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Sutherland Public School Hall (SPSH) Sustainability Report – REF Submission

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Sydney, 19th December 2024
Ref. No. 247069-S01

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Department of Education

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1.0 Introduction

1.1 Purpose of the REF

The purpose of this Review of Environmental Factors (**REF**) is to assess the proposed works to demolish the existing school Block J, car parking spaces and structures, removal of six (6) trees, and the construction of a new school hall and Covered Outdoor Learning Area (COLA), and document the likely environmental impacts and mitigation measures to be implemented. The proposed activity is located at 38-54 Eton Street, Sutherland NSW 2232 (the **site**), known as the Sutherland Public School (the **school**).

The REF has been prepared in accordance with the requirements of all potentially relevant NSW and Commonwealth legislation. The REF has been prepared in accordance with Section 3 of the *Guidelines for Division 5.1 Assessments – June 2022* (the **Guidelines**) and section 171A and 171(2) of the *Environmental Planning and Assessment Regulation 2021* (**EP&A Regulation**).

In doing so, it satisfies sections 1.7 and 5.5 of the *Environmental Planning and Assessment Act 1979* (**EP&A Act**), which requires a public authority to examine and take into account to the fullest extent possible, all matters affecting, or likely to affect, the environment by reason of the activity.

The assessment contained within this REF has been prepared having regard to:

- whether the proposed activity is likely to have a significant impact on the environment and therefore the necessity for an EIS to be prepared and approval sought from the Minister for Planning and Public Spaces under Part 5 Division 5.1 of the EP&A Act
- whether the proposed activity is likely to have a significant impact on the environment and therefore the necessity for a Species Impact Statement (**SIS**) and Biodiversity Development Assessment Report (**BDAR**) to be prepared
- the potential for the proposal to significantly impact *Matters of National Environmental Significance* (**MNES**) on Commonwealth land
- the need to refer the activity to the Australian Government Department of Environment and Energy for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**).

1.2 Proposal background

The proposed construction of a new school hall at the school is in alignment with the NSW Government's 2023–24 Budget, which has allocated $8.8 billion to fund the development and upgrading of schools across the state. This funding initiative reflects the government's commitment to investing in educational infrastructure to support growing communities and provide access to world-class public education. As part of this broader strategy, the proposed upgrades at the School aim to cater to the evolving needs of its student population and the wider school community.

2.0 The site

2.1 Site description

The site accommodates the Sutherland Public School which is located at 38-54 Eton Street, Sutherland, NSW 2232. The Sutherland Public School is approximately 1.35 hectares in area and is made up of the following 16 allotments:

- Lot 1 DP6600
- Lot 2 DP6600
- Lot 3 DP6600
- Lot 4 DP6600
- Lot 5 DP6600
- Lot 6 DP6600
- Lot 7 DP6600
- Lot 8 DP6600
- Lot 9 DP6600.
- Lot 10 DP6600
- Lot 5 Section 45 DP802
- Lot 6 Section 45 DP802
- Lot 7 Section 45 DP802
- Lot 8 Section 45 DP802
- Lot 9 Section 45 DP802
- Lot 10 Section 45 DP802

The proposed school hall is located within Lot 6, 7 and 8 DP 802 and has an area of approximately 957 sqm. Refer to **Figure 1**.
Vehicular access to the site is provided from Eton Street, Flora Street, and Merton Street, with parking spaces available along the northern and western sides of the site. Service vehicles and waste collection access the site through the Merton Street gate, which is located near the existing toilet block.

The site is currently zoned as SP2 Infrastructure (Educational Establishment) in the *Sutherland Shire Local Environmental Plan 2015* (**SSLEP 2015**). The site has a street frontage to Flora Street to the north, Merton Street to the east, President Avenue to the south and Eton Street to the west. These local roads include footpaths, street lighting and street trees along all frontages.
The area of works currently includes Block J, steel awning for existing COLA, a garden bed, trees, four car parking spaces and covered walkway structures which are proposed to be demolished to accommodate the new school hall.

Figure 1: School boundary in green, and the site in red
Source: Mecone MOSAIC

2.2 Site locality

The site is within close proximity to Sutherland Town Centre, surrounding high density residential development and also within 400 metres to Sutherland Railway Station. The school is also located within proximity to childcare and early learning facilities, which includes an existing childcare facility at the Minerva School, Moore Street Early Education Centre, St Patricks Catholic Church, Sutherland Presbyterian Church, Sutherland Shire Council Family Day Care, and Sutherland Child Care Centre. There are also two schools located directly adjacent to Sutherland Public School, which are Minerva School to the south and St Patricks Catholic School to the east.
There are multiple bus stops located along President Avenue and East Parade, in proximity to the Sutherland Railway Station. Public bus routes operating within 400m vicinity of the site include 961, 962, 965, 969, 976, 991 and M92.

2.3 Site hazards and environmental constraints

Acid Sulfate Soils
The site is not classified as acid sulfate soils.
Contamination
Investigation of the site identified some contamination in soils. This will be managed through a site remediation and environmental management strategy (refer to the Detailed Site Investigation Report for further details.)
Stormwater and Flooding
The site is not identified as flood prone land and is not subject to flood related development controls.
Bushfire Prone Land
The site is not classified as bushfire prone land.
Flora and Fauna

The site is not classified as having biodiversity values.

Aboriginal Heritage

The survey of the site concluded no Aboriginal sites were identified and therefore there is low archaeological potential.

European Heritage

The site contains the following two heritage items of local significance, as identified under the SSLEP 2015:

- Item#3614 – known as 'Former Sutherland Intermediate High School building (now part of Sutherland Primary School)' and located at 38–54 Eton Street (Lots 6-10 Section 45 DP 802)
- Item #3618 – known as 'Sutherland Primary School, including original building and grounds', Flora Street (corner of Eton and Merton Streets) and located at Lot 5 Section 45 DP 802 and Lots 1–10 DP 6600.

The project will be carried out over one continuous construction period for the demolition and construction works.

