PACIFIC BROOK CHRISTIAN SCHOOL LTD

ECOLOGICAL SUSTAINABLE DEVELOPMENT REPORT

72-74 Maitland Street, Muswellbrook NSW – Stage 1

Project Number: 111917
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Jensen Hughes Australia

Providing building regulations, fire engineering, accessibility, and energy consulting services to NSW for over 25 years

Our story begins in 1997 with the founding of BCA Logic to fulfill the demand of a consultancy company whose expertise expanded across the entire life cycle of a building, from consulting on the initial planning through to construction and occupation.

BCA Logic, SGA Fire and BCA Energy joined Jensen Hughes in 2021, a leading global, multi-disciplinary engineering, consulting and technology firm focused on safety, security and resiliency. We continue to be at the forefront of our industry and work thoroughly to preserve our position by ensuring the successful delivery of projects.

Jensen Hughes was launched in 2014 through the historic merger of Hughes Associates and Rolf Jensen & Associates (RJA), two of the most experienced and respected fire protection engineering companies at the time. Since then, we have gained market leadership in nuclear risk consulting and established commanding positions in areas like forensic engineering, security risk consulting and emergency management. Over the past 22 years, our integration of more than 30 privately held engineering and consulting firms has dramatically expanded our global footprint, giving us a powerful market presence ten times larger than our nearest competitor in some of our markets and extending our historical lineage back to 1939.

With more than 90 offices and 1500 employees worldwide supporting clients globally across all markets, we utilise our geographic reach to help better serve the needs of our local, regional, and multinational clients. In every market, our teams are deeply entrenched in local communities, which is important to establishing trust and delivering on our promises.

Glossary & Definition

Term	Definition
BASIX	Building Sustainability Index
COP	Coefficient of Performance
DCP	Development Control Plan
DTS	Deemed-to-satisfy
EMP	Environmental Management Plan
ESD	Ecologically Sustainable Development
GHG	Greenhouse Gas
HVAC	Heating, Ventilating and Air-Conditioning
LEP	Local Environment Plan
Lumens	Luminous flux, equal to the amount of light emitted per second from a uniform source of 1 candela
Lux	Light intensity in a specific area (1 lux = 1 Lumen/m^2)
NCC	National Construction Code
PV	Photovoltaic
Rt	Total R-value for the system
R-value (m^2.K/W)	The thermal resistance of a component calculated by dividing its thickness by its thermal conductivity
SA	Solar absorptance
SHGC	Solar heat gain coefficient
U-value (W/m^2K)	The thermal transmittance of the composite element allowing for the effect of any airspaces, thermal bridging and associated surface resistances
VLT	Visible Light Transmission
WELS	Water Efficiency Labelling and Standard
WSAPP	Western Sydney Aerotropolis Precinct Plan

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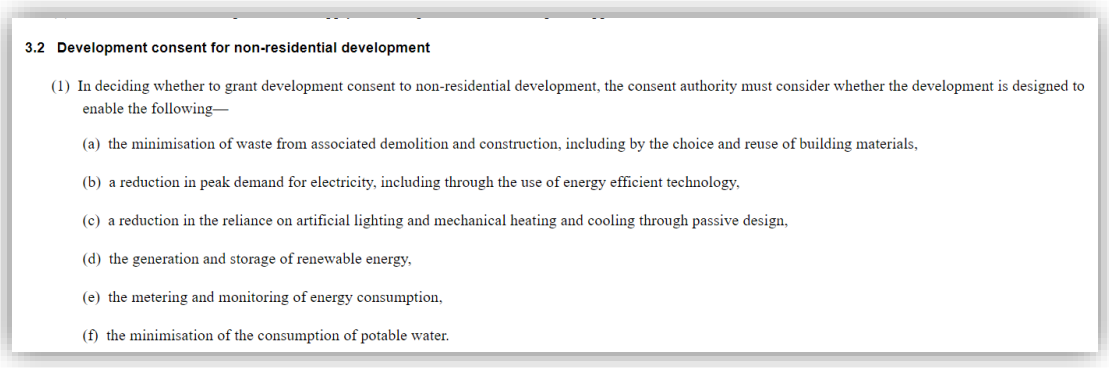
Executive Summary

Jensen Hughes Pty Limited (Jensen Hughes) has been engaged by Pacific Brook Cristian School Ltd to provide an Ecological Sustainable Development (ESD) Report that outlines both regulatory and benchmarking design initiatives for the proposed K-12 School Centre located at 72-74 Maitland Street, Muswellbrook NSW - Stage 1. The project will be assessed under the following compliance provisions:

+ Sustainable Building State Environmental Planning Policy (SB SEPP) 2022 Chapter 3.2(1) – (*Addressed in the National Construction Code 2022, Volume One – Section J*)



3.2 Development consent for non-residential development

(1) In deciding whether to grant development consent to non-residential development, the consent authority must consider whether the development is designed to enable the following—

(a) the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials,

(b) a reduction in peak demand for electricity, including through the use of energy efficient technology,

(c) a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,

(d) the generation and storage of renewable energy,

(e) the metering and monitoring of energy consumption,

(f) the minimisation of the consumption of potable water.

