Gillieston Public School Redevelopment and New Public Pre-School

Mechanical and Electrical Schematic Design Report

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Gillieston Public School
Redevelopment and New Public Pre-School

Electrical and Mechanical Services
Schematic Design Report

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REVISIONS

Revision	Date	Description	Prepared by	Approved by
01	21/09/2023	Concept Issue	JW	MF
02	28/08/2024	Schematic Design Issue	FS/RS	MM
03	17/10/2024	Schematic Design Issue	FS/RS	MM
04	16/01/2025	Schematic Design Issue	FS/RS	MM

Contents

1 Activity

Gillieston Public School has been identified by the NSW Department of Education (DoE) as requiring redevelopment. The proposed Gillieston Public School Redevelopment and New Public Pre-School is driven by service need including increase in expected student enrolments, removal of demountable structure and replacement with permanent teaching spaces.

The Gillieston Public School Redevelopment and New Public Pre-School comprises the following activities:

- Demolition and removal of existing temporary structures.
- Site preparation activity, including demolition, earthworks, tree removal.
- Construction of new:
    - 32 permanent general learning spaces and 3 support teaching spaces
    - Administration and staff hubs
    - Hall, canteen and library
    - Out of school hours care
    - Public preschool (standalone building for 60 places)
    - Covered Outdoor Learning Areas (COLAs)
    - Outdoor play areas, including games courts and yarning circle
    - New at-grade car parking
    - Extension of the existing drop-off / pick-up area and new bus bay
    - Realignment of the existing fencing
    - Associated stormwater infrastructure upgrades
    - Associated landscaping
    - Associated pedestrian and road upgrade activity

2 Background

2.1 Introduction

Arcadis have been engaged by SINSW to undertake the building services (mechanical, electrical, acoustics, ESD and Vertical Transportation) for the proposed Gillieston Public School, also referred as Maitland Public School project. ESD and Acoustics reports are provided separate to this document. The school is proposed to be installed at the site of the existing Gillieston Public School. The new buildings will predominantly be built on the undeveloped parts of the site, which will be constructed in stages whilst the existing building are kept operational.

All new building services required for the new school activity will be constructed meeting the requirements of the EFSG' s provided on the Education NSW portal.

This activity will include new General Learning Spaces, Library, Administration Offices, Communal Hall Building, COLA and Universal Pre-school. Existing Heritage Building shall be retained.

The new buildings will predominantly be built on the undeveloped parts of the site, which will be constructed whilst the existing buildings are kept operational. After the new buildings are completed, the existing demountable buildings are proposed to be removed from site.

All new building services required for the new school activity will be constructed meeting the requirements of the EFSG' s provided on the Education NSW portal.

This Scope of Activity and Return Brief shall be read in conjunction with all SINSW standards approach to documentation including Design for Manufacturing and Assembly (DfMA) Requirement Documents, Educational Facilities Standards and Guidelines (EFSG). The design is based on traditional method of construction, but Modern Method of Construction (MMoC) was taken into consideration.

Arcadis' involvement is up to Phase 3 Schematic Design stage excluding the Universal Preschool and existing Heritage Building and addresses the following engineering disciplines:

- Mechanical Engineering

- Electrical Engineering
- Environmentally Sustainable Design - Refer to Arcadis' ESD report.
- Acoustics
- Vertical Transportation

For Universal Preschool building, refer to tender documentation provided by Project Manager.

The Electrical supply for the school requires upgrading to support the future school as the existing power supply is at its limit. The new substation required to upgrade the school's power supply is proposed to be constructed on the northern boundary of the site, along Gillieston Rd.

Mechanical Design for the school is provided in line with the requirements of the EFSG, NCC 2022 and other relevant Australian standards. VRF air conditioning units and ventilation fans shall be provided throughout the school for thermal comfort and indoor air quality. Several condenser unit plants are provided at multiple locations in the site.

As part of the continued design process the contractor shall undertake the following as minimum;

- Liaison with the client and user groups to ensure the final design is based on the requirements for the facility;
- Submission of progress documents including samples and technical data for review;
- Coordination between the architecture and structural components, and between other disciplines to ensure the final constructed facility has been suitably coordinated;
- Incorporation of Environmentally Sustainable Design requirements and initiatives as outlined the Schematic Design ESD Report;
- Develop and submit cost effective ESD initiatives for review;
- Provide relevant information such as gas, water and electrical loads and locations to other disciplines in sufficient time to prevent delays to the project program;
- Request any outstanding information in sufficient time to prevent delays to the program;
- Provide relevant loads to the ESD consultant and complete of the JV3 modelling to confirm the building compliance;

2.2 Significance of Environmental Impacts

Based on the identification of potential impacts and an assessment of the nature and extent of the impacts of the proposed activity, it is determined that all potential impacts can be appropriately mitigated to ensure that there is minimal impact on the locality, community and/or the environment.

2.3 Project Appreciation

The Site is identified as 100 Ryans Road and 19 Northview Street, Gillieston Heights, legally described as Lot 51 DP 1162489 and Part Lot 2 DP 1308605.

The Site is located within the Maitland Local Government Area (LGA) and is zoned RU2 Rural Landscape and R1 General Residential zone under the provisions of the Maitland Local Environmental Plan 2011 (MLEP2011).

Existing attributes of the subject site are noted as follows:

- The subject site exhibits an area of approximately 23,385m² and is located in the suburb of Gillieston Heights;
- The subject site has a frontage to Ryans Road to the east, Gillieston Road to the north, and Northview Street to the south;
- In its existing state, the subject site comprises the existing Gillieston Public School. Existing school buildings are primarily located in the west portion of the subject site with a large area of open space situated in the eastern portion. There are limited permanent structures located on the subject site with thirteen (13) existing demountable classrooms currently occupying the subject site. Permanent buildings consist of the Main Administration Building, Original Brick Cottage, Library and GLS building located in the centre of the subject site; and

- Carparking is provided from Gillieston Road for staff. Pedestrian access is available via this main entrance from Gillieston Road and via a separate pedestrian-only access gates on Northview Street and Ryans Road.

The existing site context is shown in Figure 1 and Figure 2 below.

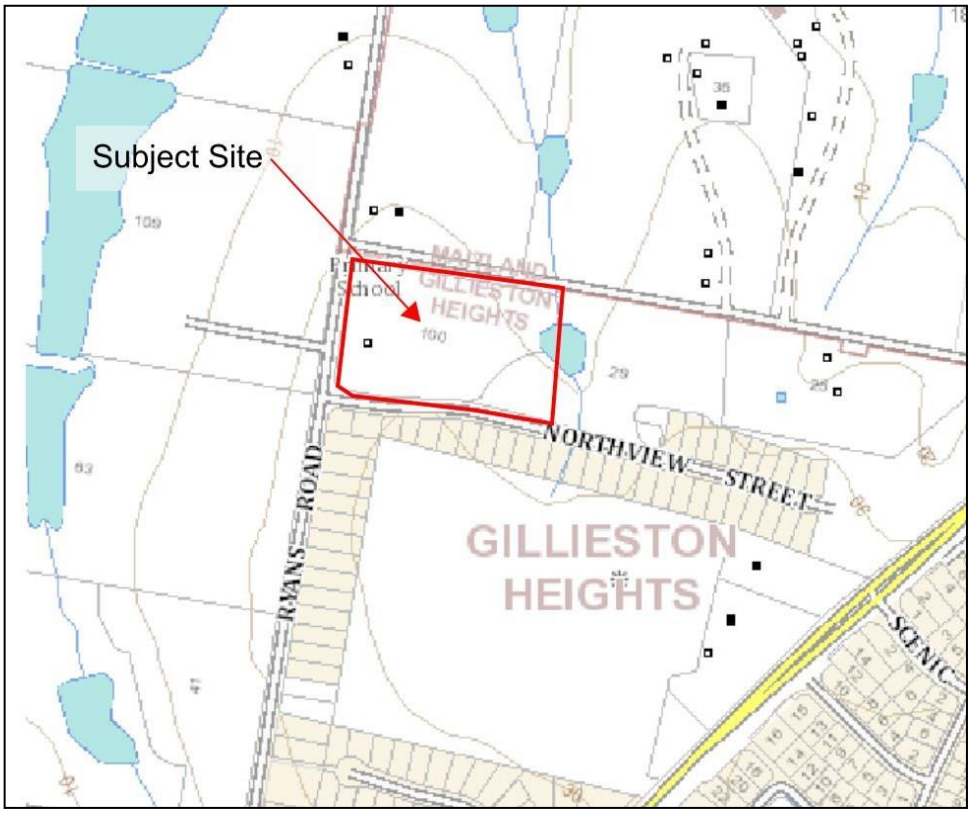

Figure 1 – Cadastral Map (Source: NSW Spatial Viewer, 2024)

Figure 2 – Site Aerial Map (Source: Near Map, 2024)

School operating hours are as follows:

Main School:	8.45am to 3.05pm
Preschool:	8.45am to 3.05pm
Before School Care:	6.00am to 8.35am
After School Care:	3.05pm to 6:00pm
Vacation Care (during school holidays):	6:00am to 6:00pm

Definitions and Abbreviations

Abbreviation	Description
AFFL	Above Finished Floor Level
BCA	Building Code of Australia
BMS	Building Management System
CCTV	Closed-Circuit Television
COLA	Covered Outdoor Leaning Area
CW	Cold Water
DfMA	Design for Manufacturing and Assembly
DHW	Domestic Hot Water
DN	Nominal Diameter for Pipes
EFSG	Educational Facilities Standards and Guidelines

EMF	Electromagnetic Field
EMS	Energy Management System
ESD	Environmentally Sustainable Design
EWIS	Emergency Warning and Intercom System
FDT	Fibre Distribution Terminal
HV	High Voltage
LV	Low Voltage
MATV	Master Antenna Television
MDF	Main Distribution Frame
MMoC	Modern Method of Construction
MSB	Main Switchboard
MSSB	Mechanical Services Switchboard
NCC	National Construction Code
OWS	Occupant Warning System
THVD	Total Harmonic Voltage Distortion
VAV	Variable Air Volume System
VRF	Variable Refrigerant Flow Air-Conditioning System
VSD	Variable Speed Drive

2.4 Unresolved Design

- Continue liaising with power supply authority.
- Make payment to received design offer.

2.5 Reference Documents

The school as design and constructed must comply with;

- Building Act 1992;
- Building and Construction Industry Security of Payment Act 2002;
- Building Regulations 2006,
- Heritage Act 1995,
- National Construction Code (NCC) including the Building Code of Australia (BCA) and the Plumbing Code of Australia,
- Occupational Health and Safety,
- Planning and Environmental,
- Applicable acts, regulations, codes and Australian Standards.

2.6 ASSET REGISTER

The Contractor shall prepare an Asset Register for the school which includes a description, location, make, model, serial number and cost of all plant, equipment, systems and other items over $5,000 in value for

financial reporting purposes. The Asset Register must be issued as part of the Manuals and it's a requirement to achieve Practical Completion.

The register shall be formatted and with 30% additional space to allow additional items to be added in future.

2.7 ESSENTIAL SERVICES

The Contractor shall prepare an Annual Essential Safety Measures Report for the school and submit copies of this to the school and the Superintendent prior at Practical Completion.

The Contractor must prepare a quarterly report during the Defects Liability Period for all essential services nominated on the occupancy permit. The report must include evidence and confirmation that regulatory inspections of essential services for the previous quarter have been carried out by the contractor.

The Contractor must continue to provide these quarterly reports should the Defects Liability Period for an essential service be extended in accordance with AS4300.

2.8 MAINTENANCE PLAN

The Contractor must prepare a detailed maintenance plan for the first 20 years of operation of the facilities. The maintenance plan must cover all elements of the building including finishes, fittings and all building services and include an estimate of the annual costs for all recommended maintenance for each year of the 20 years.

The maintenance plan must be submitted to Superintendent at Practical Completion. This shall be updated and issued again at Final Completion.

2.9 DEFINITIONS

Definitions of terms used within this specification shall be as follows:

"Principal" means SINSW / Department of Education and Training

"Superintendent" has its usual meaning under a construction contract

"Contractor" means the Services Contractor responsible for the activity of this specification employed as a subcontractor to the Head Contractor.

"Approved" means approved by the Superintendent or Principal's appointed consultant for the purpose.

"Supply" means supply and delivery without installation.

"Provide" means the supply and installation necessary for the satisfactory operation of the item.

"Install" means the installation for the satisfactory operation of the item.

"Submit" means submit to the Superintendent or Principal's appointed consultant for the purpose as the case may be.

"Activity" means the goods and services to be delivered by the Builder under this contract.

"Subcontractor" or "Services Trade" means the trade contractor, other than the Services Contractor, that could be a D & C contractor, employed as a subcontractor to the Builder.

2.10 STAGING AND PROGRAM

The contractor shall make themselves aware of the overall project deliverable program and make all allowances to meet that program. Any delays created by the contractor not meeting the program shall be the responsibility of the contractor.

2.11 SAMPLES AND PROTOTYPES

Samples shall be submitted for review where required by the Superintendent (or Principal's appointed consultant for the purpose).

Samples of materials and items described as "to be approved" shall be delivered to site at least 15 days before approval is required. One sample shall be supplied of each item required, each one to be properly identified and marked with the suppliers name, model number and drawing identification type.

All of the samples shall be submitted for inspection at the same time.

It shall be the responsibility of the Builder, Contractor or Subcontractor to arrange for the Superintendent (or Principal's appointed consultant for the purpose) to inspect the samples, and to obtain approval and acceptance in writing of the offered samples. Any materials or components not up to standard will be rejected and further samples requested to be submitted for approval.

The approved samples shall be retained on site for reference purposes until completion of the work. All such materials used in the work covered by this specification shall conform with the approved samples. The approved samples may be installed on site towards the completion of the activity.

2.12 DEFECTS LIABILITY PERIOD

Without additional charge, the Builder, Contractor or Subcontractor shall renew any activity, which exhibit either faulty workmanship or materials and fully maintain and service the whole installation for the Defects Liability Period. During this period the Builder, Contractor or Subcontractor shall meet the whole cost of breakdown calls due to shortcomings in the plant supplied by him.