This report for Review of Environmental Factors has been prepared in accordance with the following requirements:

- Government Resource Efficiency Policy (GREP)
- Sustainable Buildings State Environmental Planning Policy (SEPP 2022)
- SINSW Educational Facilities Standards & Guidelines (EFGS v2.0)
- National Construction Code of Australia (NCC 2022)
- NSW Environmental Planning and Assessment Regulation 2021

2.4 Documents Reviewed

The following documents have been reviewed to inform the assessment contained in this report:

Table 1: Documents reviewed for REF report

Discipline	Document Name	Revision	Date
Architecture	For Contract Documentation	A	13/12/24
Mechanical	Schematic Design Report	0	29/11/24
Electrical and Lighting	Draft Schematic Design Report	1	02/12/24
Acoustic	Noise and Vibration Impact Assessment for Review of Environmental Factors	1	17/12/24
European Heritage Impact Assessment	Summary Report of Initial Site Investigations	Final	15/11/23

3.0 Need and Alternatives

3.1 Strategic need for the proposal

The addition of a dedicated school hall will serve as a versatile space for various different activities and events. It will provide students, staff, and families with a venue to celebrate achievements, host assemblies, and conduct cultural, educational, and extracurricular activities. This facility is designed not only to enrich the educational experience but also to foster a sense of community and belonging.
The upgrades proposed by the NSW Department of Education (**DoE**) reflect a targeted investment in the region's growth, ensuring that infrastructure keeps pace with the population and demographic of the area. By improving facilities at Sutherland Public School, the project aims to create an environment that supports quality education and enhances student welfare. These enhancements align with the Department's broader objectives to equip public schools with modern, functional spaces that meet contemporary teaching and learning standards.
The construction of the new school hall is part of a forward-thinking approach by the NSW Government and the DoE to ensure that schools like Sutherland Public School remain well-equipped to serve their communities now and into the future. This project is in line with the commitment to provide students with access to facilities that inspire learning, celebrate achievements, and support their overall development.

3.2 Alternatives and options

Three alternative options were identified by DoE to address the lack of dedicated space for gatherings, events, extracurricular activities, and weather-proof assembly space, and improve school facilities. These were considered against a base case or do-nothing option.
A summary of the key elements of scope and assumptions of likely outcomes and impacts arising from each of the options is provided below.

3.2.1 Base Case: status quo

The Base Case assumes that the School would continue to operate using its existing buildings, infrastructure and facilities. Key elements of this scenario include:

- no additional school infrastructure will be built
- students and staff will continue to use existing facilities for assemblies, events and other gatherings
- no dedicated indoor space for large-scale activities, such as performances, presentations or inclement weather gatherings. The existing hall in Block A is undersized and cannot accommodate large groups of students, such as for school assemblies
- continued reliance on makeshift or outdoor areas for key events
- increasing maintenance costs over time due to wear and tear on existing facilities.

Under the Base Case, the school is likely to face ongoing challenges due to the lack of a purpose-built space for assemblies and events. The limited facilities may lead to disruptions during bad weather, reduced opportunities for extracurricular programs, and a potential decline in student engagement and community involvement. The operational efficiency and the quality of student experience may also suffer. Over

time, the absence of proper facilities may make it difficult for the school to cater to a growing student population.

3.2.2 Option 1: construct a new school hall

This option involves the construction of a modern, purpose-built school hall to accommodate assemblies, performances, and other school and community events. Key features include:

- a dedicated indoor space with capacity for the entire school community
- improved audio-visual and stage facilities for performances, presentations, and meetings
- a weather-protected space for events during inclement weather
- opportunities for enhanced extracurricular activities, such as music, drama, and sports programs
- potential to serve as a community resource for after-school events.

This option provides a long-term solution to the school's infrastructure challenges, significantly enhancing the learning environment and the school's ability to engage the broader community. The school hall would offer flexibility for a wide range of activities, improving student welfare, operational efficiency, and staff satisfaction. While the upfront cost may be significant, the long-term benefits outweigh the investment, especially given the growing population and increased demand for modern facilities.

3.2.3 Option 2: install a temporary modular hall

This option involves installing a prefabricated modular structure to serve as a temporary hall. Key elements include:

- a lower-cost, semi-permanent solution to address immediate needs
- reduced construction time compared to a permanent hall
- limited capacity and features compared to a permanent structure
- maintenance and replacement costs after 10-15 years of use.

While a temporary modular hall provides a short-term solution, it lacks the functionality, durability, and capacity of a permanent structure. The limited lifespan and ongoing maintenance requirements make it less cost-effective over time. This option could be considered as an interim solution but does not address the school's long-term needs.

3.2.4 Option 3: repurpose an existing building

This option involves retrofitting and repurposing an existing structure on school grounds to serve as a hall. Key aspects include:

- utilisation of existing space, potentially reducing costs compared to new construction
- retrofitting existing buildings to meet the requirements of a school hall
- limited scope and flexibility, as the repurposed structure may not fully meet the school's needs
- potential disruption during the retrofitting process.

While repurposing an existing building may reduce costs, it is unlikely to fully meet the functional requirements of a modern school hall. The limited flexibility and

potential for increased maintenance costs make this option less favourable. It may also result in the loss of space currently used for other purposes.

3.3 Options assessment

Constructing a new multi-purpose hall offers the most comprehensive solution, addressing both the immediate and long-term needs of the school. While it requires higher initial investment, the benefits to the school community in terms of improved facilities, student engagement and operational efficiency justify the cost. Options 2 and 3 could be considered if funding constraints arise, but they lack the long-term benefits and capacity of a purpose-built hall.

4.0 Project Activity

4.1 Activity outline

The project will address the existing undersized hall facility at Sutherland Public School, by providing an upgrade to achieve a medium primary school core facility according to the DoE Educational Facilities Standards and Guidelines (EFSG).
This will include demolition of existing Block J, a garden bed, car parking spaces and associated structures, and construction of a new single-storey school hall, including a covered outdoor learning area (COLA) and connecting covered walkways.
The proposal retains the existing staff and student capacity at Sutherland Public School.

4.2 Project scope of activity

The proposed activity includes the following works:

- demolition of existing Block J, garden bed, four car parking spaces and structures (refer demolition plan prepared by BKA Architecture)
- removal of six trees
- construction of a new multi-purpose school hall, including canteen/kitchenette, OOSH office, amenities, and storage
- relocation of existing COLA to the east of the school hall
- civil works as per the Civil Engineering Plan prepared by Enstruct.

