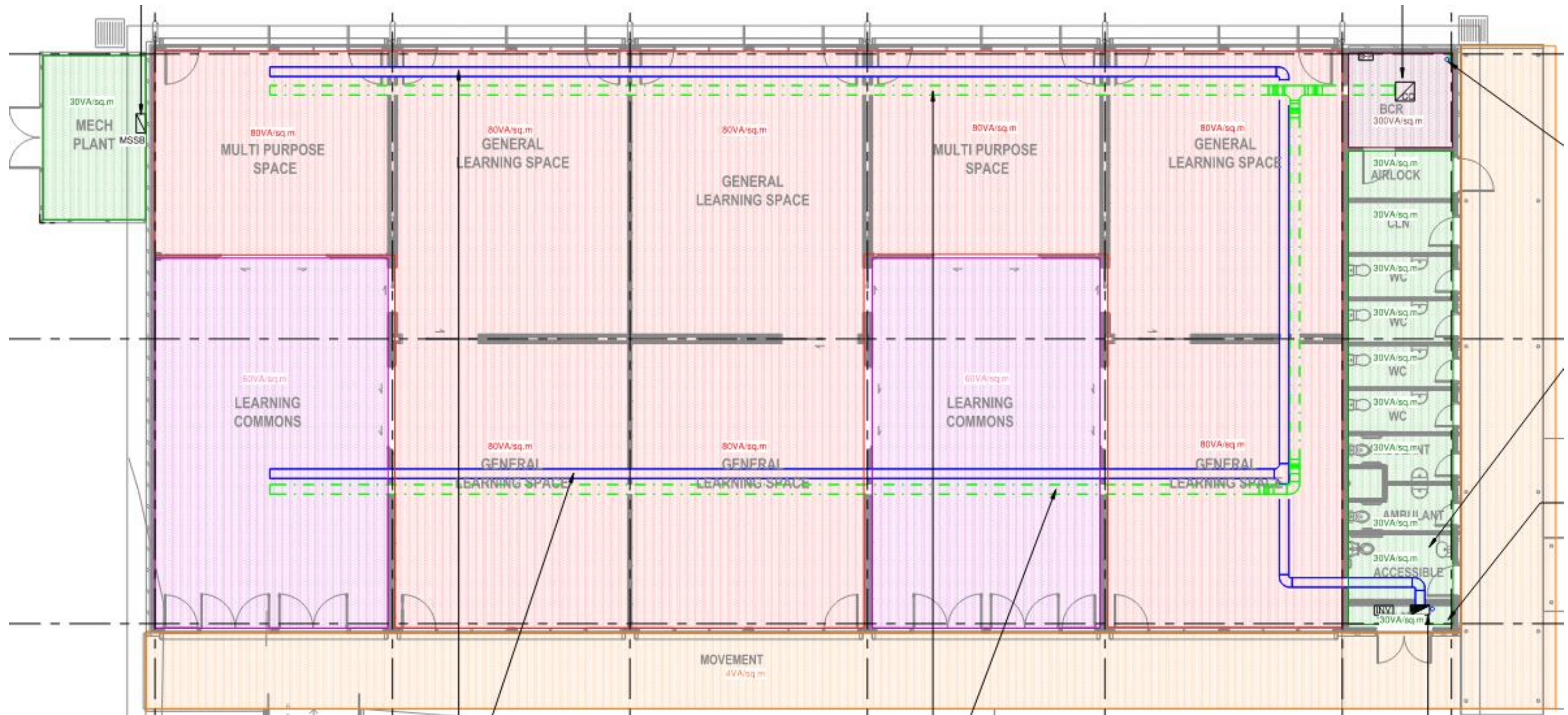
Dundas Public School – Typical EDB Schematic

Electrical Services

POWER ARRANGEMENT – BLOCK L

Cable trays to reticulate cabling from the new EDB to spaces within Block L will be provided, with final reticulation to outlets achieved using catenary wires. Cable trays shall also accommodate the new mechanical services switchboard (MSSB) submain.

Cable trays will be reticulated within the ceiling void and shall be sized based on the final number of circuits as per the DoE Pattern Book and shall include spare capacity as per the EFSG for future expansion.



Electrical Services

POWER & COMMUNICATIONS OUTLETS

INDICATIVE POWER AND TELECOMMUNICATIONS OUTLETS QUANTITIES BY LOCATION

<u>ROOM TYPE</u>	<u>ROOM QUANTITY</u>	<u>GPO</u>	<u>DGPO</u>	<u>DTO</u>	<u>CAPTIVE OUTLETS</u>	<u>STO</u>
WC, ACC. WC, AMB. WC	7	1	-	-	-	-
CLEANER ROOMS	1	-	1 (WP)	-	-	-
AIR LOCK	1	1	-	-	-	-
DB+INVERTER CUPBOARDS	1	-	2	2	-	-
BCR	1	-	4	2	2	-
LEARNING COMMONS	2	1	4	4	-	2
MULTIPURPOSE SPACE	2	1	3	3	-	-
GENERAL LEARNING SPACE	6	3	4	3	-	2
PLANT	1	1 (WP)	-	-	-	-

The proposed electrical design includes power outlets, telecommunications outlets and ceiling fans. Indicative quantities have been provided for each area of the proposed new building to align with requirements of the latest EFSG documents. These quantities are to assist with tendering for indicative pricing. Final quantities and locations shall be based on the provisions documented in the DoE Pattern Book.

Electrical Services

SOLAR ARRANGEMENT

The existing solar arrangement at Dundas Public School consists of a 4.6 kWp array located on the roof of Block K.

As per the latest EFSG, it is intended that a new PV system is sized to offset the power consumption of the proposed new building. In this instance, the proposed development requires a 21 kWp system.

No shading issues are expected for an array installed on the roof of the new Block L.

A preliminary layout has been designed based on 330W panels with a PV inverter located in the electrical cupboard. A mounting system is to provide a minimum 10-degree tilt to the PV panels to enable self-cleaning as per the EFSG. DC cabling from the rooftop PV array to the inverter(s) located in the electrical cupboard shall be reticulated through a roof penetration.

A minimum of 500mm clearance is to be provided around the perimeter of the PV array with a 700mm gap between every fourth row to create sufficient maintenance access pathways.

Final PV panel and inverter selection is to occur during detailed design to align with system and site requirements. Spatial arrangement of the electrical cupboard is based on 1x 25kW inverters. Final number and size of inverter(s) is to be determined during detailed design. Inverter(s) shall be Fronius or SMA as per EFSG requirements.

School system shall be retrofitted with central protection as sitewide inverter capacity will exceed 30kW. The central protection device must have a minimum vector shift, rate of change frequency and phase balance current as per EFSG, DNSP, and AS4777 requirements.