"Fully maintain and service" shall include all necessary adjustments carried out on a regular basis of visits at not more than three month intervals, and including but not confined to all electrical maintenance including adjustment and/or replacement, if necessary of thermal overload settings, contactors, relays, time clocks, etc., and lamp replacement up to the specified lamp guarantee.

Maintenance shall include not less than:

- Thermographic testing of the Main Switchboards and distribution boards rated in excess of 200A.
- Servicing of air conditioning units
- Routine fire services maintenance
- Checking and replacement of faulty lamps, equipment and accessories.
- Checking of mains and submains cabling for excessive temperature.
- Checking and testing the emergency and exit lighting system to AS/NZS 2293.
- Maintaining a dated record of servicing performed in a servicing record book to be retained under the Principal's control on site.
- During the Defects Liability Period the Builder, Contractor or Subcontractor shall perform such corrective activity as may be instructed in writing by the Superintendent within seven days of such notice. Should the Builder, Contractor or Subcontractor fail to carry out such corrective activity, the Superintendent reserves the right to engage others to finish such work without further notice, and the costs of same shall be deducted from amounts otherwise due or payable and shall be
- deemed a debt of the Builder. Such action shall not relieve any of the Builder, Contractor or Subcontractor's responsibility.
- Parts replaced during the Defects Liability Period shall have the full Guarantee Period of the article replaced, commencing as from the date of replacement.
- A complete and accurate record of all work carried out shall be provided by the Builder, Contractor or Subcontractor and copies forwarded to the Superintendent. It shall be the Builder's responsibility to organise and carry out an effective and approved maintenance program during the Defects Liability Period.

- The Builder, Contractor or Subcontractor shall check in with the Principal's nominee on arrival at each visit to obtain notice of any operating problems or abnormalities. Proformas setting out minimum required records of each visit shall be handed to the Principal's/occupant's nominee by the Builder, Contractor or Subcontractor before departing from each visit.
- Unless noted otherwise elsewhere, the Defects Liability Period for the activity will be 52 weeks from the acceptance by the Superintendent of the work being practically complete and the issue date of the Certificate of Practical Completion.
- Equipment warranties are to commence from that date.

2.13 MATERIALS, EQUIPMENT AND WORKMANSHIP

All equipment, materials, components and devices shall be of first quality grade, new and un-used, and comply with all appropriate Australian Standards specifications.

All workmanship shall be of the highest standard using the best trade practices. All work shall conform to the rules and regulations of the local Supply Authority and all other Authorities having jurisdiction over the activity.

All equipment, materials, components and devices shall be rated to withstand the maximum ambient temperature(s) likely to be encountered and to suit the supply voltage, current and frequency to which they are to be connected.

All parts of the installation shall be adequately protected against damage which might reasonably be expected to result from mechanical causes, exposure, high temperature, fumes, dust, steam and the like during the course of their installation and conditions of use.

2.14 STANDARDISATION OF EQUIPMENT

Where alternatives of equipment are permitted under this specification, and more than one item is to be supplied, all equipment shall be of the same manufacture and type.

2.15 TESTING

The Contractor or Subcontractor shall carry out such other tests as the Superintendent (or Principal's appointed consultant for the purpose) may direct to be satisfied that the plant complies with the specification.

Material, labour and instruments for these tests shall be provided free of charge by the Builder, Contractor or

Subcontractor. The accuracy of all measuring instruments used for testing purposes shall be certified by an approved independent testing authority, and certificates of test supplied to the Superintendent (or Principal's appointed consultant for the purpose) when notifying of intention to carry out tests.

The Builder, Contractor or Subcontractor shall give a minimum of 72 hours notice to the Superintendent (or Principal's appointed consultant for the purpose) that plant is ready for testing.

The tests shall be carried out in the presence of, and to the satisfaction of, the Superintendent (or Principal's appointed consultant for the purpose). The Builder, Contractor or Subcontractor shall record test results and on satisfactory completion of the tests forward to the Superintendent three (3) copies of the result sheets certified by himself and by the Superintendent (or Principal's appointed consultant for the purpose).

The Builder, Contractor or Subcontractor shall make available such facilities as may be required to enable the

Superintendent (or Principal's appointed consultant for the purpose) to inspect and test any items of equipment, before assembly, before delivery and after installation is completed, as may be required in this Specification.

The Builder shall be responsible for the proper functioning and correct installation of all plant and services supplied by him including systems supplied by his Contractor, Subcontractors or suppliers.

3 Site Infrastructure

The following section outlines the current status of investigations, discussions and applications to the various utility providers and authorities.

The information is based on the available Before You Dig Australia drawings.

Advice from the supply authorities is preliminary at this stage and is subject to change once further inputs have been provided by the Public Realm consultant who are providing further details on electrical load demand and individual equipment requirements.

3.1 Existing Electrical Conditions

The existing electrical power supply feeds the school from a 200A rated overhead Ausgrid connection. This connection is located on the north side of the site along the Gillieston Road boundary. It connects into the existing Main Switchboard which is located just inside the property boundary on Gillieston Road. This existing connection cannot be upgraded to suit the new activity's maximum demand. As a result, a new power supply connection is being proposed at the southwest corner of the site. It should be noted the AMU program is currently upgrading the power supply to cover the short-term load increases expected at the school.

3.2 Incoming Services / Authority Discussions

Relevant authorities for the site include:

- Electricity: Ausgrid
- Communication: NBN Co, Telstra

3.2.1 Electricity

The electricity authority that will serve the site is Ausgrid. ARCADIS has advised preliminary power load requirements of the new site to Ausgrid. A dedicated substation sized at 600 kVA to the school is recommended.

Arcadis has submitted the application and have received design fee letter. The letter could be accepted by client, or the builder should they wish to continue with Arcadis as the ASP3 designers.

Ausgrid have changed their terms and method of certification on 1st October 2024. An email detailing this change has been attached as appendix. Note, the existing application was done under the old system Flowchart attached.

If the builder decide to move forward with a new ASP3 it will be a new application and the new process.

We recommend that the contractor to assess the following, prior to deciding on the new substation capacity:

- Check the price and availability of the 600kVA substation. It is less common and so may have a longer waiting time.
- The difference in the cost of the substation sizes using aluminium windings is relatively small. This may make it beneficial have a slightly larger substation compared to replacing it in 10-20 years as the school grows and power needs change.
- The pole substation opposite the school supplies one dwelling. It is being left as two overhead bays. Ausgrid may decide to transfer this supply onto the new substation.

3.2.2 Communication

The telecommunications authorities that will serve the site are NBN Co and Telstra. ARCADIS has advised proposed incoming communications connection for the new site to Public Realm Consultant for consultation with NBN Co in subsequent stage of design.

3.3 Plantrooms Protection Method and Access

Discipline	Plantroom/Equipment	Type of Protection	Locks	Authority's Approved Lock
Mechanical	All external equipment (including disconnect switches)	Fence/cages	Yes Access by Site Manager/ Certified Contractor	No
Mechanical	Mechanical Ventilation fans on the roof, and weather station (e.g. rain sensing and ambient temperature & humidity sensing) on the roof	To be provided with roof platform for maintenance access	Yes (access to roof platform) Access by Site Manager/ certified Contractor	No
Electrical	Authority Meter & Service Protection Device compartment	Inaccessible by Public	Yes Access by certified contractor	Yes
Electrical	All other Distribution boards	Inaccessible by Public	Yes Access by certified contractor	No
Electrical	All Electrical Cupboards	Inaccessible by Public	Yes Access by Facility Manager	No
Electrical	MCR & BCR	Inaccessible by Public	Yes Access by Facility Manager	No
Electrical				

3.4 Site Energy Monitoring and Management

To Satisfy Green star:

All Energy Consumption – Required via EMS (Energy Monitoring System) including:

- Main Switchboard (incoming feeder and all outgoing feeders to EDBs, MSSBs, Lift DBs & Pumps) to have MFM (Multi Function Meter).

- MFMs to be connected to EMS (Energy Monitoring system) to monitor electricity and water Consumptions. Hydraulic and Fire Protection team to allow for connection to EMS system.
- All water consumption metering Required via EMS (Energy Monitoring System)
- Lighting Control system including daylight sensor and motion sensor. Required, standalone system control and monitoring system.

What is Not monitored:

- Mechanical switchboard to be completed with control panel integrated in Mechanical Switchboard with user interface (traffic light system).
- Standalone Security & Access System.

4 Mechanical Services

4.1 Overview

The proposed mechanical systems for the site building will generally comprise of the following systems:

- Variable refrigerant flow (VRF) air-conditioning units for GLS, Library, Administration, Canteen, Canteen Office, OSHC Office, Kitchenette
- Outside air ventilation in accordance with AS1668.2, EFS DG55.01 and ESD requirements
- Toilet exhaust mechanical ventilation systems to all amenity areas
- General exhaust ventilation systems serving canteen, kitchenette and stores
- Automatic smoke vents for the Communal Hall
- Mechanical services switchboards

Requirements

The new buildings will be designed in accordance with the requirements of:

- The National Construction Code (NCC)
- Relevant Australian Standards
- NCC BCA Section J Parts J6 and J9 Compliance
- EFSG Standards

4.2 Applicable Standards and Design Guidelines

The mechanical services will be designed and installed in accordance with the Building Code of Australia, and the relevant 2019 Australian Standards.

Specifically, the relevant acts, codes and standards include, but are not limited to, the following:

Reference No.	Name
NCC 2022	National Construction Code 2022
AS/ISO 817	Refrigerants – Designation and safety classification
AS 1668.1	The use of mechanical ventilation and air conditioning in buildings. Part 1 Fire and smoke control in buildings
AS 1668.2	The use of mechanical ventilation and air conditioning in buildings. Part 2 Mechanical ventilation in buildings
AS 1668.4	The use of mechanical ventilation and air conditioning in buildings. Part 4 Natural ventilation of buildings
AS 1861	Air conditioning units - methods of assessing and rating performance.
AS 2107	Acoustics – Recommended design sound levels and reverberation times for building interiors
AS 3000	SAA wiring rules
AS 3666	Air handling and water systems of buildings - Microbial control
AS 4254	Ductwork for air handling systems in buildings
AS 5601	Gas Installations
AS 5149	Refrigeration systems and heat pumps

N/A	Fire Engineering Report
N/A	BCA Report
	EFSG Standards

Industry association design guide publications of AIRAH, ASHRAE and ARI shall also be referred to.

4.3 Design Criteria

4.3.1 Design Approach

Item	Design Parameters
Environmental Ratings	Refer to ESD Report 50% Increase in outdoor air requirements as documented in ESD report
Load Calculations	Building capacity based on peak instantaneous load. Include a winter warm-up factor in accordance with DA09. Do not allow for the internal blinds being closed in the load calculations.

The Mechanical systems have been designed to maintain the specified internal design conditions at the following external ambient temperatures.

4.3.2 External Conditions

External Ambient Conditions	Requirements
Outside ambient conditions in which air conditioning must be required to achieve continuous maximum ratings of performance	Summer: 37.1°C dry bulb (DB) / 22.5°C wet bulb (WB) and full solar load. Winter 1.0 °C DB
Bureau of Meteorology Station used for load sizing	Maitland Airport Weather Station

4.3.3 Internal Conditions

Area	Design Parameters	Notes

Learning Spaces / Library	26°C dry bulb Summer 19°C dry bulb Winter	
Offices / Kitchenette	23°C ± 1.5°C dry bulb	
Canteen	25.0°C ± 3.0°C dry bulb	
Stores, Toilets	Not conditioned spaces	Exhaust ventilation only with makeup air from adjacent spaces / outside

Note: unless otherwise specified for individual spaces, there will be no automatic or active control of the space humidity levels. Generally, the spaces will generally remain between 40% and 60% relative humidity by virtue of the natural dehumidifying effect of the cooling coils.

4.3.4 Occupancy and Ventilation

Area	Occupancy	Ventilation
Learning Space	30	12 L/s/person outside air (7.5 l/s per person plus 50% increase)
Learning Commons	68	12 L/s/person outside air (7.5 l/s per person plus 50% increase)
Library	40	12 L/s/person outside air (7.5 l/s per person plus 50% increase)
Offices / Canteen	As per seating or 10 m^2/person	12 L/s/person outside air (7.5 l/s per person plus 50% increase)
Communal Hall	310	12 L/s/person outside air (7.5 l/s per person plus 50% increase)
Toilets	Nil	To the requirements of AS 1668.2 10 l/s per sqm or 25 l/s per fixture whichever is higher
Stores	Nil	To the requirements of AS 1668.2 5 l/s per sqm
Kitchenette	As per seating or 10 m^2/person	12 L/s/person outside air. 50 l/s per room exhaust

Maximum CO_2 concentration shall not exceed 1500 ppm for more than 20 minutes. The project aims for 800ppm at all times in accordance with ESD Report.

Design to comply with Australian Standard AS1668.2, ASHRAE standard 62.4 and EFSG Design Guide 55.02

4.3.5 Internal Design Load

<table>
<tr><th>Internal Design Loads</th><th>Requirements</th></tr>
<tr><td>Lighting loads, and people loads</td><td>People load –
78 watts / person sensible
52 watts / person latent
<table><tr><th>Room</th><th>Criteria</th></tr><tr><td>Learning Space</td><td>4.5 W/m^2</td></tr><tr><td>Learning Commons</td><td>4.5 W/m^2</td></tr><tr><td>Library</td><td>4.5 W/m^2</td></tr><tr><td>Offices</td><td>4.5 W/m^2</td></tr><tr><td>Communal Hall</td><td>4.5 W/m^2</td></tr><tr><td>Canteen</td><td>14.0 W/m^2</td></tr><tr><td>Amenities</td><td>3.0 W/m^2</td></tr><tr><td>Storage</td><td>1.5 W/m^2</td></tr></table></td></tr>
<tr><td>Equipment loads</td><td><table><tr><th>Room</th><th>Criteria</th></tr><tr><td>Learning Space</td><td rowspan="8">Minimum 15 W/ m^2 or Based on actual equipment to be used within the space</td></tr><tr><td>Learning Commons</td></tr><tr><td>Library</td></tr><tr><td>Offices</td></tr><tr><td>Communal Hall</td></tr><tr><td>Canteen</td></tr><tr><td>Amenities</td></tr><tr><td>Storage</td></tr></table></td></tr>
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4.3.6 Building Fabric U-Values

The below table lists the assumptions of building fabric U-values used as a basis for the schematic design. Values were based on NCC 2022 Section J DtS requirements for building fabric.