The area of proposed activity is shown in **Figure 2** below. Additional technical drawings are provided within the civil package at **Appendix 3**. There is road opening works along Eton Street for connection to Council's stormwater system and installation of a new mains power supply. The proposal may also include some trenching works along Eton Street for utility services.

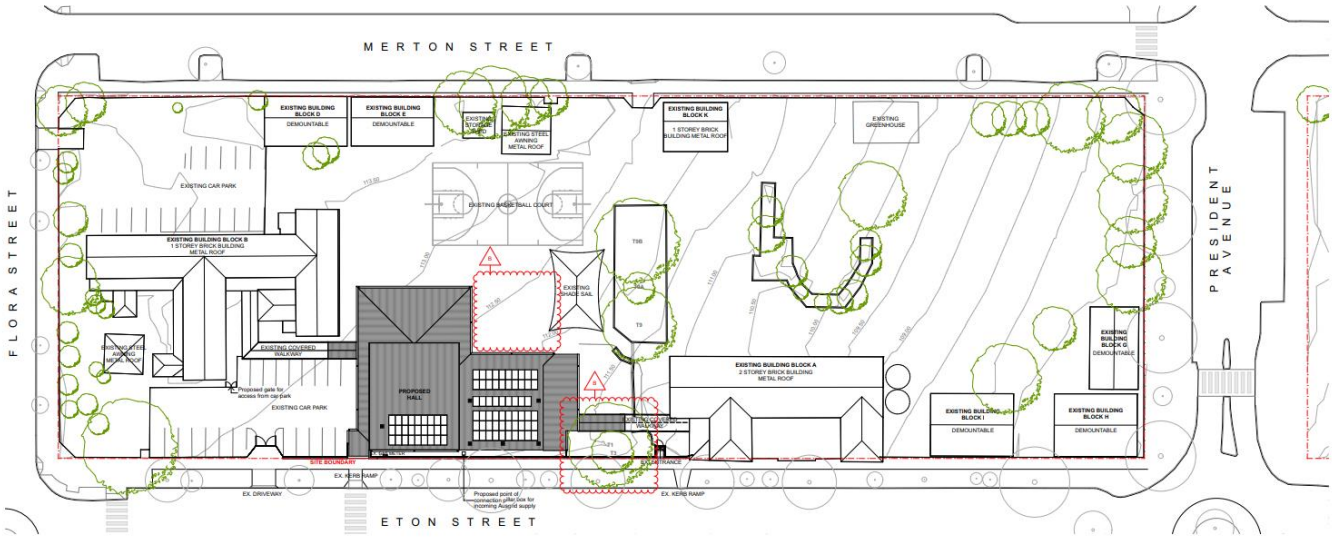


Figure 2: Proposed Site Plan
Source: BKA Architecture

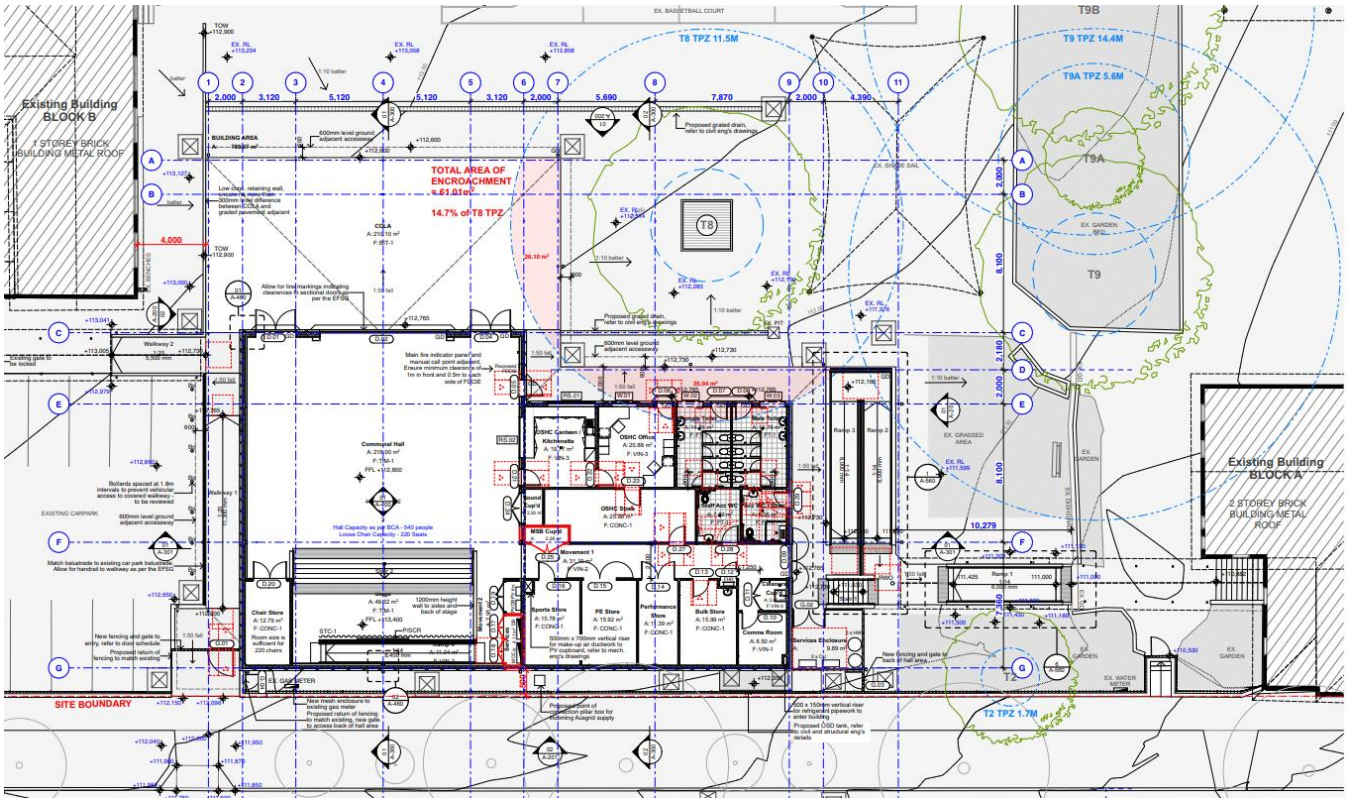


Figure 3: Proposed Ground Level Plan
Source: BKA Architecture

The Proposal will involve the construction and operation of a new multi-purpose school hall at the site, which involves the following works:

- A multi-purpose school hall.
- A covered COLA space to the east of the hall.
- The Hall building will include OSHC canteen, office and store areas along with amenities spaces and storage spaces for sports equipment and other miscellaneous items.