+ National Construction Code 2022, Volume One – Section J & J1V3 performance solution

Beyond the compliance requirements, the project team is committed to its occupants, visitors, community, and the environment with a sustainably conscious development through design to operation.

1.0 Basis of Assessment

1.1 LOCATION AND DESCIPTION

The proposed development is for the establishment of a new K-12 school (Pacific Brook Christian School)on the subject site. The proposed development will comprise site preparation and remediation, tree removal, construction of new school buildings, covered outdoor learning area, covered walkways, car parking, landscaping and associated works. The school will accommodate 140 students and 16 staff.

The building has been classified as shown in Table 1, and the location of the project is set within the following climate zones as shown in Table 2.

Table 1: Building Classifications

Class	Level	Description
Class 9b & 10a	Ground Floor	Classrooms, Staff & Student Amenities Block

Table 2: Climate Zones

Location	Climate Zone & Description
Muswellbrook	6 - mild temperate

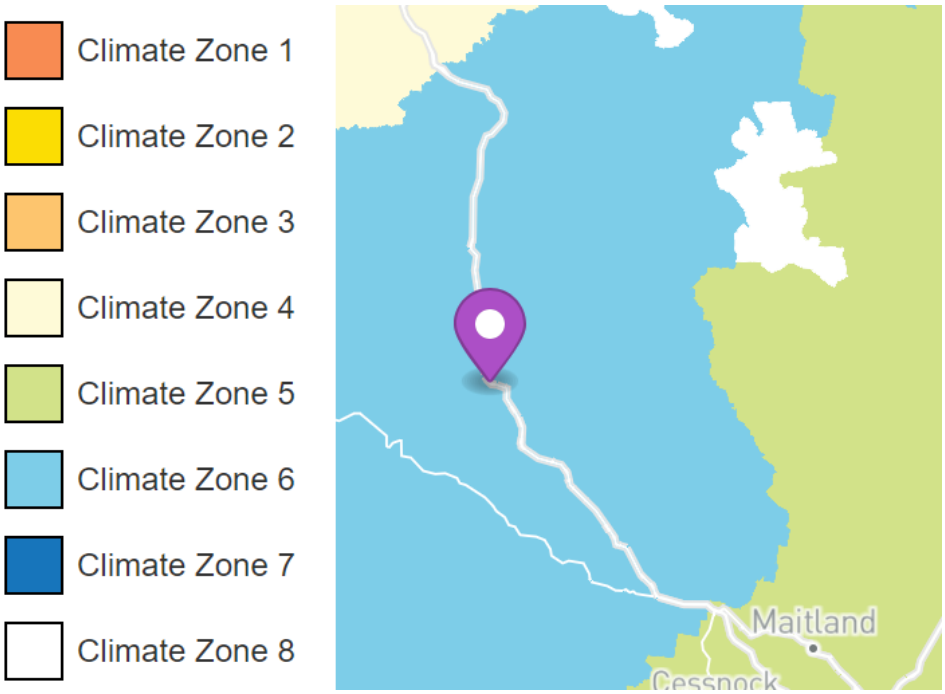


Figure 1 – Climate Zone 5 in Green

1.2 DESIGN DOCUMENTATION

This report has been prepared based on the following Design Plans and Specifications:

- Melanie Karaca & issued: 18/April/2024 (Referenced for Structure layout, glazing and building fabric systems)
- NCC22 Section J & J1V3

1.3 REPORT SCOPE

The purpose of this report is to assess the proposed design against the environmentally sustainable design strategy, energy, and water efficiency components. This report addresses:

- Sustainability drivers stipulated from relevant regulatory and project requirements.
- Project's design responses corresponding to the sustainability drivers.

1.4 LIMITATIONS

This report aims to provide high level ESD design guidance to the project in accordance with the SB SEPP & Section 193 EP&A 2021 objectives and provisions. It is intended that the options nominated in this report are subject to discuss, assess and workshop into the detailed design of the development. Section J compliance must refer to separate, designated assessment reports. Sections B, C, D, E, F, G, H and I of the NCC.