Miscellaneous Items	U-Value (W/m2K)
Roof	0.27
Floor	0.5
Wall	0.71
Window (Shading Coefficient)	2 (0.45)

4.3.7 Other Criteria

Miscellaneous Items	Requirements
Control system	Local direct digital control within Mechanical Control Panel (MCP's)

Miscellaneous Items	Requirements
Filtration	In accordance with ASHRAE Standard 52–76, minimum efficiency 80%, arrestance 98% and AS1668 Part 2. Provide panel type filtration on all outside air intakes.
Design Pressure Losses	All ductwork systems should be designed to achieve low pressure losses including: **Ductwork:** ▪ Supply: – Static-regain ductwork sizing methodology. Maximum velocity 5.0m/s. ▪ Return: – 0.8 Pa/m or 4.0m/s ▪ Plantroom Supply & Return air: – 0.8 Pa/m or 5.0m/s ▪ Toilet & General Exhaust: – 0.6 Pa/m or 5.0m/s Velocities & friction rates may be exceeded by 10% due to building constraints subject to review by Engineer. All bends to be full radius with stream splitters. Where square bends must be used, they should be fitted with aerofoil turning vanes. **Flexible Ductwork:** ▪ Maximum velocity in a flexible duct: 3m/s ▪ Maximum total length of flexible duct: 3m **Dampers:** ▪ Minimum 3.0m/s ▪ Maximum 5.0m/s (unless scheduled otherwise) **Louvres:** • Intake & Exhaust - maximum 1.5m/s, 50% free area • Exhaust (roof) – maximum 2.5m/s, 50% free area **Door Grilles:** ▪ <50L/s – 25mm Undercut ▪ 51 – 200L/s – 600x300 Door Grille, 50% free area ▪ 201 – 300L/s – 600x450 Door Grille, 50% free area **Filters:** ▪ Maximum face velocity 1.5m/s

4.3.8 Infiltration Rates

Perimeter air conditioning zones will be provided with an allowance of 0.5 air changes per hour up to a depth of 4.0m, No allowance for infiltration for internal zones of the building (i.e. with no façade).

4.3.9 Noise Levels

The mechanical systems will be designed in accordance with the acoustic requirements in accordance with AS2107 and EFSG Design Guide 55.02 to ensure the noise levels are kept to acceptable level.

Room	Criteria
Learning Space	40 dB
Learning Commons	45 dB
Library	45 dB
Offices	45 dB
Communal Hall	45 dB
Canteen	45 dB
Amenities	55 dB
Storage	50 dB

4.4 Design Description

4.4.1 Scope Summary

The mechanical services scope is as follows:

- Provision of VRF Air Conditioning System for Learning Spaces and Commons
- Provision of VRF Air Conditioning System for Library, Administration, Communal Hall, and Canteen
- Provision of 2-off split air conditioning system at 50% capacity for Comms Room
- Provision of Ventilation System for Learning Spaces, Commons, and Library via heat recovery unit
- Provision of Outdoor air via supply fans for other air-conditioned spaces
- Provision of Ventilation Systems for Store, Amenities and Kitchen
- Provision of Mechanical Control Panels

4.4.2 Learning Space and Learning Commons

The Learning Space Hubs, composed of Classrooms and Common area are provided with Variable Refrigerant Flow (VRF) air conditioning ducted system with inverter technology. Each Learning

Space and Learning Common is provided with a ducted fan coil unit (FCU) located within the ceiling void of the Common area complete with filters, dampers, outside air ductwork, internally insulated supply and return ductwork in accordance with NCC Section J requirements, supply and return grilles.

Once energised, the VRF and split air conditioning systems thermal delivery to be controlled by standard manufacturer's controls.

The VRF will be air-cooled and shall have minimum efficiency of 2.9 for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1.

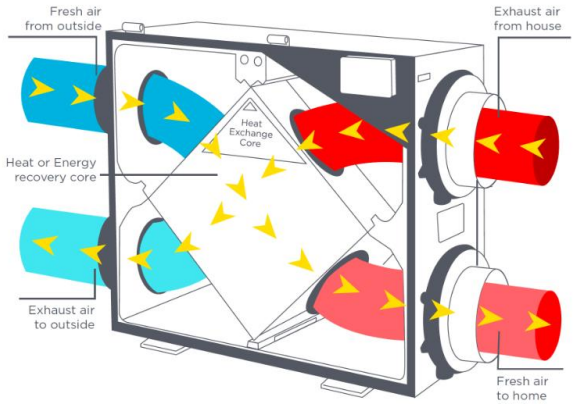
The VRF condenser shall be located at the outdoor plant and shall be provided with heavy duty fully welded RHS or RSA metal framed lockable enclosure, if installed individually. For group of VRF condensers, an

enclosure of black powder-coated security fencing on concrete slab of the full size of enclosure shall be provided.

Each space is provided with a heat recovery ventilator (HRV) to supply outdoor air to each fan coil unit serving learning space and learning common. An HRV is proposed due to the high outdoor air requirement of the learning spaces which results to significant load in the air conditioning system. For a typical learning space, the cooling required solely for the minimum required outdoor air is 55% of the total room load. Utilising HRV will bring this percentage down to 36% and the air conditioning plant will be reduced by 25%.

The HRV employs a heat exchanger where hot air from outside and cold air from the air-conditioned room transfer heat to each other resulting in a cooler outside air and warmer room air that will be discharged to outside. This tempered outdoor air will be supplied to the FCU serving the room and will be further cooled down to meet the room cooling load requirements. Similarly, in winter, the cold outside air is tempered by the warm inside air through the same process.

Figure 3-1: Heat Recovery Ventilator Schematic



The HRV will be complete with intake louvre, filter, dampers, and galvanised steel ductwork. The exhaust air shall be discharged to outside via weatherproof louvres.

The heat recovery unit shall be linked to carbon dioxide sensors to provide demand-controlled ventilation in accordance with BCA. CO_2 concentration at each room shall not be more than 800ppm for more than 20 minutes in a day. The sensors shall be wall mounted near the occupants seating area and entrance door at a minimum height of 1500mm from the floor.

Each learning space shall be provided with manually controlled ceiling fans, with the blades mounted at minimum 2400mm from the floor. Low noise white ceiling fans with adjustable or staged speed controllers. A single remote controller with timer feature to control the ceiling fans in one room shall be provided and located near the room entry. Provision of ceiling fans are documented on the electrical drawings.

4.4.3 Library

The Library and the Special Program rooms are provided with Variable Refrigerant Flow (VRF) air conditioning ducted system with inverter technology. Each space is provided with an under ceiling or wall mounted fan coil unit (FCU).

Once energised, the VRF and split air conditioning systems thermal delivery to be controlled by standard manufacturer's controls.

The VRF shall be air-cooled and shall have minimum efficiency of 2.9 for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1.

The VRF condenser shall be located at the outdoor plant and shall be provided with heavy duty fully welded RHS or RSA metal framed lockable enclosure, if installed individually. For group of VRF condensers, an enclosure of black powder-coated security fencing on concrete slab of the full size of enclosure shall be provided.

A heat recovery ventilator shall be provided to supply outdoor air to the library and to each room. The HRV will be complete with intake louvre, filter, dampers, and galvanised steel ductwork supplying outdoor air to the spaces. Exhaust air shall be via weatherproof louvres.

The outdoor fan shall be linked to carbon dioxide sensors to provide demand-controlled ventilation in accordance with BCA. CO_2 concentration at the library shall not be more than 800ppm for more than 20 minutes in a day. The sensors shall be wall mounted near the occupants seating area and entrance door at a minimum height of 1500mm from the floor.

The toilets within the library shall be provided with common exhaust fan system complete with exhaust grilles, dampers, weatherproof louvre, and galvanised steel ductwork. Make-up air shall be via transfer grille or door grille.

4.4.4 Comms Room

The Comms room within the GLS building are provided with 2 duty wall-mounted A/C units, each at 50% room load. The indoor units shall be connected from separate VRF circuits dedicated to serve other Comms Rooms.

Once energised, the VRF and split air conditioning systems thermal delivery to be controlled by standard manufacturer's controls.

Filtered outdoor air shall be provided to the Comms room and relief via external wall louvre.

4.4.5 Administration

The Administration building is provided with Variable Refrigerant Flow (VRF) air conditioning ducted system with inverter technology. Each space is provided with an under ceiling or wall mounted fan coil unit (FCU).

Once energised, the VRF and split air conditioning systems thermal delivery to be controlled by standard manufacturer's controls.

The VRF shall be air-cooled and shall have minimum efficiency of 2.9 for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1.

The VRF condenser shall be located at the outdoor plant and shall be provided with heavy duty fully welded RHS or RSA metal framed lockable enclosure, if installed individually. For group of VRF condensers, an enclosure of black powder-coated security fencing on concrete slab of the full size of enclosure shall be provided.

An outdoor air fan shall be provided to supply outdoor air to each room. The outdoor air fan will be complete with intake louvre, filter, dampers, supply grilles and galvanised steel ductwork supplying outdoor air to the spaces. Relief air shall be via transfer grille or door grille and weatherproof louvres to outside.

The outdoor fan shall be linked to carbon dioxide sensors to provide demand-controlled ventilation in accordance with BCA. CO_2 concentration at the Administration building shall not be more than 800ppm for more than 20 minutes in a day. The sensors shall be wall mounted near the occupants seating area and entrance door at a minimum height of 1500mm from the floor.

The Staff Amenities shall be provided with toilet exhaust fan. The Kitchen and Printing rooms shall be provided with separate exhaust fans, discharging directly to outside. Each exhaust fan system shall be complete with exhaust grilles, dampers, weatherproof louvre, and galvanised steel ductwork. Make-up air shall be via transfer grille or door grille.

4.4.6 Communal Hall

The communal hall will be naturally ventilated via louvres and openable windows and doors. Ceiling fans are provided to assist air circulation. Refer to electrical drawings for ceiling fan layout. The hall will be provided with louvres at minimum two sides of the façade mounted at high level for ventilation.

4.4.7 Canteen

The canteen will be provided with air conditioning via VRF air conditioning system. The indoor unit will be either ceiling cassette or wall mounted unit depending on the interior layout.

The outdoor unit shall be air-cooled and shall have minimum efficiency of 2.9 for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1. It will be located outside the building and provided with heavy duty fully welded RHS or RSA metal framed lockable enclosure.

The canteen shall also be provided with outdoor air for the occupants via a common outdoor air fan. The outdoor air system shall be complete with fan, intake louvre, filter, dampers, supply grilles (if the indoor unit is wall mounted) and galvanised steel ductwork. Relief air shall be via transfer grilles or door grilles and weatherproof louvres.

General exhaust shall be provided in the canteen via exhaust fan, complete with ductwork and accessories. Outdoor air shall be provided via outdoor fan, shared with OSHC Office complete with intake louvre, filter, damper, supply grilles, flexible and galvanised steel ductwork.

4.4.8 Canteen Office / OSHC Office

The canteen office and OSHC office will be both provided with air conditioning via VRF air conditioning system. The indoor unit will be either ceiling cassette or wall mounted unit depending on the interior layout.

The outdoor unit shall be air-cooled and shall have minimum efficiency of 2.9 for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1. It will be located outside the building and provided with heavy duty fully welded RHS or RSA metal framed lockable louvered enclosure.

The canteen shall also be provided with outdoor air for the occupants via common outdoor air fan. The outdoor air system will be complete with fan, intake louvre, filter, dampers, supply grilles, (if indoor unit is wall mounted), flexible and galvanised steel ductwork. Relief air shall be via transfer grille or door grille and weatherproof louvres.

4.4.9 OSHC Kitchenette

The Kitchenette shall be provided with air conditioning via VRF air conditioning system. The indoor unit will be either ceiling cassette or wall mounted unit depending on the interior layout.

The outdoor unit shall be air-cooled and shall have minimum efficiency of 2.9 for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1. It will be located outside the building and provided with heavy duty fully welded RHS or RSA metal framed lockable enclosure.

The Kitchenette shall be provided with outdoor air for the occupants via common outdoor air fan. The outdoor air system will be complete with fan, intake louvre, filter, dampers, supply grilles, (if indoor unit is wall mounted), flexible and galvanised steel ductwork. Relief air shall be via transfer grille or door grille and weatherproof louvres

To help remove the smell within the areas, the Kitchenette shall be provided with mechanical exhaust system discharging to outside. The exhaust system will include ceiling exhaust grille, mechanical ductwork, damper and exhaust fans to discharge air horizontally through façade louvres.

4.4.10 Toilets and Stores

The toilets shall be provided with mechanical exhaust in accordance with AS 1668.2. The exhaust system shall be complete with exhaust fan, grilles, dampers, weatherproof louvre, and galvanised steel ductwork. Make-up air shall be via transfer grille or door grille.

The storage rooms shall be provided with common exhaust fan in accordance with AS 1668.2. Each exhaust fan system shall be complete with exhaust grilles, dampers, weatherproof louvre, flexible and galvanised steel ductwork. Make-up air shall be via transfer grilles or door grilles.

4.4.11 Mechanical Services Electrical System

Mechanical services equipment will be powered from new mechanical services switchboard (MSSB). Mechanical services trade will supply and install new MSSB. Power supply (submains) to the MSSB will be provided by the electrical trade.

All MSSBs will be provided with 20% additional capacity (physical space and sub-mains size) for future expansion.

4.4.12 Controls and Operation

The controls for the mechanical equipment will be in accordance with the EFSG Design Guides 55.01 Thermal Comfort and Indoor Quality – Policy and 55.02 Thermal Comfort and Indoor Quality – Performance Brief.

The air conditioning units and outdoor air fans shall be controlled via Mechanical Control Panels (MCP) located within a lockable cupboard and Local Control Panel (LCP) located in the room at height between 1250mm to 1500mm from the floor to deliver appropriate thermal environment in a convenient manner with minimal intervention of staff. The system will provide optimisation of energy usage and monitoring of room and ambient air conditions.