Refer to the Review of Environmental Factors prepared by Mecone for a full description of the works.

4.3 Physical layout and design

The proposed site layout responds to the existing site condition and has been developed with regard to functional requirements of the school hall.
The proposed school hall and COLA is located towards the north-western side of the site. The school hall has a height of 7.5m, which is consistent with NSW Government Education Department's Educational Facilities Standards and Guidelines and is compliant with section 3.37 of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (**T&I SEPP**). Refer **Figure 4** below.
The school hall includes storage areas, amenities, disabled WC and shower, OOSHC office/store, canteen and associated store/office, covered walkways, landscaping and COLA within an area of 985 sqm.
The proposed school hall is sited to provide the following setbacks to the adjoining street frontage and buildings:

- 1.5m setback from the western property boundary along Eton Street
- 4m setback from Block B to the north to the COLA for the new hall.

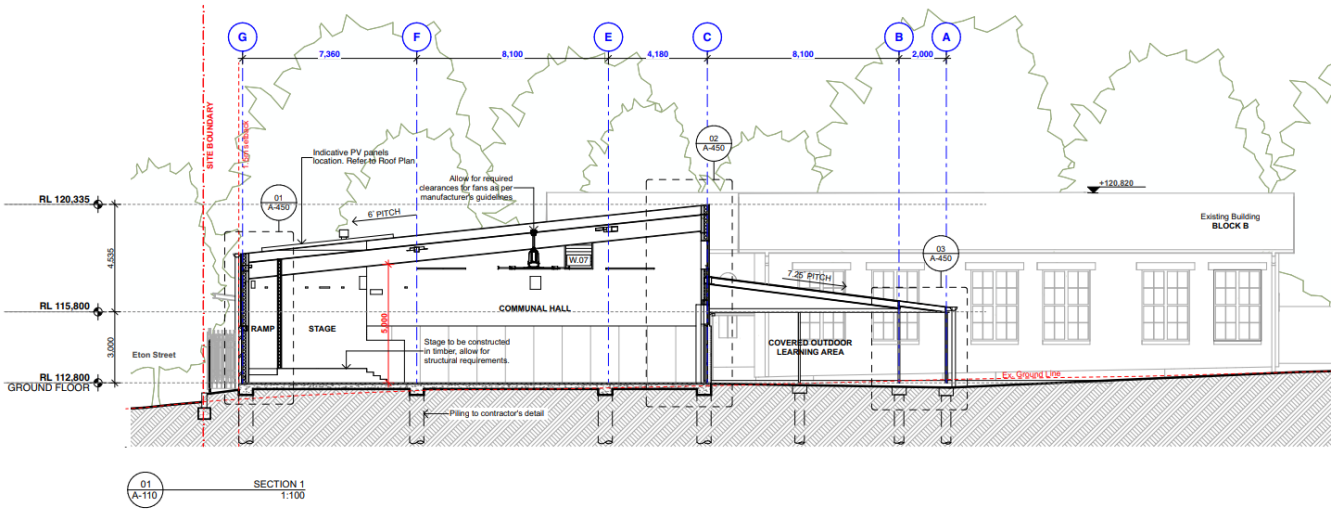


Figure 4: Proposed Section
Source: BKA Architecture

4.4 Need for the Activity

This project is intended to improve the facilities for the students and staff at Sutherland Primary School, as the new multi-purpose hall will be used as an indoor sport venue and for occasional school events, for example school assemblies.

5.0 REF Reporting Requirements & Responses

This section addresses the REF requirements issued for the project as well as the requirements of the SEPP Sustainable Buildings 2022. The requirements and the associated responses are outlined in the following Table 2, along with corresponding references to sections within this report.

5.1 Response to Section 171 of the EP&A Regulation 2021

The relevant environmental factors that are applicable to the proposed activity are outlined in the following table, with a corresponding response.

Table 2: REF Requirements and Relevant Responses and References

Item	REF Requirement	Project Response & Report Reference
1.0	Any environmental impact on a community (social, economic or cultural)	**Section 2.1** The indoor multi-purpose hall will improve facilities for students at Sutherland Primary School. **Section 4.1** Preserve integrity of Heritage Site.
2.0	the effects on any locality, place or building that has— (i) aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance, or (ii) other special value for present or future generations	**Section 4.2** Heritage site
3.0	Any risk to the safety of the environment	**Section 4.2** Climate change Risk assessment and Adaptation measures
4.0	Any reduction in the range of beneficial uses of the environment	**Section 5** Mitigation measures
5.0	Any pollution of the environment	**Section 4.3** Passive design strategies for IEQ **Section 4.4, 4.5** Net-zero by 2050 Goal, Green Energy **Section 4.7** Water consumption management **Section 4.9** Embodied Carbon emissions reduction

6.0	Any environmental problems associated with the disposal of waste	**Section 4.8** Construction and Operational waste management
7.0	Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply	**Section 4.4, 4.5** Reduction in energy demand, Net-zero by 2050 Goal, Green Energy **Section 4.6** Metering and Monitoring of energy and water use to formulate targeted demand-reduction approach.