2.0 ESD Framework Requirements & Strategy

The following regulatory frameworks are incorporated to form part of the overarching ESD strategy for the development:

2.1 REQUIREMENTS:

+ **If** Chapter 3 of SEPP (Sustainable Buildings) 2022 applies:

  - Demonstrate how the development has been designed to address the provisions set out in Chapter 3.2(1).

> **3.2** Development consent for non-residential development
>
> 1. In deciding whether to grant development consent to non-residential development, the consent authority must consider whether the development is designed to enable the following-
>
> a. the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials,
>
> b. a reduction in peak demand for electricity, including through the use of energy efficient technology,
>
> c. a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,
>
> d. the generation and storage of renewable energy,
>
> e. the metering and monitoring of energy consumption,
>
> f. minimisation of the consumption of potable water.

  - Provide a NABERS Embodied Emissions Material Form to disclose the amount of embodied emissions attributable to the development in accordance with section 35B of the EP&A Regulation.
    - To be or as detailed by the Building Quantities Surveyor

To demonstrate the principles listed above, please refer to the Sustainable Development Strategy in this report below.

2.2 SUSTAINABLE DEVELOPMENT STRATEGY

2.2.1 NCC 2022 Volume One Section J Provisions

The primary objective of Section J provisions is designed to reduce greenhouse gas emissions through improved performance of building fabric elements and operational services systems in the following categories. Deemed-to-Satisfy (DtS) compliance is mandated for project's minimum provision, but it is recommended to exceed the baseline requirement where reasonable.

The project is committed to meeting and exceeding, where possible, the standards of performance within Section J. NCC22 Section J & J1V3 PS report as detailed below, addresses *SEPP SB Chapter 3.2(1)(c), (b), (d) & (e).*

+ *SEPP SB Chapter 3.2(1)(c): 'a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,'* Addressed in Section J4 Building Fabric & J5 Building Sealing

Table 3: Building Fabric Requirements (Non-Residential)

Building Element	DTS Compliance Requirements	Compliance Recommendation	Building Fabric Total R-Value	Compliance
Wall 1: Fiber Concrete Cladding	Rt1.40	+ Bulk Insulation 90mm R2.00 or equivalent. R0.2 Thermal break tape on metal frame exterior.	Rt1.55	Specification to be detailed in final drawing set
Wall 2: Metal Cladding	Rt1.40	+ Bulk Insulation 90mm R2.00 or equivalent. R0.2 Thermal break tape on metal frame exterior.	Rt1.55	Specification to be detailed in final drawing set
Roof 1: Metal Roof	Rt3.20 and SA less than 0.45	+ Ceiling batt insulation R1.00 or equivalent with, + R1.40 Anticon 70 Reflective foil insulation blanket to reflective 20mm+ air layer	Rt3.22 and SA less than 0.45	Specification to be detailed in final drawing set
Floor 1: Suspended Timber Floor	~~Rt2.00~~ J1V3 performance solution removed requirement of DTS	+ *Insulation requirement removed via J1V3 performance solution*	-	YES

Table 4: Glazing Requirements (Non-Residential)

Types of Glazing to Conditioned spaces	Max System U-Value	Max System SHGC	Compliance Recommendation
External Glazing (Conditioned space to external)	6.80	0.81	+ Single, Al Clear

+ *SEPP SB Chapter 3.2(1)(b): 'a reduction in peak demand for electricity, including through the use of energy efficient technology'* demonstrated through in Section J6 Air-conditioning & ventilation systems, J7 Artificial lighting & power, J8 Heated water supply, and J9 Facilities for energy monitoring and on-site distributed energy resources.

    - The proposed works by 'Building Service Engineers (BSE)' have committed to efficient use of technology for providing design for building services which include: Air-conditioning, ventilation systems, Artificial lighting & power.
    - LED technology or low wattage lighting fixtures shall meet total aggregate *System illumination power load allowance* as per Section J7 DTS accompanied by Artificial lighting calculator, and efficient wall-mount and outdoor units (2 units/room) shall be used in conditioned zones whilst utilising natural ventilation, and sufficient ducted exhaust/supply flows rates to ancillary zones as per Section J6 DTS. This demonstrates compliance with SEPP SB Chapter 3.2(1)(b) to mitigate and reduce peak demand for electricity and burden on the grid.
    - To ensure compliance with SEPP SB Chapter 3.2(1)(b), a heated water supply system for food preparation and sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three — Plumbing Code of Australia.