Once energised, the VRF and split air conditioning systems thermal delivery to be controlled by standard manufacturer's controls.

The LCP shall have indicating lights to provide visual feedback to the students regarding air quality and energy usage. The LCP will provide on/off command to the A/C unit and indicate its status. In addition, the LCP shall have indicating lights to show if ambient conditions are favourable (between 18C to 24C, <70% RH) to turn off the A/C and open windows and to show whether the CO_2 concentration is high to turn on the ventilation system or open the windows.

Figure 3-1: Local Control Panel

The inbuilt conditioning unit controls shall control the temperature based on the room heat loads. The air conditioning systems shall be interfaced with the Mechanical controller (MCP) for the Communal Building, which will manage the on/off and status indication of the air conditioning systems.

The controls shall be able to switch off the air conditioning units when the rooms are unoccupied for greater than 10 minutes (adjustable). A passive infrared (PIR) sensor is provided at each space.

Temperature and Humidity Sensors shall be provided to measure ambient air conditions. When ambient conditions are favourable, e.g. when outside temperature is between18-24°C DB and relative humidity is less than 70%, the controls shall be able to provide an indicating light to switch off the A/C and open the windows instead for natural ventilation.

The CO_2 sensor shall be interfaced with the controls to control the operation of the outdoor air fan. When the room is unoccupied or when the CO_2 concentration drops to 800 ppm when the A/C is operating, the fan is switched off. When the room is occupied or if the CO_2 sensor shows more than 1200ppm concentration for 10 minutes (adjustable), the outdoor air fan will turn on.

The air conditioning units and outdoor air fans shall turn off upon activation of fire detection alarm system in the zone.

5 Electrical Services

5.1 Overview

The electrical services systems serving the buildings will include:

- External Substation.
- Site Services Protection Device.
- Electricity supply authority metering facilities.
- Electricity sub-meters for Canteen Hall building, UPS, Heritage Building and remaining Building C boards.
- Connection of the electricity sub-meters to the central monitoring system.
- General power for Building C and Canteen Hall.
- General lighting for Building C and Canteen Hall.
- External lighting (Carpark, Primary Access Pathway).
- Lighting control system for Building C, UPS, Canteen Hall and external lighting.
- Emergency and exit lighting for Building C and Canteen Hall buildings and its interface with central monitoring system to comply with AS2293 and NCC BCA 2019.
- Surge protection for DBs.

5.2 Design Criteria

Item	Design Parameters
Substation	• As minimum 1 x 600kVA kiosk sub-station (Contractor to liaise with authority and determine whether 600kVA or 800kVA meet the project program)
Supply Conditions	• 400/230V • 50Hz
Main Switchboard	• Main Switch • Form 3b • IP56 • Essential Services Section for Lifts • Surge Protection • Anti-Condensation Heater • 25% spare space • Provide minimum 20% spare capacity within the busbars for future loads.
Distribution Board • Canteen Hall • Building C • External Lighting	• Main switch always provided at DB, 160A (min). • Form 2. • Busbar rating => 250A. • Rating 35% above peak enrolment forecast demand. • 25% spare space. • 10% spare MCBs fitted. • Miniature CBs < 100 A. Use of current limiters to be absolutely minimised. • Final sub circuit protection circuit breakers - min 6kA fault level. • Lighting allowance at DBs to NCC 2016 Section J for the respective room usage and square meterage served by the DB. • Power allowance at DB's to AS/NZS 3000 Table C3. • All lighting circuits (single or 3 phase, less than or equal to 20 Amps) will be protected by 30mA RCD's. Dog tags to be provided on critical circuits that must not be accidentally turned off.

	• Smoke seals must be provided to all DBs. • Switchgear to be of common manufacture supply for ease of maintenance and adequacy for circuit discrimination.
Electromagnetic Interference	• Substations & MSB nominally located away from occupied areas. • Submain cable routes in unscreened riser cupboards • Major submains cabling and boards to be located to avoid high levels of EMI adjacent to occupied areas or to be provided with screening.

Reticulation Design
• Site Infrastructure
• Canteen Hall
• Building C
• External Lighting
	• Volt drop
	  • Consumer mains < 0.25%.
	  • Submains approx. 2.75%.
	  • Final sub-circuits, 2%.
	• Generally, Distribution Boards to Be Located At 25m Radius Maximum to Furthest Outlet (Horizontal Distance).

Consumer Mains	• Max. Demand + 25%. • Aluminium conductors MUST NOT be used throughout the project.
Submains • Canteen Hall • Building C • External Lighting • Existing Heritage Building	• Capacity max. Demand + 25%. • Hydraulics FLC of connected equipment. • Lift load as per AS3000 Table C2 • Fire equipment – Prysmian, Firestop. • core less than 125A. • Aluminium conductors MUST NOT be used throughout the project.

Lighting
• Canteen Hall
• Building C
• External Lighting
	• As per AS/NZS 1158, AS/NZS 1680, SINSW Standard *0951 Lighting* minimum with consideration for:
	  – Glare.
	  – Uniformity.
	  – Lamp efficiency.
	  – Colour rendering.
	  – Aesthetic and architectural empathy.
	  – Computations reflectivity:
	  – Ceilings / Walls / Floors to be referenced from Architect's finishes selection.
	  – Maintenance factor to be determined using AS/NZS 1680.
	  – Lighting Design to be confirmed with architect during Detail Design Phase.

Lighting control • Canteen Hall • Building C • External Lighting	• DALI lighting control system linked to time clocks, motion/occupancy sensors, daylight control facilities, preset control panels and localised lighting control to turn the lights on and off and adjusting light levels. • Manual override to any automatic lighting control • External lights will be programmed to be controlled separately to internal lighting. To be controlled by PE cell in conjunction with time clock. • Display lights will be programmed to be controlled separately to internal and external lighting.
Emergency and Exit Lighting • Canteen Hall • Building C	• Single point emergency and illuminated exit sign units with AS/NZS 2293 classification • Computer monitored network with 6 monthly automatic testing facilities from a PC based system

	• LED emergency lights and exit signs
External Lighting	• No external luminaire to have an upward light output ratio that exceeds 5%; • Must comply with AS4282 'Control of the Obtrusive Effects of Outdoor Lighting' • All external lighting to have a light source efficacy of at least 100 lumens/watt; • All external lights are connected to daylight sensors (daylight sensors can be combined with a time switch)
Risers and Trays • Canteen Hall • Building C	• Sized for all submain cables in accordance with AS/NZS 3008. • Cable trays to be provided with 30% spare capacity.
Final sub circuits • Canteen Hall • Building C • External Lighting	• Power 2.5mm2 min. • Lighting 2.5mm2 min. • Maximum of 8 double or 16 single 10A general power outlets per power circuit. • Maximum of 20 lighting points per lighting circuit. • Initial outlet capacity of 25% spare.

5.2.1 Applicable Standards

The Electrical Systems will be designed and installed in accordance with the following Codes and Regulations, and requirements of Authorities having jurisdiction over the project:

- Schools Infrastructure New South Wales (SINSW)
- Determination of the Relevant Building Surveyor.
- Building Act 1993.
- Building Interim Regulations 2017.
- National Construction Code (NCC) incorporating the Building Code of Australia (BCA 2019).
- Determination of the Relevant Building Surveyor.
- Network Service Provider Service Installation Rules.
- Fire Safety Engineering Report.
- Australian Standards as below.

STANDARD / CODE	TITLE
ANSI 568-2001	Installing Commercial Building Telecommunications Cabling.
AS/NZS 1158:2020	Lighting for roads and public spaces.
AS 1170.4	Structural Design actions – Earthquake actions in Australia.
AS 1284.1	Electricity metering - General purpose induction watthour meters.
AS 1319	Safety signs for the occupational environment.
AS/NZS 1367	Coaxial cable and optical fibre systems for the RF distribution of analogue and digital television and sound signals in single and multiple dwelling unit installations.
AS/NZS 1680	Interior lighting.
AS/NZS 1768	Lightning Protection.
AS/NZS 2293.1	Emergency escape lighting and exit signs for buildings - System design, installation and operation.
AS 2560.2.2	Guide to Sports Lighting Specific Recommendations - Lighting of Multipurpose Indoor Sports Centres.

STANDARD / CODE	TITLE
AS/NZS 3000	Electrical Installations (Wiring Rules).
AS/NZS 3008.1.1	Electrical Installations - Selection of cables - Cables for Alternating Voltages up to and including 0.6/1 kV - Typical Australian Installation Conditions.
AS/NZS 3085.1	Telecommunications Installations - Administration of Communications Cabling Systems - Basic Requirements.
IEC 61439	Low-Voltage Switchgear and Control Gear Assemblies - Type-Tested and Partially Type-Tested Assemblies.
AS/NZS 4282	Obtrusive Effects of Outdoor Lighting.
AS/NZS 62560	Self-ballasted LED-lamps for General Lighting Services by Voltage > 50 V - Safety Specifications.
AS/NZS 3084	Telecommunications Installations - Telecommunications Pathways and Spaces for Commercial Buildings.
ACIF/S008	Requirements for Customer Cabling Products.
ACIF/S009	Installation Requirements for Customer Cabling (Wiring Rules).
CIBSE	Commissioning Codes.
IEC 61000-3-2	Harmonic Current Emissions.
IEC 61547	EMC Immunity Requirements.
IEC 61558	Safety of Power Transformers.
IEC 62031	LED Modules for General Lighting – Safety Specifications.
IES LM-79	Approved Method for the Electrical and Photometric Testing of Solid-State Lighting Devices.

5.3 Scope of Work

5.3.1 Substation

As minimum, a new 600kVA kiosk substation is proposed at the northern boundary of the new school on Gillieston Rd. Contractor liaise with power authority to determine whether 600kVA or 800 kVA delivery and installation meet the project program.

An easement of 5.3m x 3.3m, (to be confirmed by Power Authority) with street frontage, will be required to site the new kiosk, However, this requirement will be subject to Ausgrid confirmation during the design development stage.

A preliminary maximum demand has been estimated to be in order of 596kVA. The assessed demand is based on Architectural Schematic Design drawings dated 02nd August 2024, and the following assumptions have been made:

- Day 1 connection
- Air-conditioning to the entire site
- Supply to Heritage Building
- 15% spare capacity
- No allowance has been made for future expansion.
- Spare capacity allowance as per SINSW standards with a summary outlined in table below:

Asset Type	Required Spare Capacity
Service / Consumer Mains	15%
Main Switchboard	25%
Submains	20%
Distribution Board	25%

Figures below tabulates details of load allowance for each areas based AS/NZS 3000 Table C3, VA/m² rate allowances:

AREA DETAILS		POWER DENSITY (VA/sqm)			GENERAL POWER
AREA NAME	AREA SIZE (sqm)	LIGHTING AND POWER	MECHANICAL	TOTAL	DEMAND (kVA)
Core Facilities					
Lower Ground Floor					
Mech Plant	45.6	50	0	50	2.3
4 x Special Program	137.8	50	40	90	12.4
WCs	92.6	5	25	30	2.8
Cleaners Room	3.2	5	10	15	0.0
Comms Room	4.8	30	40	70	0.3
Store Rooms	24.1	5	10	15	0.4
Foyer	131.6	5	0	5	0.7
Office & Meeting Room	157	50	40	90	14.1
Sick Bay	14.2	25	40	65	0.9
Clerical / Printing / Work Room	84.7	50	40	90	7.6
Staff Lounge	131	30	30	60	7.9
Kitchen Area	21.9	50	5	55	1.2
Circulation Space	154.7	5	0	5	0.8
Ground Floor					
11 x GLS Hubs	707.6	25	40	65	46.0
3 x Learning Commons	393.5	25	40	65	25.6
WCs	152.4	5	25	30	4.6
Cleaners Room	115.9	5	10	15	1.7
Store Rooms	64.2	5	10	15	1.0
Comms Room	16	30	40	70	1.1
Mech Plant	45.6	50	0	50	2.3
Library	304.1	25	40	65	19.8
KLA Store Room	31.7	5	10	15	0.5
Office Room	25.7	50	40	90	2.3
Circulation Space	404	5	0	5	2.0
First Floor					
16 x GLS Hubs	1028.2	25	40	65	66.8
4 x Learning Commons	524.8	25	40	65	34.1
WCs	98.5	5	25	30	3.0
Store Rooms	68.2	5	10	15	1.0
Comms Room	21.8	30	40	70	1.5
Circulation Space	400.3	5	0	5	2.0
Second Floor					
8 x GLS Hubs	514.1	25	40	65	33.42
2 x Learning Commons	262.4	25	40	65	17.06
WCs	49.3	5	25	30	1.48
Store Rooms	34.1	5	10	15	0.51
Comms Room	10.9	30	40	70	0.76

Circulation Space	220.5	5	0	5	1.10
Universal Preschool					
3 x Play Areas	216.3	25	40	65	14.1
Admin Spaces	15.1	50	40	90	1.4
Amenities Rooms	28.2	5	10	15	0.4
Office & Meeting Room	31.1	50	40	90	2.8
Comms Room	5.6	30	40	70	0.4
Kitchen	12.1	50	5	55	0.7
Store Rooms	20	5	10	15	0.3
Laundry & Cleaners Room	8.4	10	10	20	0.2
WCs	11.5	5	25	30	0.3
Circulation Space	50.3	5	0	5	0.3
Outdoor Play Space	420	10	0	10	4.2
Communal Hall / Canteen / OSHC					
Hall / Stage	364.5	40	40	80	29.2
Canteen / Canteen Office	72.5	30	40	70	5.1
Store Rooms	93.8	5	10	15	1.4
WCs	49.3	5	25	30	1.5
COLA	404.9	5	0	5	2.0
OSHC Kitchen	22.3	50	5	55	1.2
OSHC Office & Store	47.5	50	40	90	4.3
Cleaners Room	6.5	5	10	15	0.1
Circulation Space	47	5	0	5	0.2
External Areas					
Existing Carpark	300	5	0	5	1.5
Staff Carpark	670	5	0	5	3.4
GLS Carpark	585	5	0	5	2.9
UPS Carpark	592	5	0	5	3.0
Existing Loads					
Existing Loads				0	118
Spare Capacity for Primary Schools 201 students and more: 400Amps					**276.8**

	AMP 3-PH	kVA
TOTAL	1146.7	793.5
DIVERSITY	0.6	
DEMAND	688.0	476.1

5.3.2 Main Switchboard

The site main switchboard and SPD will be located externally adjacent to the new kiosk substation. The MSB will supply the existing heritage building in addition to all new the buildings and external services. There will be two separate sections on the MSB; an essential services section for safety loads as per AS3000 and a section for general lighting and power.