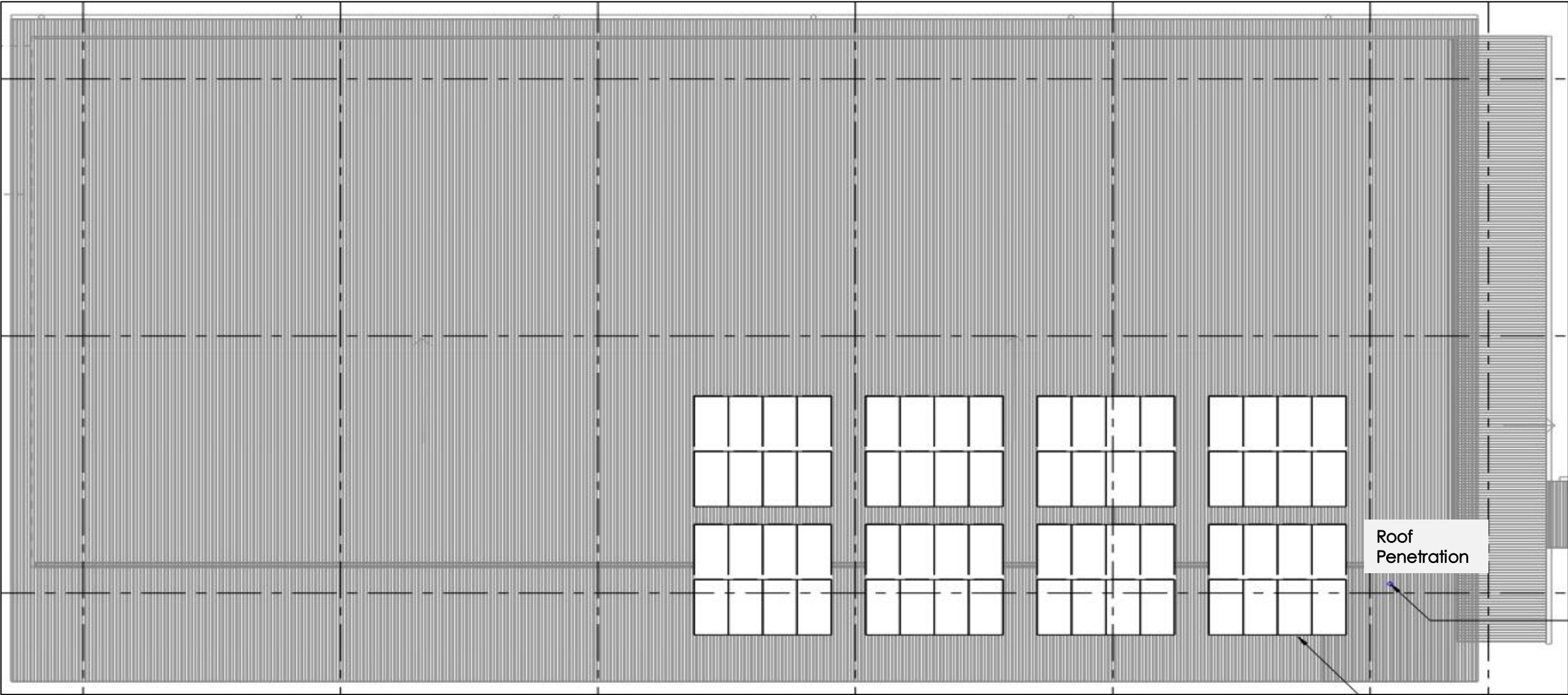


Estimated consumption	Building area (Interior)	Predicted power consumption	Size of proposed solar array	Payback period
130 Wh/sqm/day	760 sqm	99 kWh/day	21 kWp	5-6.6 years

**Value derived from energy modelling of a previous public school project with similar room layouts*

Electrical Services

SOLAR ARRANGEMENT



Block L Roof Layout

Electrical Services

LIGHTING

General

Lighting will comply with all relevant Australian Standards, including AS1680 and AS1158 recommended illumination levels, the EFSG, Patternbook and NCC 2022.

New LED luminaires will be provided for general lighting throughout the school. No specialist or feature lighting has been considered. Luminaires will be concealed and integrated within architectural details wherever possible to simplify the appearance of the ceiling and promote visual acuity. The lighting colour temperature to be used throughout the areas shall be 4000K unless noted otherwise.

Type of luminaires shall be coordinated with the Patternbook and EFSG, indicatively:

- LED panels shall be used in general areas, such as general learning and multi purpose spaces.
- LED downlights are to be used in common areas, corridors, amenities and cleaners' rooms.
- LED downlights and infrared heat lamps are to be used in accessible amenities.
- LED battens shall be used in storerooms, electrical cupboard, communications and all plant rooms.
- Weatherproof, vandal resistant LED troffers shall be provided for all external areas including stairs and external corridors.

Emergency & Exit

Emergency luminaires and exit signs are to be provided in accordance with the NCC and AS/NZS 2293.1-2018. An emergency lighting test switch is to be provided at each EDB.

Control

Lighting in the new building is to be controlled via a programmable and addressable DALI based lighting control system such as Dynalite or KNX. All luminaires are to be DALI dimmable.

An indicative lighting control strategy is:

- Internal luminaires shall be controlled via motion sensors and switch plates with timer shutoff.
- External luminaires shall be controlled via motion sensors and photocells with timer shutoff.