5.2 Project response to Section 3.2 (1) of the State Environmental Planning Policy (Sustainable Buildings) 2022

This section has been prepared to address the relevant development consent requirements outlined in Chapter 3.2 (non-residential development) of the State Environmental Planning Policy (Sustainable Buildings) 2022. The following table summarises the requirements:

Table 3: Project response to SEPP SB 2022

Clause No.	SEPP SB 2022 Chapter 3.2 Requirement	Section of report where response is provided
3.2 (1)	(a) the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials	Refer to **Section 4.8**: minimisation of waste.
3.2 (1)	(b) a reduction in peak demand for electricity, including through the use of energy efficient technology	Refer to **Section 4.4**: Reduction in peak demand for electricity.
3.2 (1)	(c) a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,	Refer to **Section 4.3**: Passive design below.
3.2 (1)	(d) the generation and storage of renewable energy,	Refer to **Section 4.5**: Energy efficiency for details on the on-site electricity generation systems.
3.2 (1)	(e) the metering and monitoring of energy consumption,	Refer to **Section 4.6**: Metering and monitoring.
3.2 (1)	(f) the minimisation of the consumption of potable water.	Refer to **Section 4.7**: Minimise potable water consumption.
3.2 (2)	The embodied emissions attributable to the development have been quantified.	Refer to **Section 4.9**: Embodied emissions.

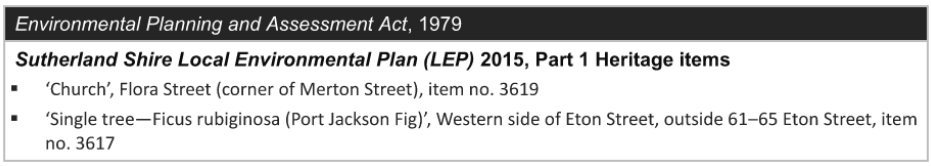
6.0 Sustainability Approach

The following sustainability initiatives are being considered for the design in consultation with SINSW Sustainability team and governing guidelines such as GREP, SEPP, EFSG V2.0 and NCC. Relevant design documentation and reports to support these strategies have been developed and shared with the design team to inform the requirements for the following design phase and subsequent construction stage, where it will be the responsibility of the contractor to implement the targeted strategies.

6.1 Impact on Site

The activity is located on the existing school site with a local heritage listing. The design team has been recommended that the hall design should be sympathetic to the heritage buildings around. Development of the school (particularly at the north-eastern portion of the school site) has been designed carefully to prevent any visual impact on the church opposite, particularly the church spire (bell tower) which has landmark significance. European Heritage Impact Assessments were conducted as part of the site investigation.

Beyond the buildings, a 'single tree – Ficus rubiginosa' along the western side of Eton Street is also considered item of local heritage significance. The landscape strategy has been developed to enhance the environmental performance of the land, to meet or improve beyond its existing condition, including integration of native plant species and incorporation of water sensitive urban design features to passively manage storm water across the site and enhance biodiversity.


Environmental Planning and Assessment Act, 1979

***Sutherland Shire Local Environmental Plan (LEP)* 2015, Part 1 Heritage items**

- 'Church', Flora Street (corner of Merton Street), item no. 3619
- 'Single tree—Ficus rubiginosa (Port Jackson Fig)', Western side of Eton Street, outside 61–65 Eton Street, item no. 3617

Figure 5: Local Heritage items in proximity of the activity site. (Source: European Heritage SRISI Document)

6.2 Resilience

The project has identified and developed strategies to increase the resilience of the proposed activity in response to potential risks arising from climate change.

The latest available global climate models show that in the coming decades, Australia is projected to experience the following:

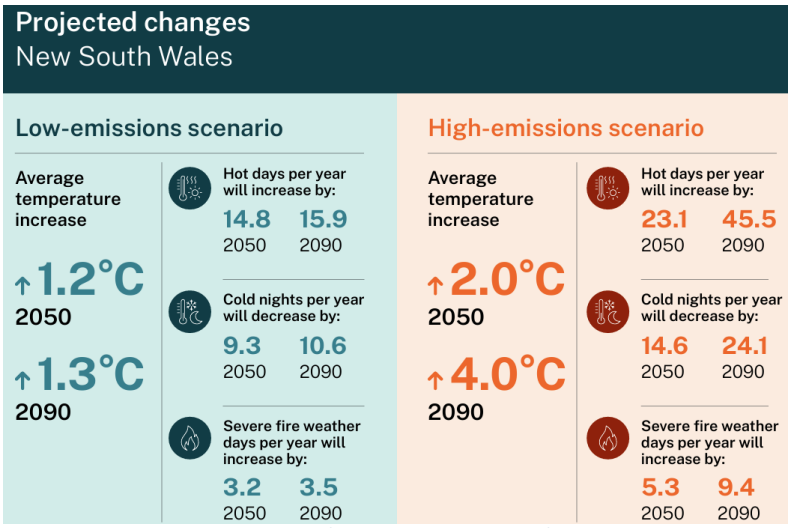


Figure 6: Summary diagram of climate projections for NSW. Source: NARCLiM 2 Climate Change Snapshot / NARCliM2-Snapshot-NSW.pdf

The below climatic variables have been considered to develop a resilience strategy for the school.

- Temperature
- Precipitation
- Fire weather/Bushfires
- Drought
- Flood
- Solar Radiation
- Relative Humidity
- Evapotranspiration
- Soil Moisture
- Wind
- Sea-level rise
- Cyclone

A Climate change workshop has been conducted during the design stage to discuss the Climate Change impacts/ risks on the design and to assess how the design and services strategy will respond to future expected climate conditions or develop risk mitigation strategies.

The table below summarises the list of climate change risks and a review of how the design has addressed these risks. The climate change risks/ impacts in the table below are gathered from Adapt NSW and Steensen Varming has developed the responses against each upon discussion with all the design consultants during the climate change workshop.

Table 4 List of climate change risks and design responses (Source: AdaptNSW and Steensen Varming)

Climate Impact	Risk	Response / Design Considerations
 Increase in **hailstorms**	Blocking gutters / Damage to buildings / Injury to visitors	**Passive design optimisation** to reduce impact of extreme temperatures
 Increase in **extreme hot days and average temperatures**	Stress on electricity network / **blackouts** Increased **internal temperatures** Greater **energy consumption** Higher **peak loads** Accelerated **degradation of materials.**	**Redundancy** built into cooling capacity. **Durable materials** selection **Mechanical System** to be able to respond to extreme temperatures.
 Increased **drought duration**	Restrictions to **water supply** **Damage to landscape** and higher maintenance costs	**No water-based heat rejection** to be used **On-site efficiency measures** to reduce potable water demand **Drought resistant planting** selection
 Increased **fire weather**	**Smoke from bushfires** causing health impacts **Damage to powerlines** impact supply	**Back-up power** systems & **onsite generation** **Filtration** for air intakes into buildings.
 Increased **rainfall variability** **And flooding**	**Damage to buildings**, landscape, and infrastructure. **Flooding impacts**	**Sustainable urban drainage** features will capture, treat, store stormwater, and reduce outflow. **Predictive / forecast management** of water storage
 Increased **storm intensity**	Blowing debris causing property damage and safety risks Interruption of waste collection services	**Durability** of materials selection **Predictive management** planning in even of large storm events