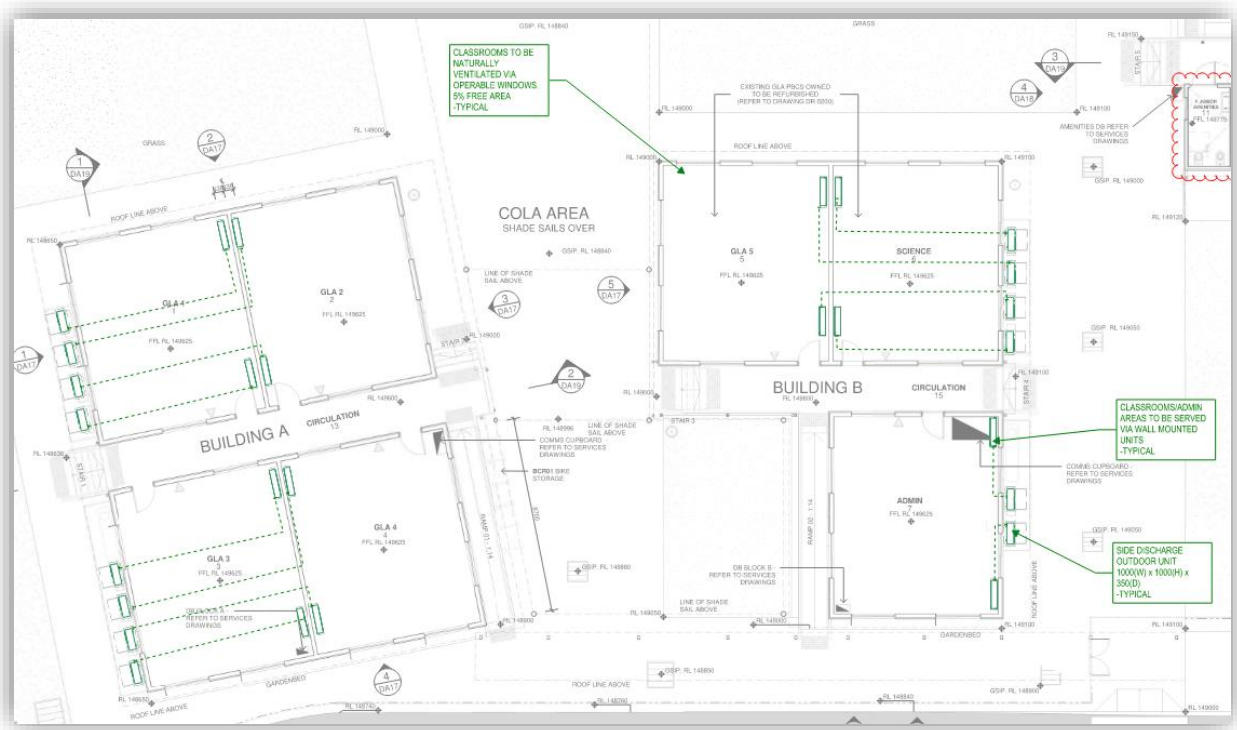


Figure 2 - A/C Fixtures

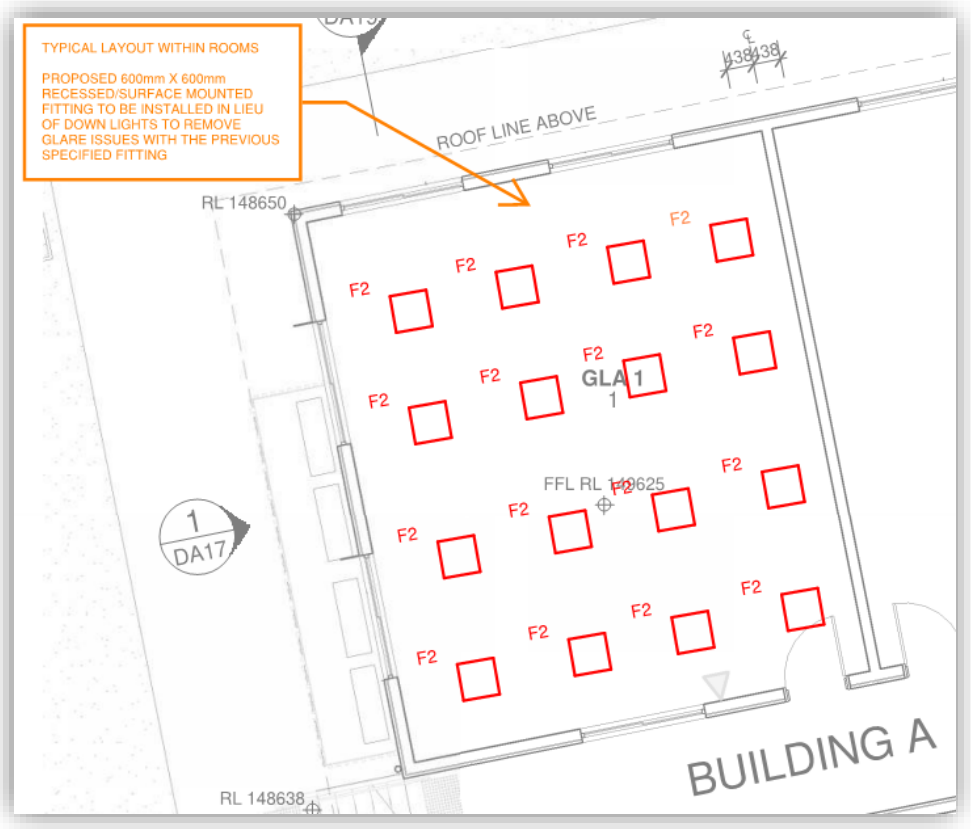


Figure 3 - Typical Lighting Fixtures

+ *SEPP SB Chapter 3.2(1)(d) & (e): 'the generation and storage of renewable energy' & ' the metering and monitoring of energy consumption'* demonstrated through J9 Facilities for energy monitoring and on-site distributed energy resources.

    - Section J9D5 detailed in section J report, accommodates for the future installation of solar photovoltaic panels and storage solutions. In addition, project must have an energy meter configured to record the time-of-use consumption of gas *(there is no gas to site as per BSE assessment)* and electricity.

2.2.2 Other Required Project Reports to address BS SEPP

The project is committed to meeting and exceeding, where possible, the standards of performance within Waste and water management plans, which addresses *SEPP SB Chapter 3.2(1)(a) & (f).*

+ *SEPP SB Chapter 3.2(1)(a): 'The minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials'* Addressed in *Waste Management Pla*n
    - A Waste management plan (WMP) will be put in place as a mechanism to monitor and ensure waste is evaluated into the appropriate streams and also as a result of ongoing operations from the development. Programs should be robust to ensure no crossover of waste types into landfill and recyclable waste.
+ *SEPP SB Chapter 3.2(1)(f): 'Minimisation of consumption of potable water'* Addressed in *Water Management Plan*
    - The reduction in water use will be established through high WELS rated water fixtures and fittings, and provision of rainwater capture and reuse system. Project will ensure a minimum water rating of 4 star, for water features that include taps, toilets, showers and any white-goods.

Design Summary

The design outlined in this report follows the guidelines of the BCA NCC 2022 & SB SEPP 2022 Chapter 3.2(1). This report provides a high-level overview of sustainable design principles incorporated into the design, as well as specific proposals for maximizing energy and water efficiency within the project.