5.3.3 Electricity Suppliers Metering

The site will have one single electricity tariff meter complete with CT chamber located within the main switchboard. All services within the building will be supplied from this meter. The contractor will provide and install the meter panel and CT chamber however, the supply authority will supply and install the meter and the current transformers (CTs).

5.3.4 Consumer Mains

Consumer mains within underground conduit will be provided and connected between the supply in the substation and the new Main Switchboard (MSB).

Consumer mains will be sized to the full load capacity of the transformers which will allow for future load growth of 25% spare capacity.

5.3.5 Distribution Switchboards

Distribution boards will be installed for the supply and connection of light and power for all areas of Building C and the Communal Hall. The boards are located on all levels within 60/60/60 fire rated cupboards. Distribution board cupboards to be locked with DoE “E” Keys.

The Canteen will be provided with a dedicated distribution board within its own area. This board will be supplied directly from the Main Switchboard located externally.

Distribution boards will include circuit breakers for protection of final sub-circuits and un-equipped mountings will be incorporated for 25% extra poles.

Distribution boards will be equipped with separate dedicated chassis for light and for power and sub-metering per chassis. All lighting and automation controls will be provided within these switchboards.

5.3.6 Sub-Mains Cabling

Sub-mains reticulation will be provided from the main switchboard to distribution switchboards and mechanical plant and each level light and power distribution boards. Sub-mains for essential safety services will be fire-rated. The existing Heritage Building will remain operational and sub-mains cabling will be provided for the distribution board.

The UPS Building will have conduits terminated at the proposed site for future connection. Sub-mains cabling for the UPS distribution board will be from the external MSB.

5.3.7 Sub-Metering

Electrical services sub-meters will be provided for:

- Mechanical Services Switchboards
- Common area lighting and power per distribution board chassis.
- Communications room switchboard
- Canteen DB

Electrical sub-meters will be connected to the central monitoring system enabling all building services information to be sent/received as required.

5.3.8 Inground Conduits and Pits

Inground conduits and reticulation throughout the site to be provided from the kiosk substation to the MSB adjacent to the kiosk and from there to all DBs.

The pits and conduit system between all buildings and the proposed locations indicated on site plan. The system will incorporate a spare capacity of at least 25% should additional cables need to be installed in the future.

All conduits that are installed in a location that has a concrete slab must be cast under the slab, and routed directly to the equipment rack or frame that they are to supply.

The conduits entering the Heritage Building will be retained and the new containment route from MSB will be tied into the existing pit/conduit. Due to the staging sequencing for the school, containment to MDB1 will also be made good to provide continued supply to the existing demountables until the new buildings are fully operational.

Spare Capacity Allowance:

Conduit diameters to be sized in accordance with the relevant AS and general installation

practices.

The follow space factors are recommended:

- 0 - 10 metres 50% space factor for single cables
- 0 -10 metres 40% space factor for multiple cables
- 10 - 30 metres 33% space factor
- 30+ metres 25% space factor
- Each 90 degree change of direction is to be considered equivalent to 10 metres of conduit run.

Provide as a minimum the following spare conduits with draw cords along all cable routes:

- 2 x 32 mm uPVC
- 1 conduit of sufficient size (minimum 32 mm dia.) to enable an extra parallel leg of the designated submain to be installed

Larger conduits will be required for many runs. Size conduits in proportion to those installed for the initial installation.

From each EDB provide at least the following spare conduits:

- For the future buildings included in the overall design to a point 1m clear of hard surfaces in the direction of the possible loads.

In addition, provide 4 x 50 and 4 x 32mm conduits for “unknown” future use, again to 1m clear of hard surfaces in the direction/s of the possible loads.

5.3.9 Emergency Evacuation Lighting

Emergency lighting system will be provided throughout to comply with AS/NZS 2293 and will include emergency luminaires and illuminated exit signs.

The luminaires will comprise single point units (SPU’s) incorporating lithium batteries, automatic battery charger and mains failure relay.

All emergency lighting points will be centrally monitored from a computerised testing and maintenance system which is programmed for scheduled discharge testing, reporting and alarms in the event of equipment failure.

5.3.10 External Lighting

All areas intended to be used at night should allow appropriate levels of visibility.

External lighting shall be provided for the new carparks compliant to AS/NZS 1158. External lighting shall be provided to the following areas:

- All carpark areas to a minimum P11(a) lighting category and controlled via a PE cell and Time Clock.

Pedestrian pathways, lane ways and access routes in outdoor public spaces should be lit to the minimum Australian Standard of AS1158. Avoid lighting spillage onto neighbouring properties as this can cause nuisance and reduce opportunities for natural surveillance. Lighting shall be designed in accordance with AS4282 – Control of the obtrusive effects of outdoor lighting.

Lighting should be consistent to reduce the contrast between shadows and illuminated areas and have a wide beam of illumination, which reaches the beam of the next light, or the perimeter of the site or area being traversed. Lighting should clearly illuminate the faces of users of pathways.

Streetlights should shine on pedestrian pathways and possible entrapment spaces as well as on the road. Lights should be directed towards access/egress routes to illuminate potential offenders, rather than towards buildings or resident observation points. Lighting to consider all vegetation and landscaping that may act as an entrapment spot. Lighting to be designed with appropriate impact protection (IK) rating to protect from vandalism. Where appropriate, use movement sensitive and diffused lights.

All possible places for intruders to hide are to be illuminated. As a guide, areas should be lit to enable users to identify a face 15m away.

All lighting is to be maintained and kept in clean condition with all broken or faulty fittings replaced as soon as possible. Energy efficient lamps/fittings/switches to be used to reduce energy usage.

5.3.11 Additional External Lighting

All external entry areas (incl. entry court, learning street, etc.)

- Pedestrian / Vehicular areas; Minimum P3 lighting category.
- Pedestrian only areas; Minimum P8 lighting category.

5.3.12 Automatic Lighting Control

Provide a stand-alone Lighting Control System (LCS).

The LCS shall be provided to meet the requirements of the BCA and minimise energy consumption and unnecessary artificial lighting. The LCS shall be provided with the following basic features:

- Motion detector control of lighting.
- Dynamic dimming of lighting to glazed perimeter areas.
- Lighting dimmer switches where required- TBC in Detail Design.

5.3.13 General Purpose Outlets

Power outlets and accessories including electrical connections will be provided in all areas including, toilets and lobby. Final location of power outlets will be confirmed with the architect and client.

All electrical services within Canteen Hall and Building C shall be supplied via a local distribution board with separate chassis' and check metering for the following:

- Lighting

- Power
- Plant Equipment

For meeting rooms and collaborative working areas, power will be provided from outlets within floor boxes under the tables and reticulated up through umbilicals (To be confirmed with the architect in the coming phase). Cables will be run through suitably sized in the raised floor from the nearest walls to each floor box (to be confirmed as the design progresses). Equipment will have a maximum distance of 25m from the relevant Distribution Board, as per SINSW design checklist requirements.

All special and kitchen equipment will be provided with all required outlets either above or under bench depending on final equipment layout.

All outlets intended to be used for the connection of equipment in wet areas, class 1 equipment (not double insulated) and portable equipment subject to wear and tear (e.g. for cleaners and maintenance use), will be protected by 30mA RCBO protective devices located in the relevant distribution switchboard.

5.3.14 EV Charging

Dedicated electric vehicle charging distribution board provided in accordance with NCC 2022. 20% of car parking spaces to allow for a 7 kW (32 A) type 2 electric vehicle charger with DIN rail metering for each outgoing circuit.

5.3.15 Wiring

Large groups of cables will be installed on cable ladders, cable trays or wiring ducts. Cables trays are proposed to be in the ceiling space or within raised floor pending confirmation from architect and client. Vertical cable trays and reticulation from the distribution boards will be mounted on cable tray/ladder as appropriate.

Where cable trays pass through non-accessible ceiling, access panels are to be located at regular intervals to facilitate both initial installation and modifications required to wiring throughout the life of the building.

5.3.16 Telecommunications

A lead-in pathway from the property boundary to the Main Communications Room located in Building C. The pathway must be used for incoming voice and data services and will be sized accordingly. The Main Distribution Frame must be located within the Campus Distributor.

The pits and conduit system between all buildings and the proposed locations indicated on site plan. The system will incorporate a spare capacity of at least 25% should additional cables need to be installed in the future.

All conduits that are installed in a location that has a concrete slab must be cast under the slab, and routed directly to the equipment rack or frame that they are to supply.

The conduits entering the Heritage Building will be retained and the new containment route from the Main Communications Room will be tied into the existing pit/conduit.

5.3.17 Security System: Access Control and CCTV

The department's preferred security services provider shall be engaged to install a security system throughout the buildings as per the client's requirements.

PIR intruder detectors shall be provided around the rooms as appropriate. Internal and external sirens and signalling shall also be provided, which shall sound and flash in the event of an intruder detected when the building is in the armed state.

Reed switches shall be provided on all external doors and windows.

Subject to client's strategy, CCTV shall be provided to both front and rear entrances to the building, through publicly accessible areas and as per client requirements.

Access control to main gate as per architect and SINSW requirements.

5.3.18 ENERGY MANAGEMENT / MONITORING SYSTEM

- An energy, water and waste management system with usage tracking relayed on the display screen in the entry lobby.
- Energy usage tracking to include
- Data will be stored for a minimum of 7 years and will be easily managed and calculated, i.e. via time interval, system type and energy type
- Separated metering data for different building services systems such as lighting, power, mechanical services equipment, gas, and hydraulic water meters
- Sensors and Air Monitoring including a weather station

6 Infrastructure Assessment and Staging Plan

6.1.1 Services and Utilities Impact Assessment

Gillieston Public School is currently supplied by the Ausgrid network through a pole-mounted transformer (PTX - 54552) located on Pole HR8 3014. The supply is conveyed overhead from Pole HR8 0847 across the road to a lead-in pole situated on the school boundary.

The site's electrical supply is constrained to 200 amps by the Service Protective Device (SPD) within the Main Switchboard (MSB). Preliminary maximum demand calculations indicate that the school's load requirements are approximately 520 amps or 360 kVA. Following consultations with Ausgrid regarding the increased load demands, it has been determined that a new substation is necessary to accommodate the capacity required for the new school buildings.

To facilitate this, two new poles will be installed on Gillieston Road in front of the proposed substation. High Voltage (HV) cabling from HR8 3014 will transition underground at the new pole to supply the new substation. HV cabling will then be extended from the substation to the second new pole and continue overhead to pole HR8 3011.

A BYDA survey has identified existing NBN and Telstra pits at the northern edge of the property. New conduits will connect to these existing NBN and Telstra pits, with containment provided into the Main Communications Room located in Building C. This room will house NBN equipment, the security panel, and headend equipment. Additionally, a pit and conduit system will be established to extend from the Main Communications Room to the Heritage Building, Communal Hall building, and UPS building.

6.1.2 Staging Plan

The current electrical infrastructure for the school is supported by an external switchboard situated to the north of the property on Gillieston Road. The existing containment system, which services the Heritage Building switchboard and MDB-1, runs below the proposed Building C.

It is proposed to install a new 600kVA substation and a new external Main Switchboard adjacent to the existing switchboard. To accommodate this, the existing containment system beneath the proposed Building C and its immediate surroundings will be demolished. In its place, a new pit and conduit system will be installed to avoid the building footprint. The new conduits will tie into the existing pits and conduits on the assumption that existing pits and conduits are complaint to latest standards, ensuring continuity of supply to the existing electrical infrastructure. The delivery of the substation will be via a truck and crane on Gillieston Road, as per

Ausgrid requirements. The electrical infrastructure, including the Main Switchboard and various distribution boards, will be delivered to the school via the parking spaces adjacent to Building C.

MDB-1 will remain operational until the completion of Building C construction and the official occupancy of the new building by students. As the Heritage Building will remain in use, MSB1 is proposed for replacement due to its expiration of design life. The underground containment system from MSB1 to the demountable units (D14417, D10870, D16781, D15745) will be dismantled. Following the completion of the redevelopment of the school, the containment system serving MDB-1, all downstream switchboards, and associated cabling will be removed.

The changeover in supply from the existing switchboard to the new substation and MSB will result in no supply to the school during the activity. It is recommended that the changeover takes place on a weekend to prevent loss of supply and safety issues arising.

Refer to Appendix D for Redevelopment Staging Plan.

7 Mitigation Measures

Project Stage ***Design (D)*** ***Construction (C)*** ***Operation (O)***	**Mitigation Measures**	**Relevant Section of Report**
D / C	*Existing supply does not meet capacity requirements. New substation proposed.*	Section 6.1.1
D / C	*Existing timber poles supplying site MSB to remain. New timber poles to be installed for the proposed substation supply to prevent loss of supply to school until construction activity complete.*	Section 6.1.1
C / O	*Changeover in supply to be organised after hours/weekends to minimise downtime during school hours*	Section 6.1.2
D	*Services pits designed with drain hole to prevent flooding*	Section 5.3.8
D	*To prevent excess energy requirements, lighting design to be compliant to NCC Section J requirements*	Section 5.2

8 Environmentally Sustainable Design

Refer to the Sustainability Development Plan and ESD Modelling Report (issued separately).

9 Vertical Transportation

Refer to the Vertical Transportation Memo (issued separately).

10 Acoustic Report

Refer to the Acoustic Memo (issued separately).

Appendix A – Mechanical Equipment Schedules

Refer to Mechanical Specification GPS-AAP-XX-XX-TS-M-00001.

Appendix B Single Lift Value Engineering Option

The schematic design has considered two separate lifts to be installed as part of Building C. For Phase 4 Detailed Design, the number of lifts is to be reduced to 1. Below is a sketch from SHAC including the deletion of the 2 current lifts, the shifting of the central stairs (West), and the inclusion of a new lift beside the central stairs.