Key Climate Change risk mitigation strategies considered for the proposed new high school includes:

- Passive Design Optimisation: Increased thermal performance of the building envelope, Shading, daylight improvement, natural ventilation enhancement, etc.
- Active design systems: mixed mode control for internal comfort to reduce the energy demand, LED light fixtures with time switches, occupancy sensors and photo sensors are proposed to control lighting when and where appropriate, Energy Monitoring System (EMS) to be provided to monitor the energy usage across the project.
- Reduced stormwater runoff through rainwater harvesting from roofs which would contribute to the existing rainwater collection tanks. This recollected

water is to be used for irrigating selection of native species with low water demands.
- As part of the community resilience initiative, under the 'Share Our Space' program launched by SINSW, if needed, the schools could serve as a place of refuge in case of a natural calamity.

6.3 Passive design

The following passive design initiatives have been considered for the project:

- Considering the activity is for a new school hall, glazing has been strategically placed in spaces which can allow for more relaxed environmental conditions and that can benefit from access to daylight, views and natural ventilation.
- Acoustic design provided with the mitigation measures to help hall door and windows to be kept open if the noise level within the hall is managed to stay below 80dB(A), to assist with the natural ventilation.
- Daylight provision to all spaces to improve visual comfort and in minimising the use of artificial lighting. Detailed daylight simulations have been undertaken as part of the Environmental Sustainability Design (ESD) scope of works, to document daylight compliance with regulations and EFSG V2.0 guidelines. Around 57% of the primary occupied space is designed to receive at least 160 lux due to daylight, for around 80% of the nominated hours.
- Where required the windows are designed to have appropriate shading or be of high performance to control heat gains and glare.
- The building fabric is designed to achieve 10% improvement over the minimum deemed to satisfy (DTS) façade performance requirements under NCC 2022 Section-J. A Section-J assessment report has been prepared by Steensen Varming and shared with the design team.
- The control system and related lighting equipment are to facilitate various moods and provide high flexibility and adaptability to cater for different uses and events and future changes in function. Time switches, occupancy sensors and photo sensors are suggested to be used to control lighting when and where appropriate.

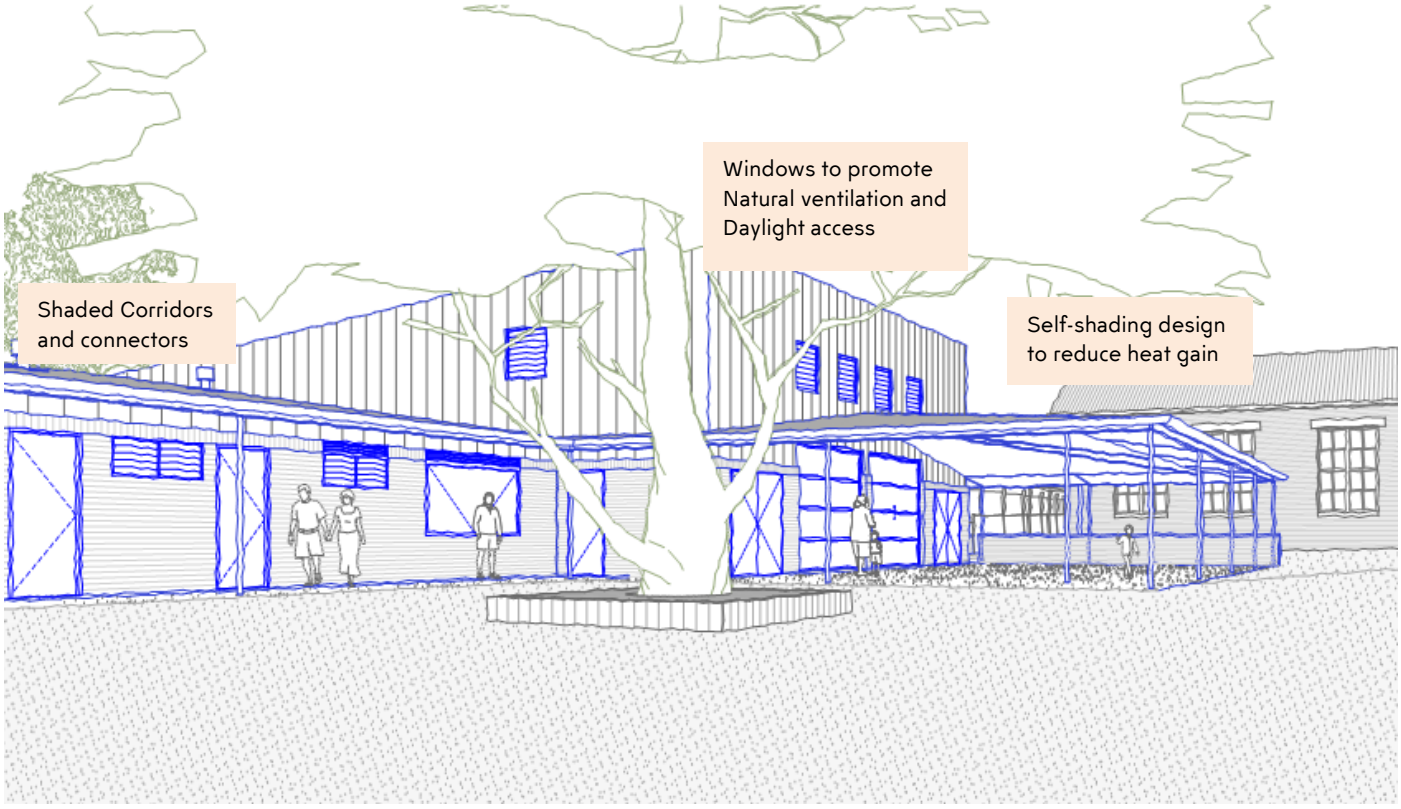


Figure 7: Passive design strategies for the New high school for Schofields and Tallawong

6.4 Reduction in peak demand for electricity

The following energy efficient design features are being considered in the current design, to reduce peak demand for electricity.