Addressing the applicable sustainability objectives of the SB SEPP, the report incorporates strategies to achieve:

+ Effective passive design features, high-performance energy and water systems, sustainable construction practices and demonstrates how performance standards are achieved. These elements directly demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standard.

In summary, this report details the project's strategy to achieving the objectives and requirements outlined, including adherence to Section J of the NCC 2022 and other project management plans. The table below summarises how requirements are met with strategy and commitments. By fulfilling these commitments, the project will meet the criteria for sustainable performance.

Table 5 - Requirements and Strategy/commitments

SEARs Requirements	Strategy and/or Commitments
SB SEPP 2022 Chapter 3.2(1) (b-e)	2.2.1 NCC 2022 Volume One Section J Provisions + J4 Building Fabric – Addresses SEPP SB Chapter 3.2(1)(c) + J5 Building Sealing – Addresses SEPP SB Chapter 3.2(1)(c) + J6 Air-conditioning & ventilation systems - Addresses SEPP SB Chapter 3.2(1)(b) + J7 Artificial lighting & power - Addresses SEPP SB Chapter 3.2(1)(b) + J8 Heated water supply - Addresses SEPP SB Chapter 3.2(1)(b) + J9 Facilities for energy monitoring and on-site distributed energy resources - Addresses SEPP SB Chapter 3.2(1)(d) & (e)
SB SEPP 2022 Chapter 3.2(1) (a) & (f)	2.2.2 Other Required Project Reports to address BS SEPP + Waste management plan - Addresses SEPP SB Chapter 3.2(1)(a) + Water management plan - Addresses SEPP SB Chapter 3.2(1)(f)
If required: NABERS Embodied Emissions Material Form to disclose the amount of embodied emissions attributable to the development in accordance with section 35B of the EP&A Regulation.	Completed by the Building Quantifies Surveyor