Appendix C Authorities

OFFER to provide DESIGN RELATED SERVICES

DESIGN RELATED SERVICES OFFER

Premises address: **GILLIESTON PUBLIC SCHOOL 100 RYANS ROAD, GILLIESTON HEIGHTS 2321**

NMI - Number: **Webform Ref 1946179**

MC Reference: **1900130751** **AP Reference: 800673743**

This offer is made on 2/09/2024

By *Ausgrid* of 24 Campbell St, Haymarket NSW 2000.

To the ***connection applicant*** named in the *connection application* received on 29/08/2024 in respect of the *premises* referred to above.

Ausgrid has determined that network alterations are required to connect your development and we cannot proceed to a connection or relocation offer at this stage. To enable Ausgrid to further consider and process your application you will require a certified design and associated certification number. Your application remains technically incomplete until you have been issued a certification number.

This Design Related Services Offer provides guidance on how to obtain a certified design and associated certification number.

Scope of Network Alterations

Ausgrid has determined that the following works are likely to be required:

- Installation of a kiosk type substation.
- Any asset relocation proposed in conjunction with the proposed connection assets.
- Other – Removal of existing pole transformer and/or ABS is permitted if required. Note Pole transformer removal will require LV interconnectors to replace existing LV capacity.

These works are classified as contestable, which means that you are required to fund the design and some or all of the construction works. If you have not already done so, you will need to engage and manage suitably qualified contractors, known as Accredited Service Providers (ASPs) to undertake the design and construction.

Initially, your ASP Level 3 (ASP/3) will undertake the design, and then your ASP Level 1 (ASP/1) will undertake construction in accordance with the design and Ausgrid's policies and standards. The timeframe for the works will vary depending on factors such as the complexity and the way in which you manage your ASP's.

Once the works have been satisfactorily completed and electrified, the premises connection assets will be owned and maintained by Ausgrid as part of the electricity distribution network.

Contract for Design Related Services

This letter is an offer for the Customer to enter into a Contract for Design Related Services with Ausgrid. It remains open for acceptance for 45 business days. If the offer is accepted by the Applicant, the Applicant does so as the Customer's agent. No work will be undertaken by *Ausgrid* until a Design Contract is in place.

You are encouraged to contact ASP/3's and ASP/1's to understand the likely overall costs you will incur for design and construction before you accept and commit to the Contract for Design Related Services.

IMPORTANT: The contractual arrangements provide the framework for a design to be prepared by your ASP/3, and NOT by *Ausgrid*. *Ausgrid's* fees as outlined below are for the design related network services we provide during the design phase and are **IN ADDITION** to the fees charged by your ASP/3 in preparing the design.

Acceptance Fees

The acceptance fees relating to the Contract for Design Related Services are outlined in the attached Acceptance Fee Summary and also detailed on the Ausgrid Portal page. *Ausgrid* will invoice **the Customer** once we receive acceptance via the Ausgrid Portal along with a Customer Details Form (attached). The Contract will commence when you pay the invoiced fee.

The acceptance fees are an estimate for the *Ausgrid* services required and are payable up front by the **Customer**. Further fees may apply for any additional services required and these will be quoted via the Ausgrid Portal on each occasion.

Ausgrid's published rates for our services are amended from time to time in our Alternative Control Services Fee Schedule Publication, and in accordance with the Contract, *Ausgrid* reserves the right to charge the rates that are applicable at the time the service is provided.

Fees for *Ausgrid's* services are in addition to the design and construction costs charged by your ASP's, and some fees may not be refundable if the service has already been provided. Fees and rates are set by the Australian Energy Regulator.

WHAT TO DO NEXT

- To move ahead, please accept the offer (see below) outlined in this document and then have the **Customer** pay the invoice that will be forwarded
- **Complete and forward the Customer Details Form**
- Engage an ASP Level 3 designer
    - On the Ausgrid Portal, nominate the ASP/3 as the designer for this project
    - Advise the ASP/3 that the Design Information Category for this project is **Standard**

Enquiries: connections.technical.enquiries@ausgrid.com.au

Enclosures:

Contract terms – via website at:
https://ausgrid.com.au/CDRS.

Customer Details Form – via website at
https://ausgrid.com.au/customerdetailsform

Acceptance Fee Summary – attached

PLEASE REVIEW THE OFFER OUTLINED IN THIS LETTER, ALONG WITH THE TERMS LINKED ABOVE, THEN PROCEED TO THE AUSGRID PORTAL

IF YOU WISH TO ACCEPT THIS OFFER

SELECT "ACCEPT" AGAINST THE OFFER ON THE AUSGRID PORTAL WITHIN 45 BUSINESS DAYS

RETURN THE CUSTOMER DETAILS FORM BY EMAIL TO contestability@ausgrid.com.au

IF YOU WISH TO DECLINE THE OFFER

SELECT "DECLINE" AGAINST THE OFFER ON THE AUSGRID PORTAL.

Should you wish to proceed in the future, a new connection application will need to be lodged.

DESIGN RELATED SERVICES OFFER

ACCEPTANCE FEE SUMMARY

Service Description	Unit	Quantity	Price per unit	Total Price
Administration of Contestable Works - General - Design	Service	1.00000	$270.78	$270.78
Design Information - Standard	Hour	7.00000	$249.03	$1,743.21
Design Certification - Other - R3	Hour	13.00000	$249.03	$3,237.39
Administration of Contestable Works - General - Design	Service	1.00000	$270.78	$270.78
Design Information - Standard	Hour	7.00000	$249.03	$1,743.21
Design Certification - Other - R3	Hour	13.00000	$249.03	$3,237.39
SUBTOTAL				$5,251.38
GST (10%)				$525.14
TOTAL				$5,776.52

These fees are an **initial estimate** for the services we will require to provide throughout the design contract and are payable up front by the **Customer**, on acceptance of the contract.

IMPORTANT: **Additional** services may be required through the course of the design contract (e.g. asset number requests, specialist services, consultancy services). The fee for such services will be billed to the **Customer** in accordance with the contract, and are payable prior to design certification. Typical examples include, but are not limited to, fees for asset creation, additional certification effort and requests to vary network standards.

TO AVOID DELAYS, DON'T FORGET TO RETURN A COPY OF THE COMPLETED **CUSTOMER DETAILS FORM** TO AUSGRID (contestability@ausgrid.com.au)

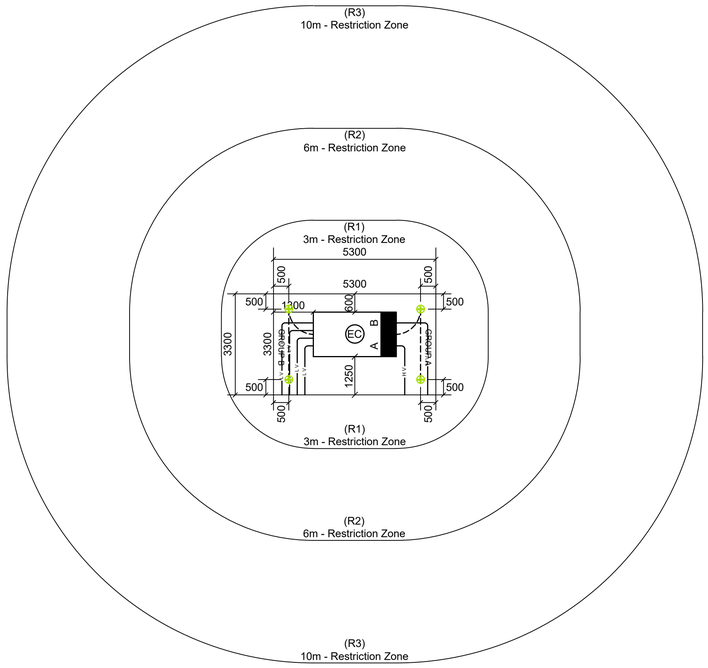
HR-81332
HR-81330
HR-81349
80312
3x111AL
2x95AL ABC
HR-83014
Indicative Driveway
HP54552
GILLIESTON RYANS
NEW timber pole with HV & LV UGOHs
2x95AL ABC
HR-80847
11kV and LV in HD PVC conduits
ABL63999
R-81339
RYANS RD

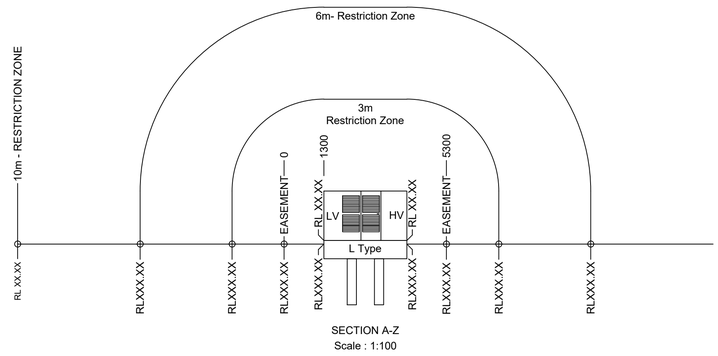
As per the design related service offer
ASP/3 design scope:

1. Installation of L type kiosk substation.
2. Installation of HV cabling (line type - HV-)
3. Installation of a low voltage direct distributor as back-up supply (line type - LV-)
4. Remove of ABL 63999

Note: final substation loaction (easement) and clearance requirements are to be further reviewed by architects and confirmed.

L-Type Kiosk Substation





SCALE 1 : 200
0 5 10 15 20 METRES

CHECK FOR OTHER SERVICES BEFORE BORING OR EXCAVATION

PROPOSED DESIGN SCOPE (PDS)

LEGENDS

	PROPOSED	EXISTING
Pole	○	●
SL Standard	▣	▣
LV Pillar	□	■
LV Link Pillar	⊠	H
Streetlight		
Streetlight-PEC		
Streetlight-replacement		
Private Pillar	P	P

	PROPOSED	EXISTING
Pole-to be removed		
USL		
ABS		
IDT		
Kiosk Sub		
Chamber Sub		
Pole Sub		
Two Pole Sub		

PROPOSED: UGOH ○ Pot End ◁ | Joint ⬭ Sealed End ◁ | Conduit
EXISTING: UGOH ● Pot End ◀ | Joint ⬬ Sealed End ◀

UG Cables	OH Cables	Joints
HV	HV	HV
LV	LV	LV
SL	SL	SL

REMOVE

OH Lines	UG Cables
HV	HV
LV	LV
SL	SL
SV	SV

OH Lines	UG Cables

CAD DRAWING DO NOT SCALE DRAWING
AMENDMENTS

ASSOCIATED DRAWINGS

ARCADIS Design & Consultancy for natural and built assets
Level 16, 580 George Street, Sydney, NSW, 2000. Phone (02) 8907 9000
www.arcadis.com © Copyright reserved.
THIS DRAWING MUST NOT BE REPRODUCED IN PART OR WHOLE UNLESS WRITTEN PERMISSION GIVEN BY ARCADIS.

ASP REF. GILLIESTON PUBLIC SCHOOL
CERTIFICATION NUMBER ##-##

DESIGNED BY	Eric Yang
AUTH NO.	3543
SUBMIT DATE	11/09/2024
LGA	GILLIESTON HEIGHTS
AUSGRID REF.	AUSGRID MAP REF.HR82

PROPOSED DESIGN SCOPE
NEW KIOSK SUBSTATION
AT GILLIESTON ROAD
GILLIESTON HEIGHTS

SIZE A1 | AUSGRID PROJECT No. 1900130751 | SHEETS 1 of 1 | AMD 0

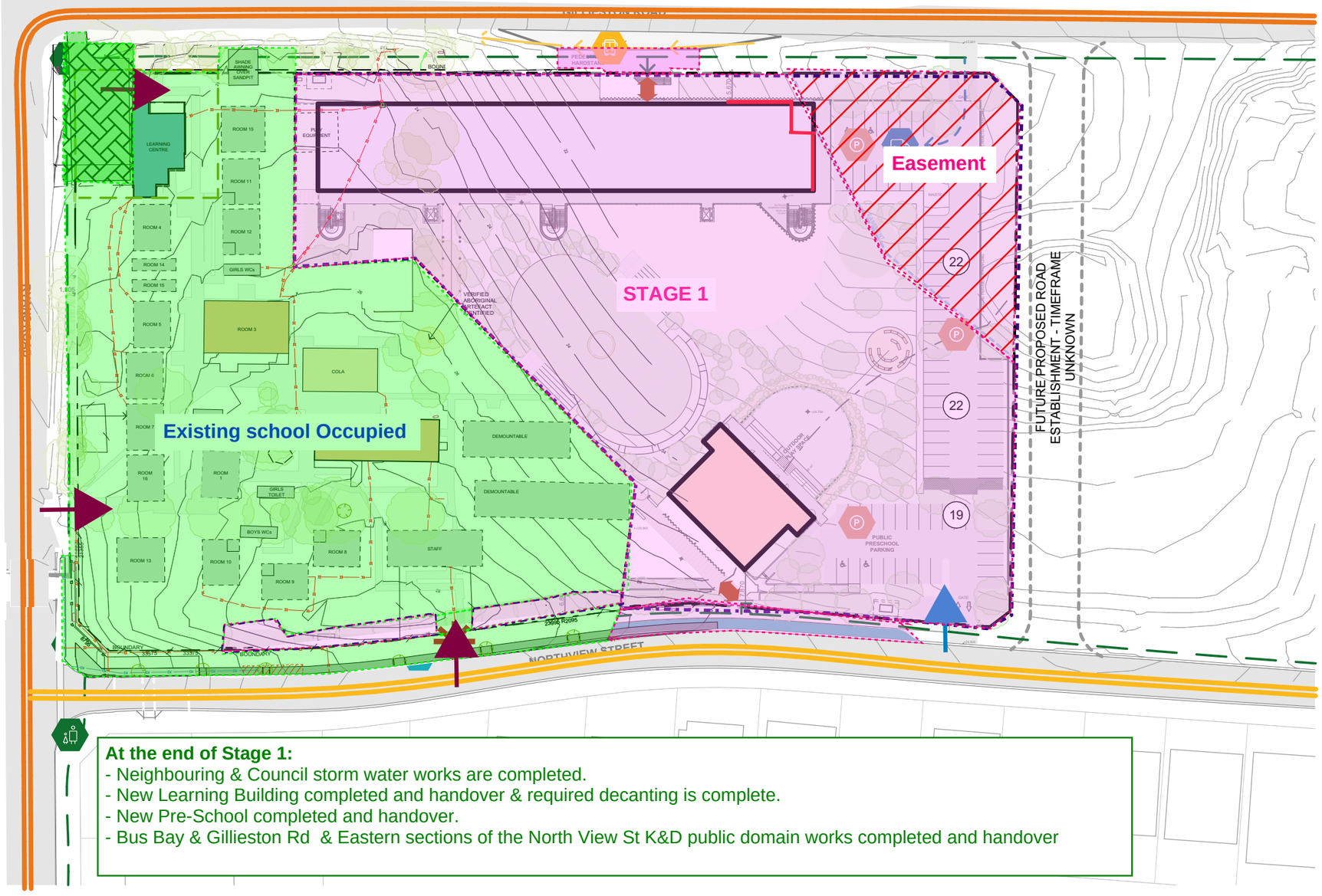
04/09/2024

Appendix D Staging Plan

Gillieston Public School - Stage 1 Construction Works

Construction works includes:
- Site Establishment
- Neighbouring & Council storm water works
- All works required for the Completion of the new Learning Building & required decanting
- All works required for the Completion of the new Pre-School
- Bus Bay & Gillieston Rd & Eastern sections of the North View St K&D public domain works