- To supplement the natural ventilation strategy for the main hall, ceiling mounted fans are to be installed to implement a mixed mode ventilation strategy to ensure thermal comfort during peak summer days.
- The mechanical ventilation system applies CO2 monitoring in main hall to activate the fans upon exceedance of the CO2 threshold. This approach works in conjunction with the natural ventilation strategy in providing a high level of indoor air quality and a smooth transition between natural and mechanical ventilation, leading to reduced energy consumption.
- Electric lighting is designed to be comprised of high efficiency LED technology. Lighting within the multi-purpose hall consists of suspended direct LED luminaires and flexible stage lighting.
- The lighting control system and related lighting equipment are to facilitate various moods and provide high flexibility and adaptability to cater for different uses and events and future changes in function. Time switches, occupancy sensors and photo sensors are suggested to be used to control lighting when and where appropriate.
- An Energy Monitoring System (EMS) will be applied to monitor the energy usage across the project. The energy and water usage data are available to staff and can be used to inform the students thereby assisting them in understanding of the consumption patterns, leading to improved, more resource-conscious user behaviour.
- A 25kW capacity PV panel array system has been proposed along the North & South roof.

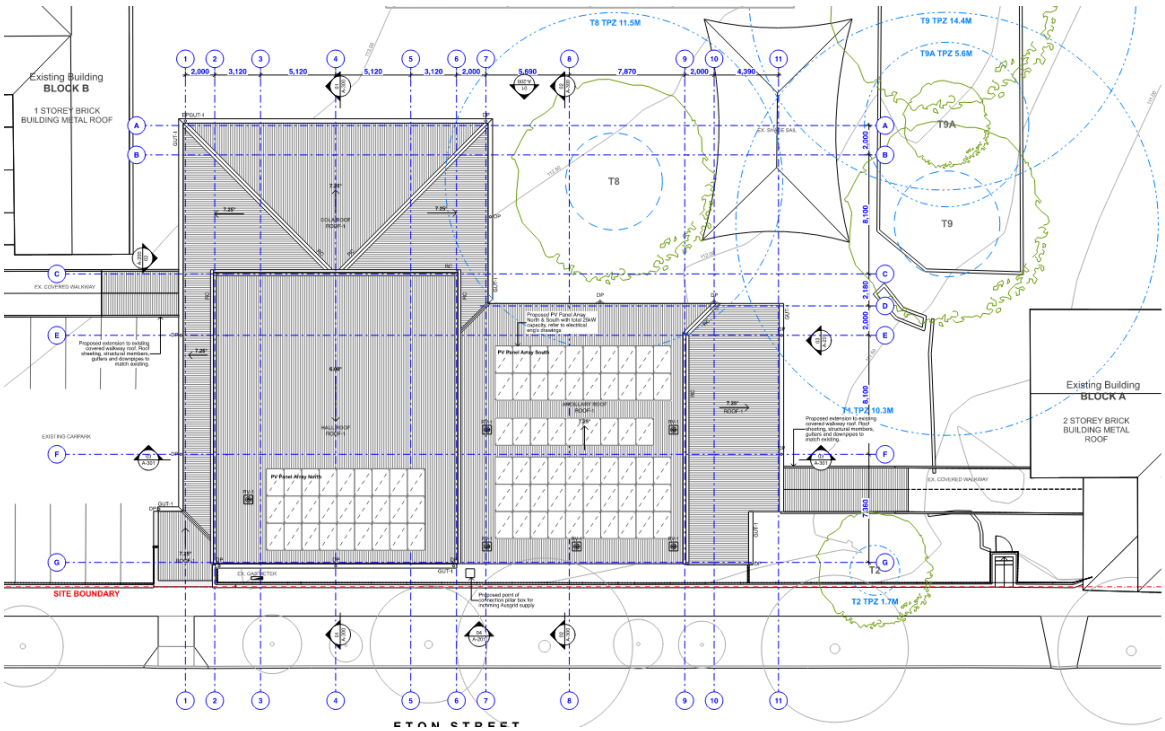


Figure 8: Provision of Solar Panels to provide renewable energy

- Passive strategies detailed in Section 4.3 will also contribute towards reducing peak demand as cooling loads will be lower.
- The project is targeting a minimum 10% improvement over NCC 2022 Section-J energy efficiency requirements.

6.5 Energy efficiency

Aligning with the NSW Government commitment to achieving net-zero emissions by 2050 and halving emissions by 2030, the activity is designed to endeavour for optimized energy efficiency and reduction in GHG emissions. Refer to Appendix A for the Net-Zero Energy Statement.

The proposed approach to sustainability and energy related systems is based on applying an “energy hierarchy” methodology.

This methodology has the reduction of energy use as its priority and then seeks to meet the remaining energy demand by the most efficient means available, before the inclusion of on-site generation and procurement of green power.

Figure 9 Energy Hierarchy

The following initiatives are being considered for the project's energy generation and storage capabilities.

- Currently, a 25kW PV system has been incorporated into the design. Further, a spatial allowance will be made in the architectural design of each building, to ensure an area of at least 20% of the roof space is available for PV installation. This is in accordance with the minimum deemed-to-satisfy (DTS) requirements of NCC Section-J.
- The main switchboard will be designed in accordance with NCC 2022 Section-J requirements, to allow for PV and future battery installation.
- The PV supply is connected to the main switchboard so the surplus energy, if available, could be shared with adjacent buildings.

6.6 Metering and Monitoring of Energy Consumption

The following initiatives are being considered, to enable metering and monitoring of energy consumption of the project.

- A BMS system as per NCC requirements will be included in the project.
- The Energy Monitoring System (EMS) will be applied to monitor the energy usage across the project. The energy usage data will be available to the staff and could be used to inform the students thereby assisting in their understanding of their consumption patterns, leading to improved, more resource-conscious user behaviour.

6.7 Minimise Potable Water Consumption

The following hierarchy alongside the Educational Facilities Standards & Guidelines (EFSG) has been considered as the basis of water strategies/ initiatives implemented within the proposed activity.