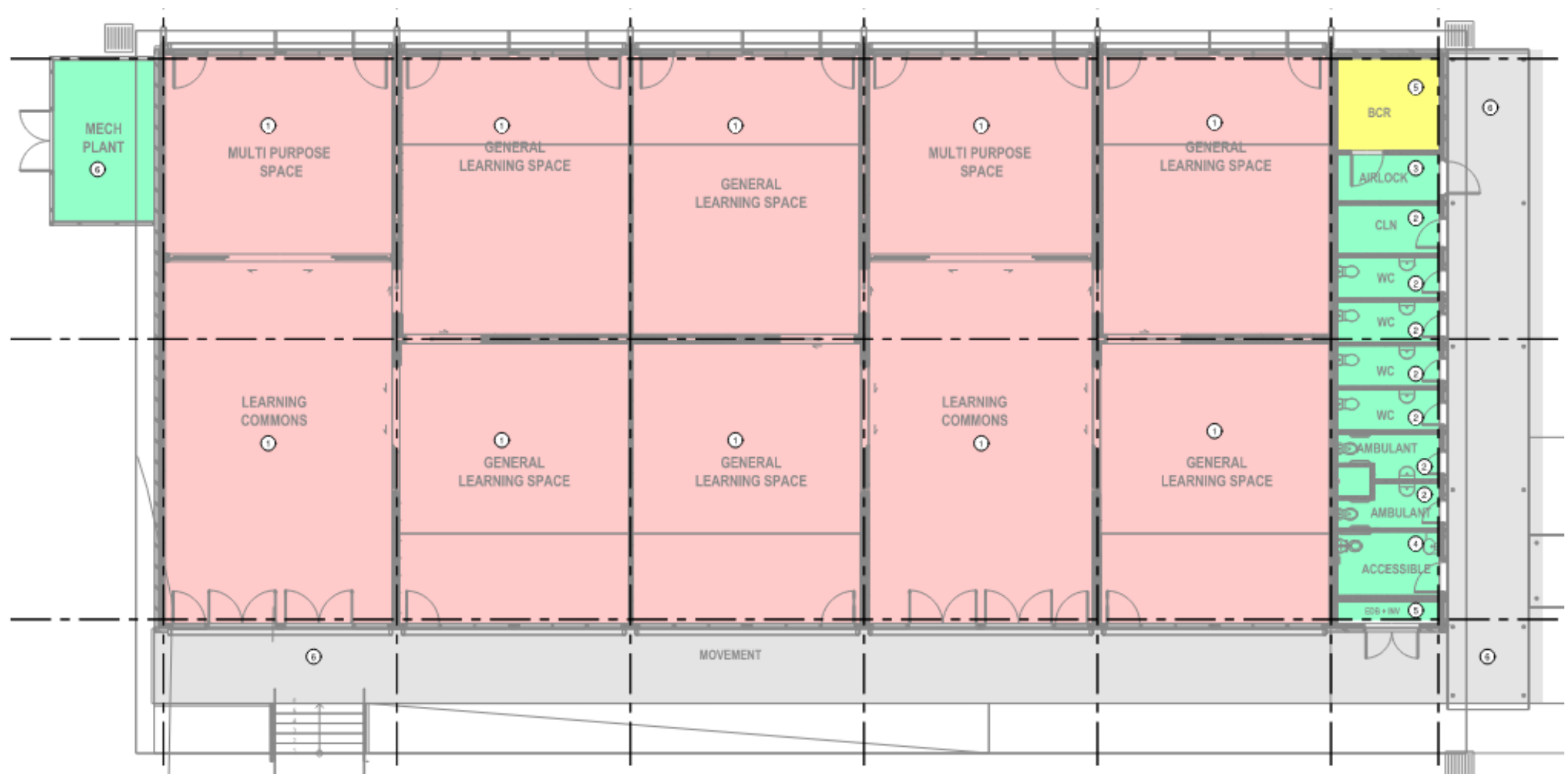
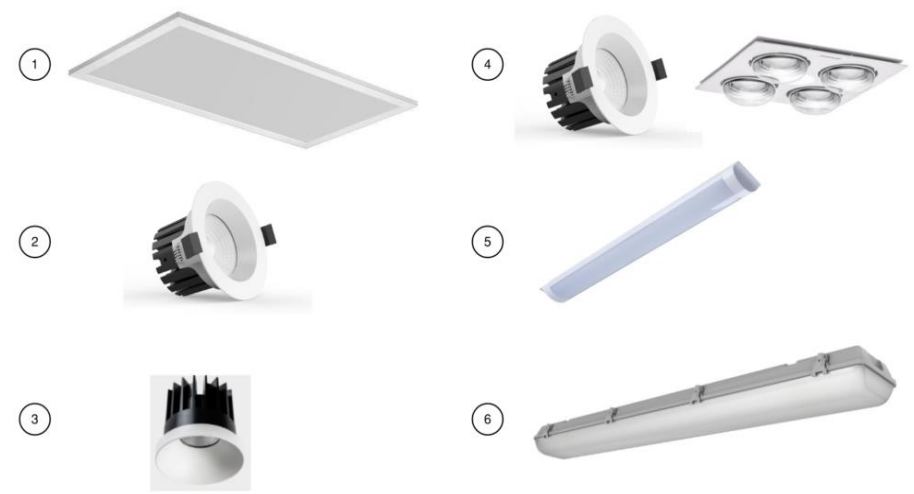
Internal areas such as general learning spaces shall offer dimming and scene-setting where appropriate.

Electrical Services

LIGHTING

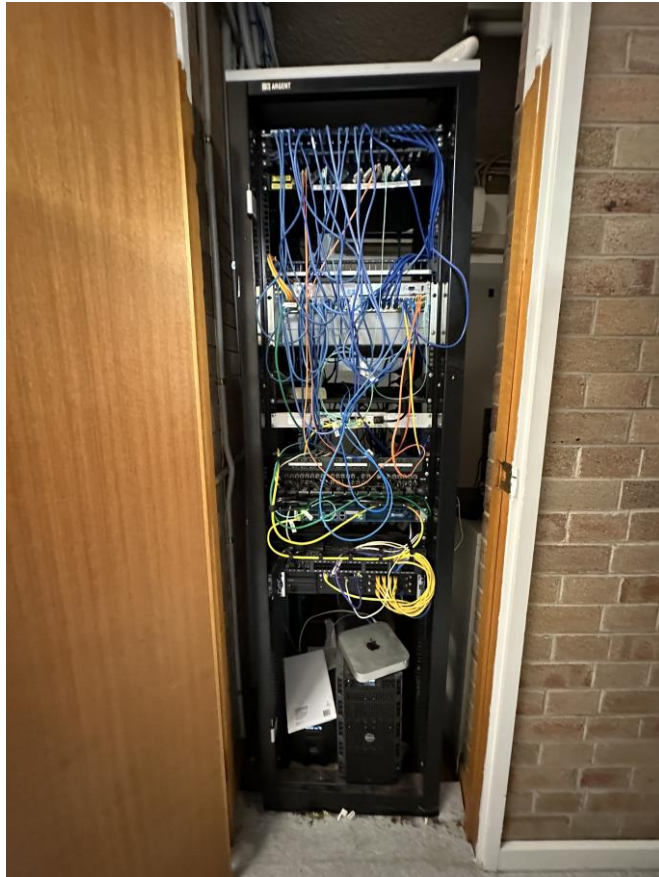
LIGHTING DESIGN LEGEND

- 80 LUX AVERAGE HORIZONTAL ILLUMINANCE AS PER EFSG AND AS/NZ AS1680.2.1-2008 TABLE D1
UGR AS PER EFSG AND AS/NZS AS1680.1-2006 TABLE 8.2
LIGHTING UNIFORMITY AS PER EFSGH AND AS/NZS AS1680.1-2006 TABLE 3.2
- 160 LUX AVERAGE HORIZONTAL ILLUMINANCE AS PER EFSG AND AS/NZ AS1680.2.1-2008 TABLE D1
UGR AS PER EFSG AND AS/NZS AS1680.1-2006 TABLE 8.2
LIGHTING UNIFORMITY AS PER EFSGH AND AS/NZS AS1680.1-2006 TABLE 3.2
- 240 LUX AVERAGE HORIZONTAL ILLUMINANCE AS PER EFSG AND AS/NZ AS1680.2.1-2008 TABLE D1
UGR AS PER EFSG AND AS/NZS AS1680.1-2006 TABLE 8.2
LIGHTING UNIFORMITY AS PER EFSGH AND AS/NZS AS1680.1-2006 TABLE 3.2
- 320 LUX AVERAGE HORIZONTAL ILLUMINANCE AS PER EFSG AND AS/NZ AS1680.2.1-2008 TABLE D1
UGR AS PER EFSG AND AS/NZS AS1680.1-2006 TABLE 8.2
LIGHTING UNIFORMITY AS PER EFSGH AND AS/NZS AS1680.1-2006 TABLE 3.2
- 400 LUX AVERAGE HORIZONTAL ILLUMINANCE AS PER EFSG AND AS/NZ AS1680.2.1-2008 TABLE D1
UGR AS PER EFSG AND AS/NZS AS1680.1-2006 TABLE 8.2
LIGHTING UNIFORMITY AS PER EFSGH AND AS/NZS AS1680.1-2006 TABLE 3.2