Key Notes:
1. Staff will be utilising the existing car park adjacent to Building D (Brick Cottage) on Gillieston Road during Stage 1 Construction Works
2. School Access on Northview Street is retained across Stage 1 Services corridor



At the end of Stage 1:
- Neighbouring & Council storm water works are completed.
- New Learning Building completed and handover & required decanting is complete.
- New Pre-School completed and handover.
- Bus Bay & Gillieston Rd & Eastern sections of the North View St K&D public domain works completed and handover

CONSTRUCTION LEGEND

Easement - This area is in possession of the Contractor. However, works in this area cannot be commenced until neighbouring & council stormwater works are complete

In Construction & Site in possession with the contractor

Existing and Operational

Completed and Occupied

Contractor Site Access

School Access

Hoarding Line

Staff car park

Remediation - This area is required to be remediated and made good prior to Hall and OOSH demountable installation

TECHNICAL OVERLAY

Bus Stop

Carparking

Kiss n Drop

Bicycles and Scooters

Crossings and School Zones

Maintenance and Delivery Access

LEGEND

- FUTURE PROPOSED ROADS
- CAR PARKING
- KISS N DROP & QUEUING ZONE
- BICYCLE / SCOOTER PARKING
- MAINTENANCE / DELIVERY ACCESS
- ACTIVE TRANSPORT LINKS
- MULTIDIRECTIONAL CAR ACCESS
- NARROW CUL DE SAC
- BUSBAY DROP OFF
- ENTRY

4814
DA3502
RevA 17.09.24

Gillieston Public School
100 Ryans Road & 29 Northview Street

0m 10 20 30 40 50 1:1000 @A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

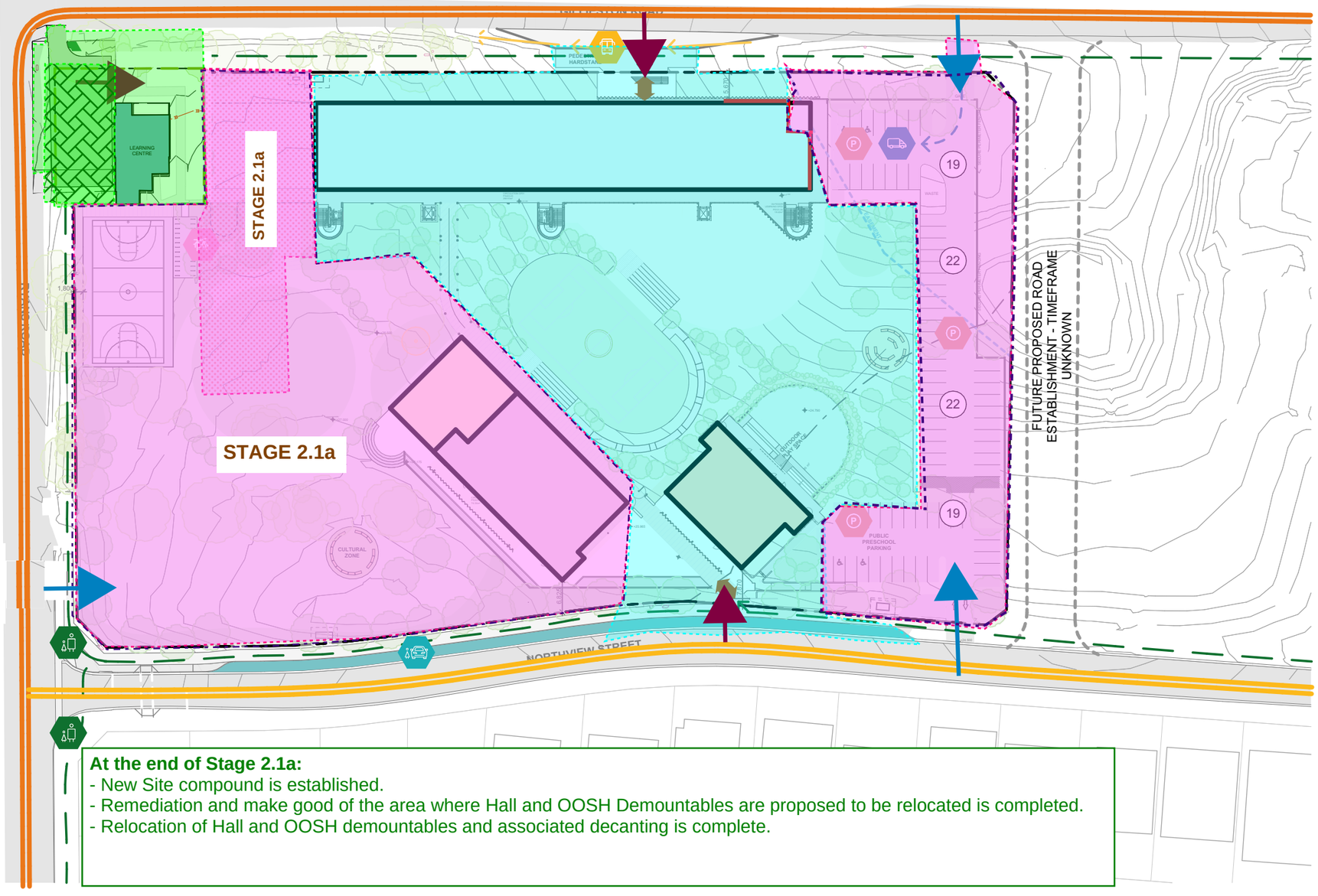
Gillieston Public School - Stage 2 Construction Works

Some parts of Stage 2 works would occur simultaneously

Gillieston Public School - Stage 2.1a Construction Works

Construction works include:
- Site shed relocation.
- Remediation and make good of the area where Hall and OOSH Demountables are proposed to be relocated.
- Relocation of Hall and OOSH demountables and associated decanting to facilitate construction of New Hall and OOSH Building.

Key Notes:
1. Staff will be utilising the existing car park adjacent to Building D (Brick Cottage) on Gillieston Road during Stage 2.1a Construction Works



At the end of Stage 2.1a:
- New Site compound is established.
- Remediation and make good of the area where Hall and OOSH Demountables are proposed to be relocated is completed.
- Relocation of Hall and OOSH demountables and associated decanting is complete.

CONSTRUCTION LEGEND

- Easement - This area is in possession of the Contractor. However, works in this area cannot be commenced until neighbouring & council stormwater works are complete
- In Construction & Site in possession with the contractor
- Existing and Operational
- Completed and Occupied
- Contractor Site Access
- School Access
- Hoarding Line
- Staff car park
- Remediation - This area is required to be remediated and made good prior to Hall and OOSH demountable installation

TECHNICAL OVERLAY

- Bus Stop
- Carparking
- Kiss n Drop
- Bicycles and Scooters
- Crossings and School Zones
- Maintenance and Delivery Access

LEGEND

- FUTURE PROPOSED ROADS
- CAR PARKING
- KISS N DROP & QUEUING ZONE
- BICYCLE / SCOOTER PARKING
- MAINTENANCE / DELIVERY ACCESS
- ACTIVE TRANSPORT LINKS
- MULTIDIRECTIONAL CAR ACCESS
- NARROW CUL DE SAC
- BUSBAY DROP OFF
- ENTRY

4814
DA3502
RevA 17.09.24

Gillieston Public School
100 Ryans Road & 29 Northview Street

0m 10 20 30 40 50 1:1000 @A3

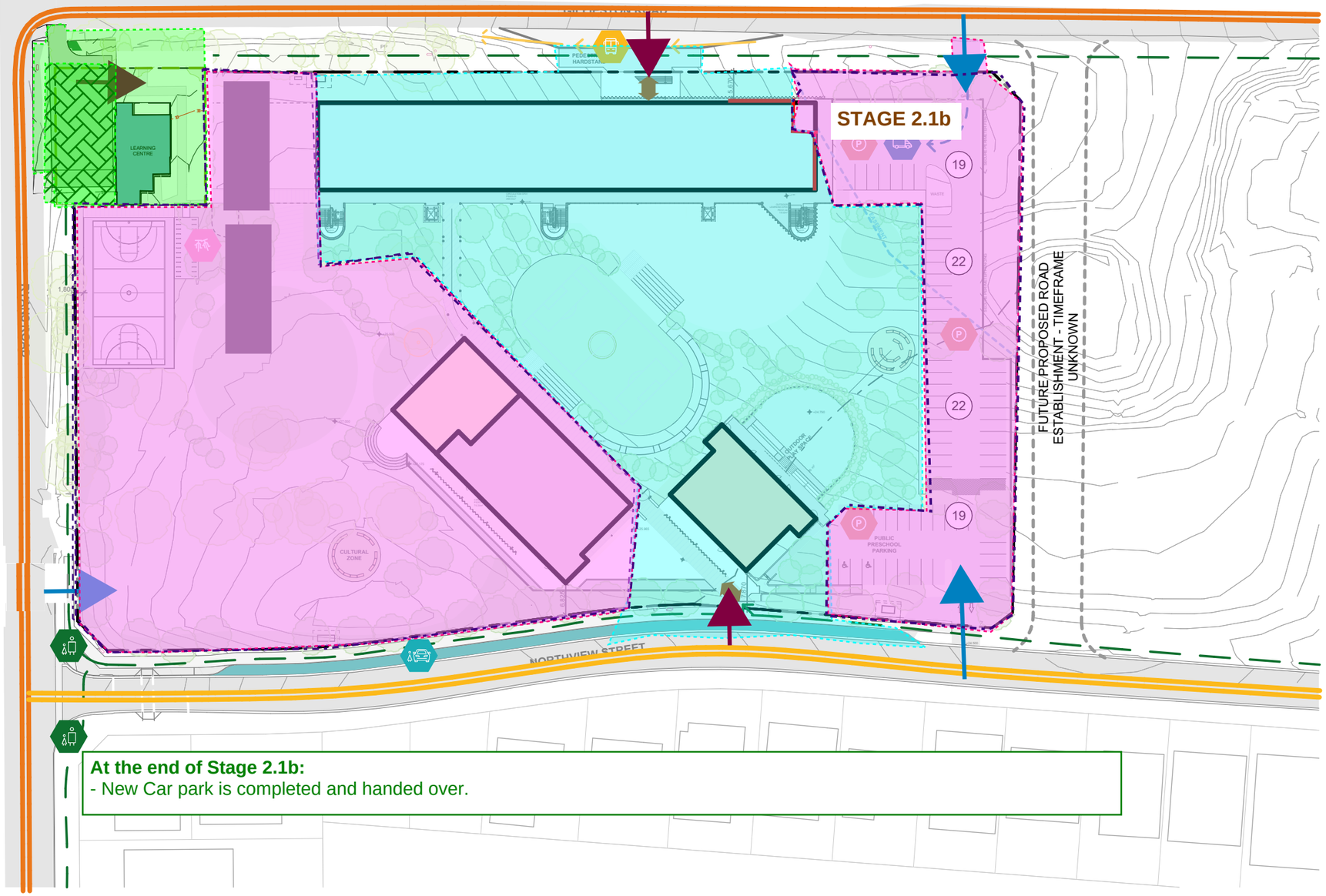
SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

Gillieston Public School - Stage 2.1b Construction Works

Construction works include:
- Construction of New Car park

Key Notes:
1. Staff will be utilising the existing car park adjacent to Building D (Brick Cottage) on Gillieston Road during Stage 2.1b Construction Works



At the end of Stage 2.1b:
- New Car park is completed and handed over.