Electrical Services

COMMUNICATIONS NETWORK



Existing

The existing communications network at Dundas Public School is serviced by Telstra and NBN lead-ins. The Network Termination Device (NTD) and MCR are located within Block A. The existing MCR consists of a single communications cabinet, which does not have capacity for an additional outgoing fibre connection to serve Block L. However, there is capacity for a new FOBOT within this cabinet, which will serve the new BCR in Block L.

It is noted that the existing MCR does not strictly comply with the EFSG.

The School utilises fibre backbones between the MCR and other buildings. These are reticulated around the site using a network of pits and conduits.

Proposed

The existing MCR is to be retained in its current location for this scope of works. However, modifications will be required in alignment with the recommended upgrades documented in the Dundas ICT survey. New fibre is to be reticulated from a new FOBOT in the existing campus distributor to the new BCR in Block L.

The new BCR for Block L will be located within the services core, with plan area dimensions of 2.8m x 3.0m. This BCR will house a security field panel and communication rack(s) – the quantity of which will be determined in coordination with ITD at a later stage.

A new system of pits and conduits will be utilised to reticulate communications cabling from Block A to Block L.



PROPOSED COMMUNICATIONS, AV & SECURITY UPGRADES

Site Communications Upgrades

According to the Dundas ICT Survey, the following upgrades are proposed for the existing communications system:

- BCR's in Blocks A and E are to be upgraded to 18RU racks
- New head end and edge switches are to be provided in the existing MCR. Rack is to be upgraded to 42RU 600W
- The existing BCR's in Blocks A,B,D,E and K are incompatible with the latest WAP PoE requirements and require switch replacement.

The existing 28x Aruba IAP 105 wireless access points (WAPs) installed in the school are not compatible with the new Aruba IAP 500 series wireless access point that will be installed in the new building. These 28x WAPs require replacement.

Telephony

The existing NEC PABX telephony system is not compatible with the new TiPT phone system.

The existing system will need to be replaced with the new TiPT VoIP phone system (Telstra Cloud based VoIP phone system) including The replacement of 28x existing NEC handsets.

The TiPT system is to be expanded to accommodate the new building with outlets for phone connections and handsets to be provided.

PA

The existing PA system on site is to be expanded to suit the new building. New speakers, interconnecting cabling and amplifiers are to be provided. Confirmation on the suitability of this proposed expansion is pending.

AV

The final AV design shall be completed by the contractor in consultation with the EFSG and Pattern Book.

Indicatively, this will involve:

- Interactive Learning Displays
- Mounting Hardware/ Mobile Trolleys
- Portable Hearing Augmentation

Security

A new Security Field Panel (SFP) is to be provided within the new BCR in Block T. New RS-485 LAN cabling is to be extended from the MCR to the new BCR in a star topology.

Indicatively, this will involve:

- PIR sensors throughout all new rooms.
- All perimeter doors leading will have reed switches to monitor door status.
- All electrical cupboards will be lockable with a master PWD "E" key.
- A sounder/screamer within each floor.

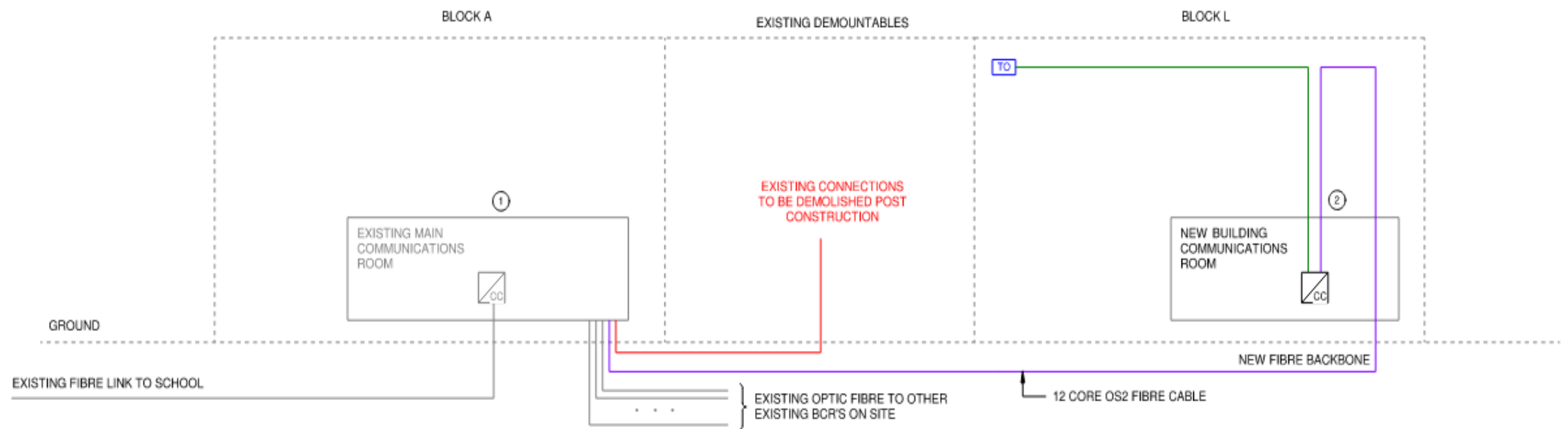
The final security design shall be based on the SSU brief.

Video Security

A video security system shall be provided as per the SSU Brief. Indicatively this will involve:

- Minimum 6MP POE Camera
- NVR upgrades to enable recording for 42 days at 20 frames per second.
- Cat6A cabling.

COMMUNICATIONS NETWORK

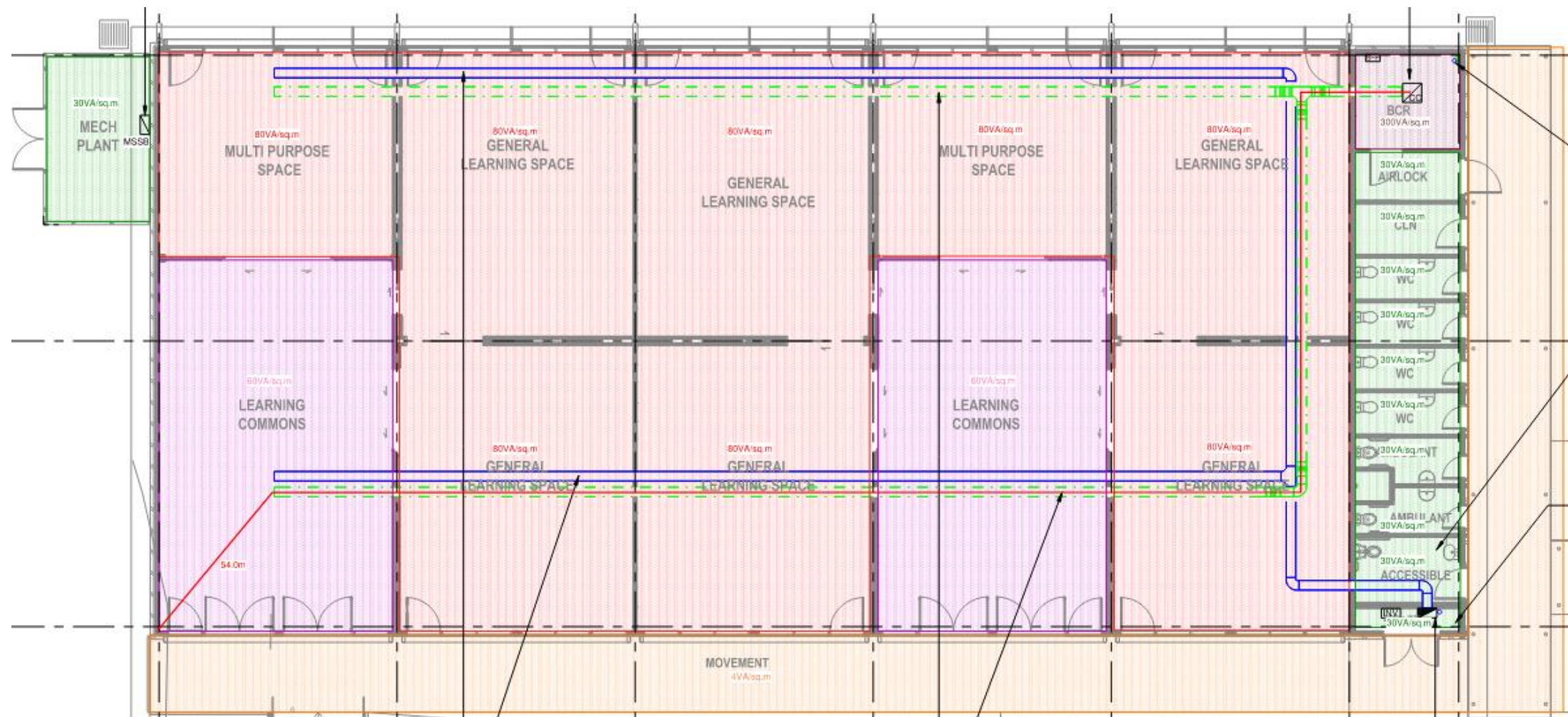


Dundas Public School Communications Schematic

Electrical Services

COMMUNICATIONS NETWORK

The placement of the new BCR is such that the maximum length of horizontal structured cabling will be less than 75m as per the ESG.



Electrical Services

RISKS & OPPORTUNITIES

Pattern Book Development and Release

The School Infrastructure Pattern Book is currently being developed with portions released to date. The current designs have been based on the available sections of the Pattern Book, with the latest EFSG utilised where the relevant sections of the pattern book have not yet been released. Subsequent issue of the Pattern Book may result in the current designs varying from requirements documented in the pattern book. This may result in further design work being required if the plans are to be updated to the new requirements.

Substation Upgrade Requirement

Based on the information provided by Endeavour Energy to date, it is highly likely that the proposed new supply connection for the School at the existing padmount substation will trigger upgrades to increase capacity from 315kVA to 500kVA. However, confirmation is being sought to verify the exact size of the existing outgoing LV connections for customers on Kissing Point Rd to ensure the transformer upgrade cannot be avoided.

Connection Offer Time Limit

A connection offer for the required supply capacity of 243A per phase from the existing substation in a neighbouring lot has been received from Endeavour Energy. This connection offer is valid for a period of 3 months. As the padmount substation also supplies other properties along Kissing Point Road, other works in the vicinity after the offer lapses may result in a reassessment indicating that the required supply capacity is no longer available.

SSU Audits & Briefs

SSU audits and brief, to date, have not been provided. These audits conducted by Schools Information Technology Directorate and School Security Unit are intended to provide the full scope of works required for the proposed new building as well as required upgrades to existing security infrastructure at the site, to ensure that one combined network is in place for security. Current design's have omitted any upgrade works to existing security infrastructure and included general security requirements as per the existing EFSG. Reassessment of the required works should occur once the audits are received.

Arboricultural Constraints

Approximate routes shown on the electrical site plan for in-ground electrical, communications and security cabling have been coordinated based on Arborist input to mitigate encroachment in tree protection zones. However, it must be noted that these routes will need to be coordinated on-site and may vary from what has been documented at this stage.

MECHANICAL SERVICES

Mechanical Services

CLIMATIC CONDITION & DESIGN CRITERIA

DUNDAS PUBLIC SCHOOL

Ambient condition:

- Summer: 36.5°C DB, 24.9°C WB
- Winter: 5.5°C

(temperatures based on Parramatta North weather station)

Site is not mapped as Bushfire Prone Land (BFPL). No impact services identified at this stage.

Internal design condition for new buildings per EFSG DG 55.02:

- Cooling: 24 ~25.5 °C
- Heating: 19.5 ~ 21°C

Occupancy density:

- 2 sqm/person in accordance with EFSG for GLS

Internal equipment gains: 30 W/person, which allows for 1 laptop/person

Lighting heat gains: 4.5 W/m² in accordance with NCC 2022

Fresh air provision:

- 12 L/s/person in classrooms

AIR-CONDITIONING PROVISION REQUIREMENT

The following is noted from the SINSW Design Guidelines 55 on the provision of air conditioning:

Avg Mean Max Jan Temperature	New/Major Upgrade/Redevelopments Areas	Avg Mean Max Jan Temperature	Existing Areas
≥33°C	Provide to permanent learning spaces, staff, and administration areas.	≥33°C	Provide to permanent learning spaces and libraries only. Admin and staff areas sourced by school own funding only.
<33°C	Provide to permanent learning spaces and libraries only. Administration and staff areas to be conditioned ONLY when included in the project upgrade scope and inclusion is required to achieve compliance with the relevant standards. When not included, school can source their own fundings	≥30°C	Provide to permanent learning spaces and libraries only. No requirement for admin and staff areas
		<30°C	Schools may apply to SINSW for A/C to be installed in permanent learning spaces and libraries