CONSTRUCTION LEGEND

- Easement - This area is in possession of the Contractor. However, works in this area cannot be commenced until neighbouring & council stormwater works are complete
- In Construction & Site in possession with the contractor
- Existing and Operational
- Completed and Occupied
- Contractor Site Access
- School Access
- Hoarding Line
- Staff car park
- Remediation - This area is required to be remediated and made good prior to Hall and OOSH demountable installation

TECHNICAL OVERLAY

- **Bus Stop**
- **Carparking**
- **Kiss n Drop**
- **Bicycles and Scooters**
- **Crossings and School Zones**
- **Maintenance and Delivery Access**

LEGEND

- FUTURE PROPOSED ROADS
- CAR PARKING
- KISS N DROP & QUEUING ZONE
- BICYCLE / SCOOTER PARKING
- MAINTENANCE / DELIVERY ACCESS
- ACTIVE TRANSPORT LINKS
- MULTIDIRECTIONAL CAR ACCESS
- NARROW CUL DE SAC
- BUSBAY DROP OFF
- ENTRY

4814
DA3502
RevA 17.09.24

Gillieston Public School
100 Ryans Road & 29 Northview Street

0m 10 20 30 40 50 1:1000 @A3

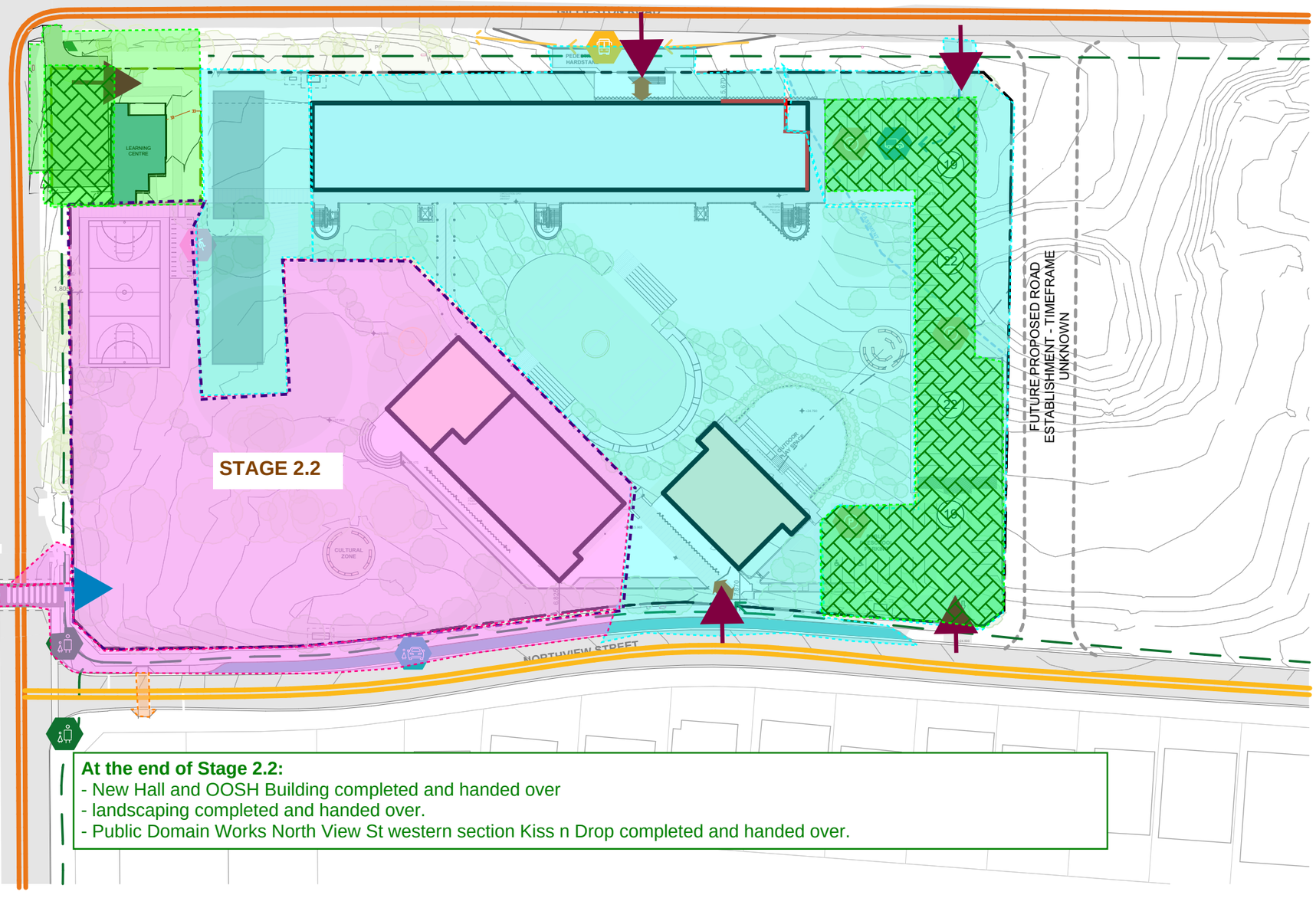
SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

Gillieston Public School - Stage 2.2 Construction Works

Construction works include:
- Completion & Handover of New Hall and OOSH Building
- Completion of landscaping
- Completion of Public Domain Works North View St western section Kiss n Drop

Key Notes:
1. Staff will be utilising the existing car park adjacent to Building D (Brick Cottage) on Gillieston Road and the new car park during Stage 2.2 Construction Works



At the end of Stage 2.2:
- New Hall and OOSH Building completed and handed over
- landscaping completed and handed over.
- Public Domain Works North View St western section Kiss n Drop completed and handed over.

CONSTRUCTION LEGEND

- Easement - This area is in possession of the Contractor. However, works in this area cannot be commenced until neighbouring & council stormwater works are complete
- In Construction & Site in possession with the contractor
- Existing and Operational
- Completed and Occupied
- Contractor Site Access
- School Access
- Hoarding Line
- Staff car park
- Remediation - This area is required to be remediated and made good prior to Hall and OOSH demountable installation

TECHNICAL OVERLAY

- **Bus Stop**
- **Carparking**
- **Kiss n Drop**
- **Bicycles and Scooters**
- **Crossings and School Zones**
- **Maintenance and Delivery Access**

LEGEND

- FUTURE PROPOSED ROADS
- CAR PARKING
- KISS N DROP & QUEUING ZONE
- BICYCLE / SCOOTER PARKING
- MAINTENANCE / DELIVERY ACCESS
- ACTIVE TRANSPORT LINKS
- MULTIDIRECTIONAL CAR ACCESS
- NARROW CUL DE SAC
- BUSBAY DROP OFF
- ENTRY

4814
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RevA 17.09.24

Gillieston Public School
100 Ryans Road & 29 Northview Street

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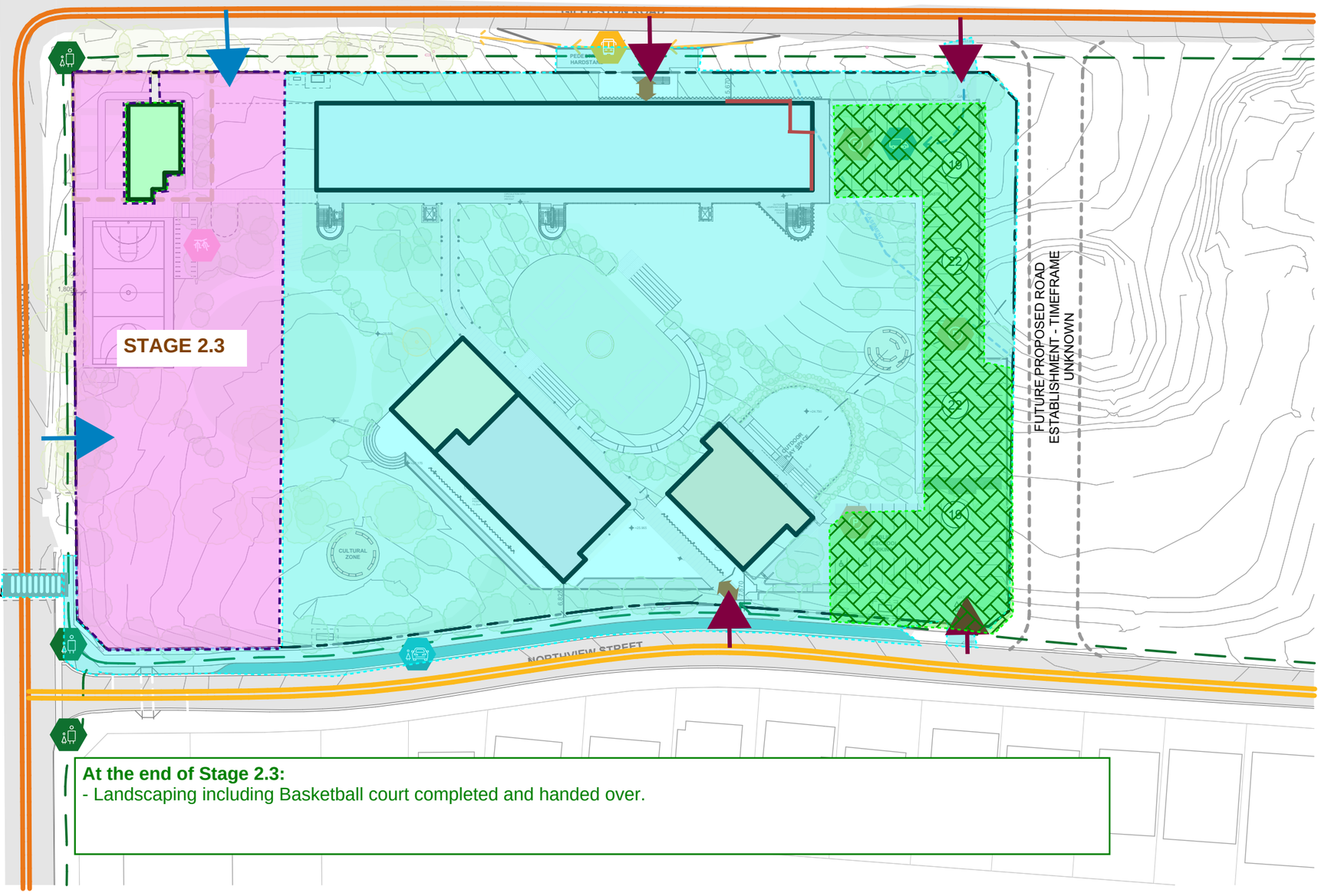
SHAC
Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

Gillieston Public School - Stage 2.3 Construction Works

Construction works include:
- Removal of relocated demountables
- Completion of landscaping including Basketball court

Key Notes:
1. Staff will be utilising the new car park during Stage 2.3 Construction Works



At the end of Stage 2.3:
- Landscaping including Basketball court completed and handed over.

CONSTRUCTION LEGEND

- Easement - This area is in possession of the Contractor. However, works in this area cannot be commenced until neighbouring & council stormwater works are complete
- In Construction & Site in possession with the contractor
- Existing and Operational
- Completed and Occupied
- Contractor Site Access
- School Access
- Hoarding Line
- Staff car park
- Remediation - This area is required to be remediated and made good prior to Hall and OOSH demountable installation

TECHNICAL OVERLAY

- **Bus Stop**
- **Carparking**
- **Kiss n Drop**
- **Bicycles and Scooters**
- **Crossings and School Zones**
- **Maintenance and Delivery Access**

LEGEND

- FUTURE PROPOSED ROADS
- CAR PARKING
- KISS N DROP & QUEUING ZONE
- BICYCLE / SCOOTER PARKING
- MAINTENANCE / DELIVERY ACCESS
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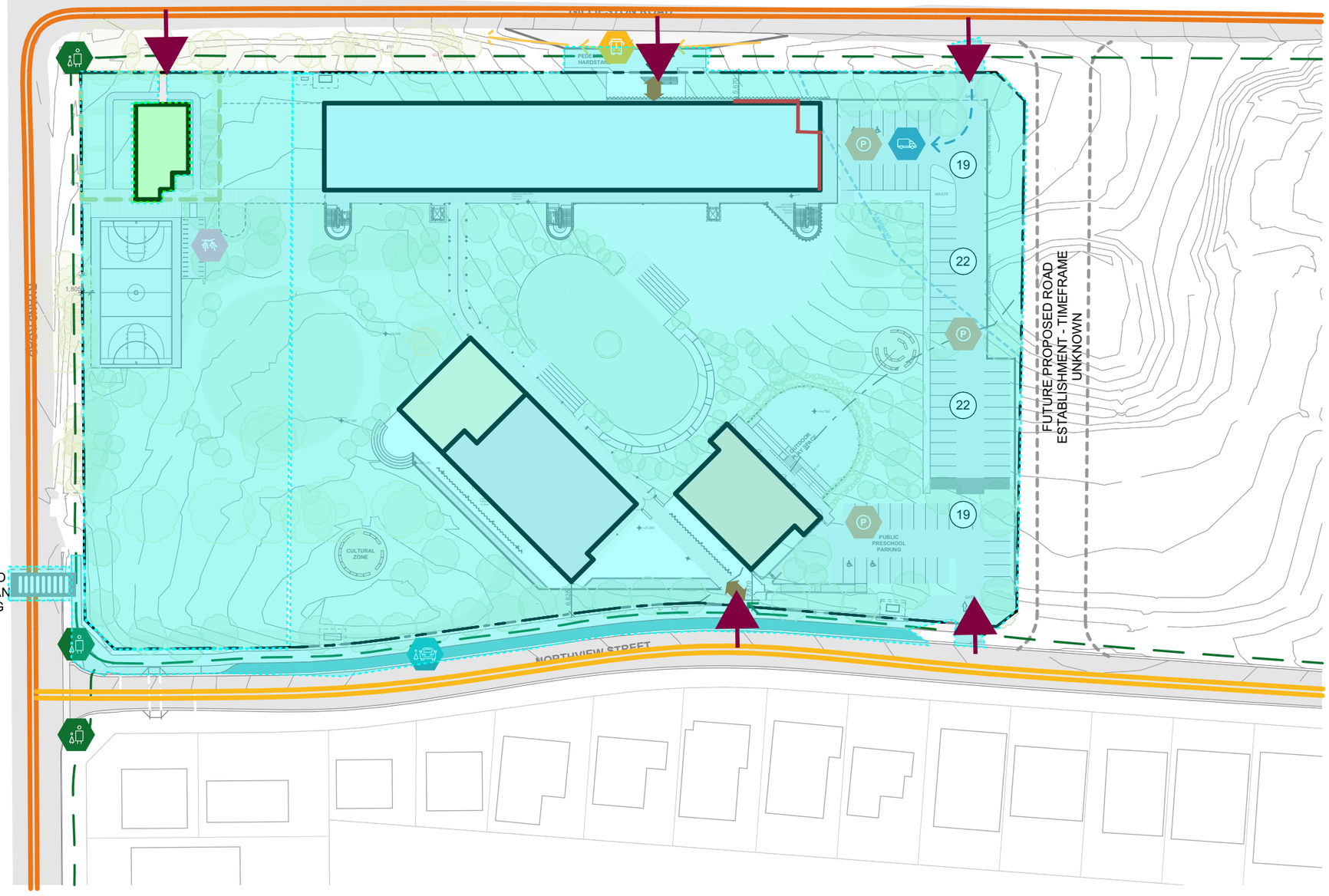
Gillieston Public School - Completion



CONSTRUCTION LEGEND

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TECHNICAL OVERLAY

- **Bus Stop**
- **Carparking**
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LEGEND

- FUTURE PROPOSED ROADS
- CAR PARKING
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