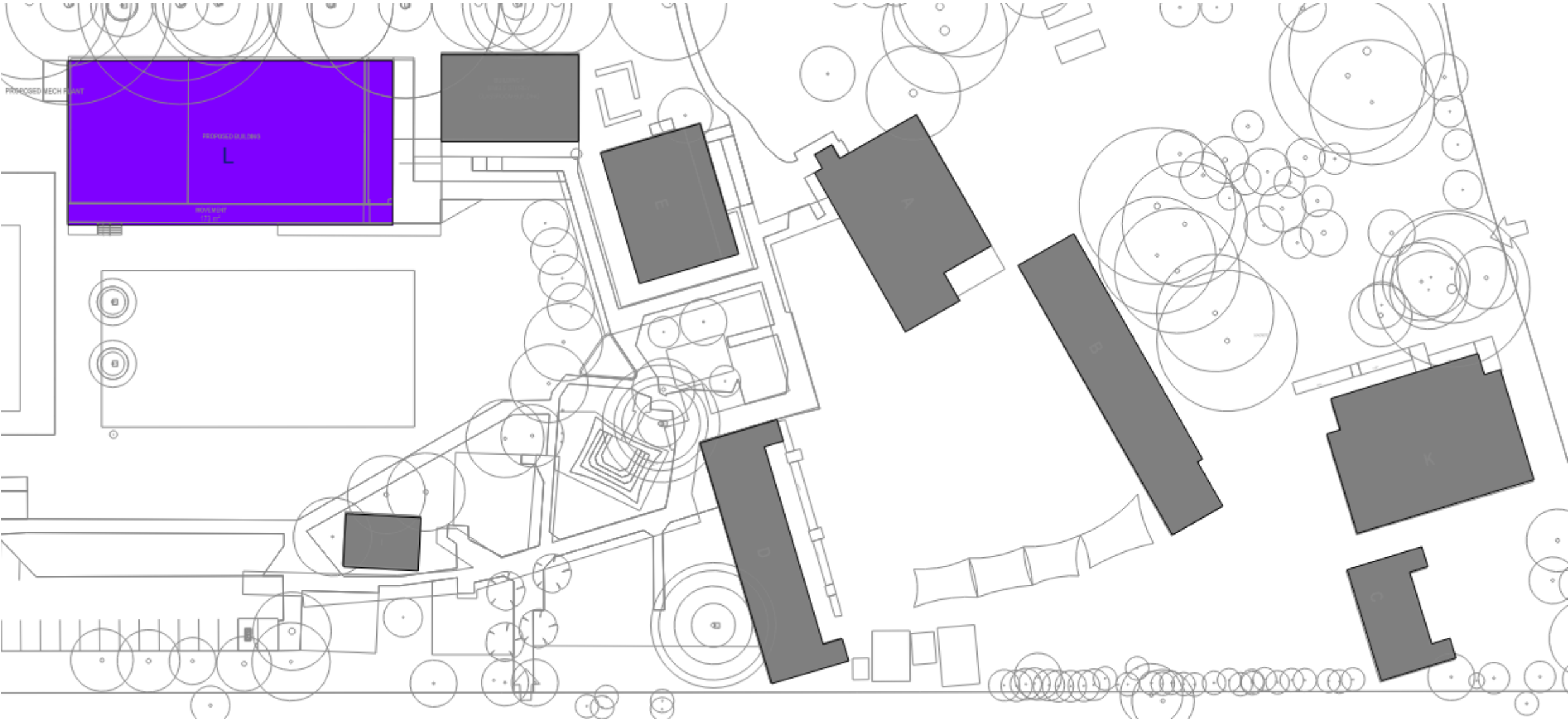
As Dundas Public School is 36.5 C, which is >33°C isotherm, AC is required to be provided to the followings per the EFSG:

- New Building: learning spaces, admin/staff offices, and communications rooms.
- Existing Building: learning spaces and libraries only, Admin and staff areas sourced by school own funding only.

EFSG Cooler Classroom Program (CCP) Guideline defines the followings existing spaces as learning spaces:

Primary School	Secondary Schools	Not Considered as Learning Spaces per CCP Guideline
Home Base HB and associated Practical Activity Areas PAA (normally one space). Where separated by wall, PAA requires separate A/C	General Learning Spaces	• Preparation rooms (food & science) • Library workrooms and library offices • Storerooms • Any eligible rooms <15 sqm adjacent to air-conditioned space • Any room with open or meshed walls • Workshops • Hot metal area • Tin sheds • Craft room (if not learning space or PAA) • Seminar rooms (which are not part of library) • Study spaces • Darkrooms • Any spaces not used for learning by students
Libraries and associated areas (reading, study, seminar rooms), provided the area is >17sqm. No A/C, fresh air, or controls for spaces <17sqm		
Withdrawal rooms (generally shared with Home Base and will share A/C and fresh air system with HB via vents/louvres or opening the door, unless separated and larger than 17sqm).	Practical rooms, including laboratories, kitchens & hospitality spaces, and performance and fitness workshops (but not gyms.)	

Mechanical Services
Dundas Public School
Existing Site Plan and Existing A/C Provision



LEGEND



NO UPGRADES PROPOSED WITHIN THE BLOCK. BUILDING IS GENERALLY ALREADY PROVIDED WITH A/C OR A/C IS NOT REQUIRED FOR THE SPACES AS PER EFSG COOLER CLASSROOM PROGRAMS



NEW BLOCK TO BE PROVIDED WITH A/C AND VENTILATION AS REQUIRED. REFER TO ASSOCIATED DRAWINGS OF THE BLOCK FOR FURTHER DETAILS

Mechanical Services

TYPICAL COOLING & HEATING INFRASTRUCTURE SYSTEMS

From EFSG DG 55.02:

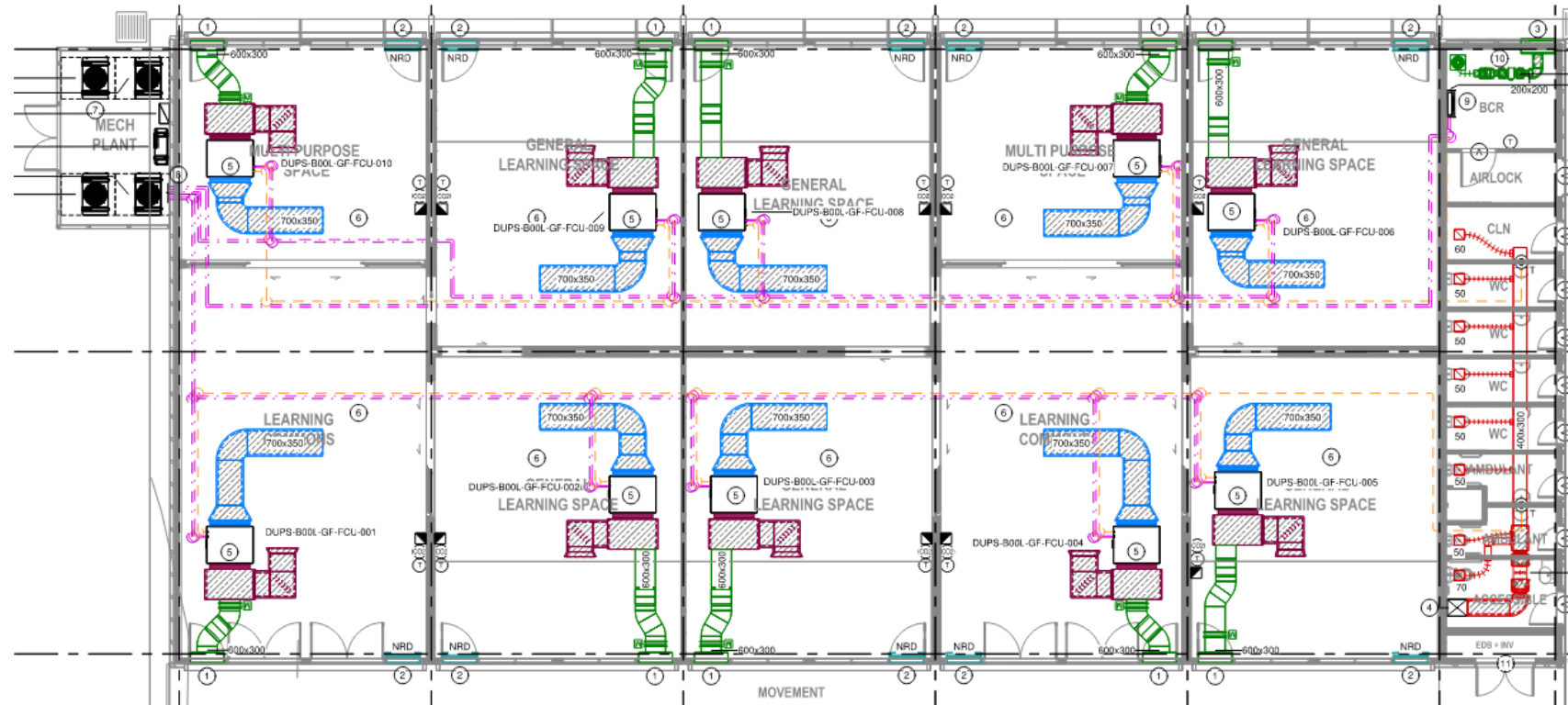
School Type	Air Conditioning System	Ventilation	Design Considerations
Cooling system capacity below 900 kW	Centralised ducted VRF	Ducted fresh air	- Refrigerant Charge - Energy Recovery Ventilator requirements due to specific conditions
Cooling system above 900 kW in a single building	Centralised ducted VRF Or Chilled/Heated Water System	Ducted fresh air	- Refrigerant Charge - Energy Recovery Ventilator requirements due to specific conditions - Centralised energy recovery ventilator to be considered - Chilled water system should be considered

For Dundas Public School, it is expected that the cooling system capacity load will be <900 kW and thus a centralised ducted VRF system shall be applied

Mechanical Services

AIR-CONDITIONING STRATEGY

NEW LEARNING BLOCK L



- GLS shall be air-conditioned in accordance with EFG DG 55, i.e., in-ceiling ducted fan coil unit (FCU) with fresh air intake and relief air discharge louvers on façade. Condensers located on a dedicated external plant space
- Toilets and cleaner space to be mechanically ventilated via in-line ducted fan, with discharge to external passing via roof cowl
- EDB cupboard is naturally ventilated via low- and high-level intumescent grilles
- BCR room shall be air-conditioned via wall-mounted split A/C complete with fresh air provision via in-line fan and intake from facade

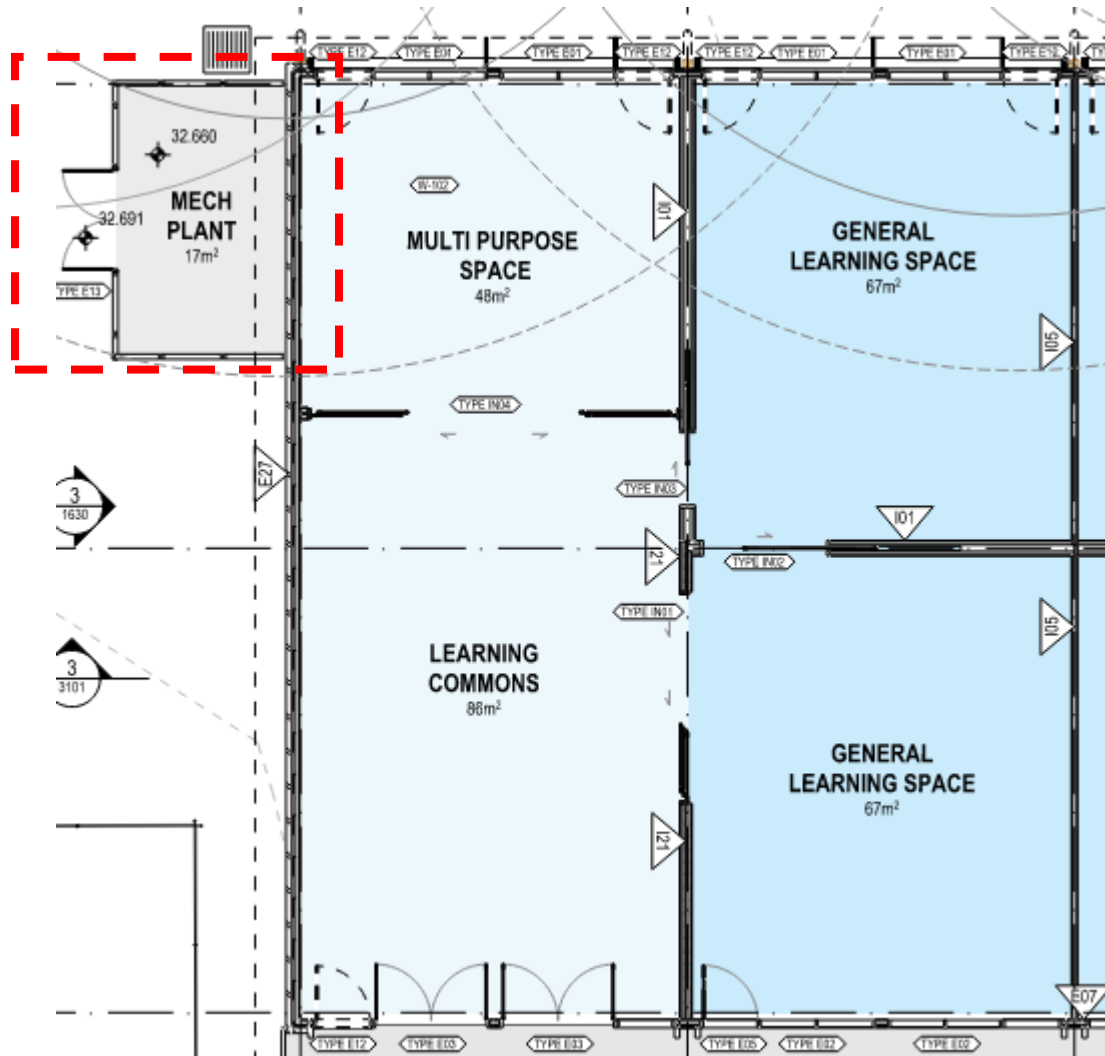
Mechanical Services

AIR-CONDITIONING PLANT SPATIAL

OUTDOOR PLANT

New Learning Building

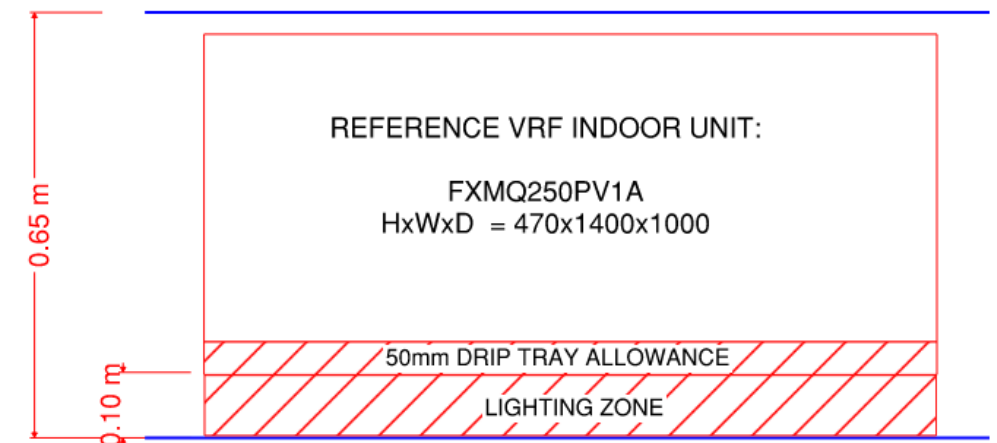
The A/C condensers for the new learning building will be located at Ground Level with the min size of 16 sqm. Space will be open to sky with louvred façade.



INDOOR CEILING SPACE

The indoor ceiling space required to accommodate the new ducted VRF unit in the new building space is estimated to be:

650 mm (clear) high minimum.



Mechanical Services

MECHANICAL CONTROL STRATEGY

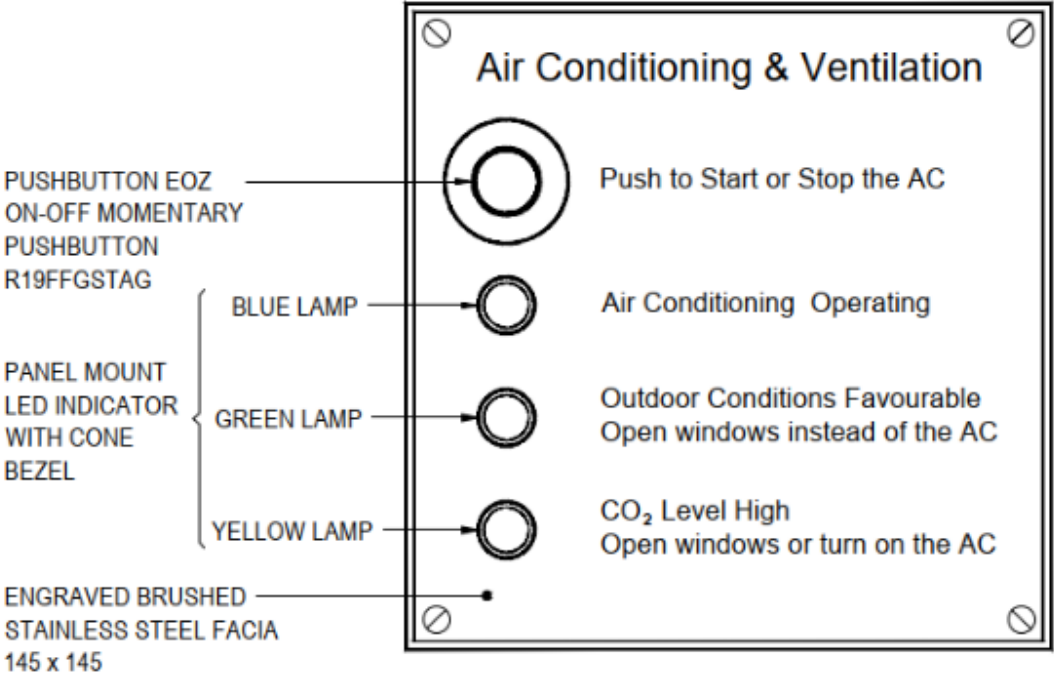
Currently there is no Building Management Control System (BMCS) available in Dundas Public School.

NEW BUILDING

Building Management Control System (BMCS) is proposed to be installed for the **new building** to ensure fully integrated and operational mechanical services system, including:

- Automatic A/C shutdown when the spaces are not in used for greater than 10 minutes (except in specific cases such as designated computer rooms)
- Enthalpy measurement will be used to determine favorable ambient conditions, to inform traffic light system of favorable outdoor conditions
- Dedicated space temperature sensor and CO2 sensor shall be provided to each general learning space
- User interface for operation of the systems via a Local Control Point incorporating pushbutton & Blue, Green and Yellow mode LED indication lights
- Central touch screen controller to control the A/C in the new building

For Rooms with A/C, CO2 and Enthalpy Indication



Mitigation Measures

Mitigation Measures			
Mitigation Number/ Name	When is Mitigation Measure to be complied with	Mitigation Measure	Reason for Mitigation Measure
Noise	During Works During normal operations	Refer to NDY Noise and Vibration Impact Assessment	Minimise noise impacts to nearby sensitive receivers.
Tree Roots	During Works	Trenching and conduit routes to be developed in line with Arborist Report. Works on site to be conducted as per Arborist's requirements	Minimise impacts to existing tree roots
Emergency lighting & Exit signage	During Works During normal operations	Emergency and Exit Signage to be provided as per NCC and AS2293.1:2018	Provide visibility in an emergency for safe egress.
Mechanical Metering	During Works During normal operations	Mechanical metering and monitoring to be provided as per sustainability requirements	Meet sustainability requirements.

Evaluation of Environmental Impacts

We note that the Noise impact can be adequately mitigated through the proposed measures and will not have a significant affect on the environment.

We note that the Tree Root impact can be adequately mitigated through the proposed measures and will not have a significant affect on the environment.

We note that the Emergency lighting & Exit signage impact can be adequately mitigated through the proposed measures and will not have a significant affect on the environment.

We note that the Mechanical Metering impact can be adequately mitigated through the proposed measures and will not have a significant affect on the environment.