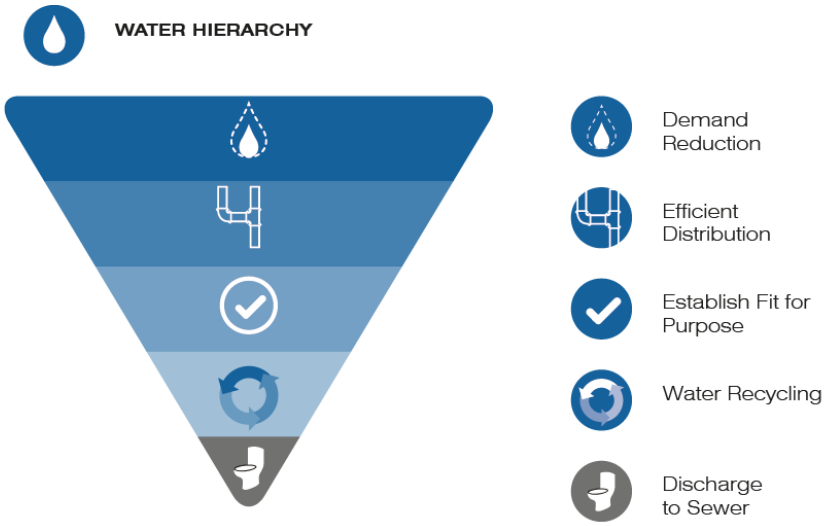


Figure 10 Water Hierarchy

The following initiatives are being implemented in the current design, to minimise the project's potable water consumption.

- Water efficient fixtures and fittings, such as taps, showerheads, toilets, zip taps, dishwashers etc certified under the WELS rating scheme will be specified for the project.
- For rainwater collection and stormwater management, the design team reviewed the existing campus provisions. The new sports hall shall contribute to the existing rainwater collection tank and stormwater management system without straining their capacity.
- The rainwater collected shall be used for irrigation purpose to reduce the load on potable water consumption.
- Efficient water management through an automatic water meter monitoring system will be installed.

6.8 Minimisation of waste

The activity is targeting the following waste-related ESD strategies for the contractor to implement during construction:

- The builder or head contractor will be contractually required to have an environmental management system in place to manage impacts of construction activities on the site.
- The builder or head contractor will develop and implement an environmental management plan to cover the scope of construction activities.
- The builder diverts at least 90% of construction and demolition waste from landfill.

For operational waste management, the activity shall endeavour to implement guidelines provided in the SINSW Waste Handbook. The project has been designed for the collection of separate waste streams and the design will ensure safe and efficient access to waste and storage areas for both occupants and waste collection contractors.

6.9 Embodied Emissions Reporting

As part of the Sustainable Buildings SEPP, a NABERS Embodied Emissions Material form is required to be prepared by the quantity surveyor for the project and will be submitted as a stand-alone document, at the post-approval stage as a part of the mitigation measures.

The embodied emissions material form would disclose the quantities and types of materials proposed for the project to inform on the amount of embodied emissions attributable to the activity. This is to contribute towards developing a benchmarking tool for the industry.

To support a reduction in the embodied emissions for the project, the following recommendations have been made to the design team taking inspiration from EFSG and recognised industry standards such as Green Star Guidelines:

- Material reduction through efficient design layouts, structure and façade.
- Prioritising prefabricated and modular components
- Specification of low carbon materials
- Sourcing of local products and implementing 'Responsible Procurement' policies as guided by Green Star Buildings v1
- Substitution of raw materials with recycled or reclaimed alternatives
- Design for disassembly & repurposing of demolition waste

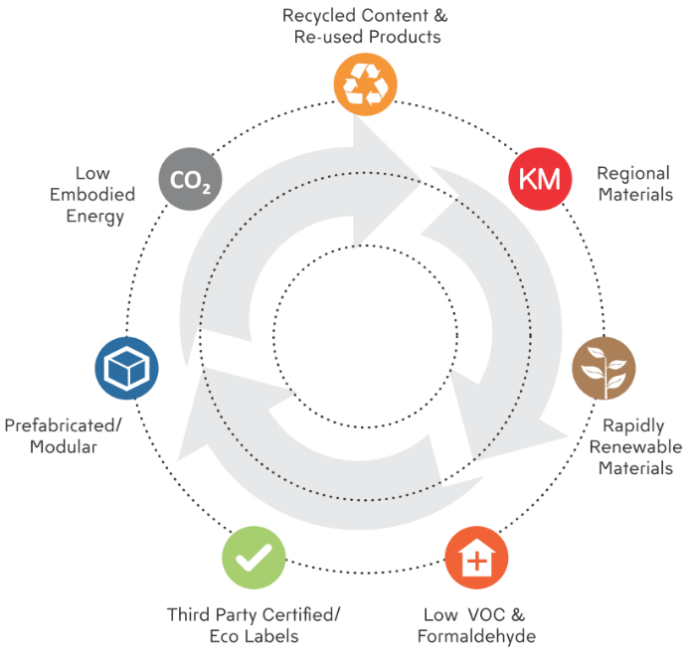


Figure 11 Material selection strategies

7.0 Mitigation Measures

The table below shows the key mitigation measures for the sustainability requirements of the activity and at what stage the measure is to be resolved:

Table 5: Key Mitigation Measures for the activity

PRE-CONSTRUCTION		
Mitigation Number/ Name	**Mitigation Measure**	**Reason for Mitigation Measure**
Formal Green Star Certification / Green Star Buildings v1 / 5 Star	A holistic approach to sustainability must be implemented, by addressing the requirements from Green Star Buildings framework, which is representative of an Industry Best-practice outcome.	To ensure the environmental performance and Indoor Environmental Quality of the building performs beyond the minimum regulatory compliance standard and achieves a high-performance outcome.
Passive design	The final building design must achieve high levels of daylight and natural ventilation.	To reduce operational energy consumption and also contribute towards reduction of Greenhouse Gas Emissions.
Reduction in energy demand	The following strategies must be incorporated: CO2 sensors for mechanical systems to activate fans when needed. LED lighting fixtures must be provided with Passive Infrared Occupancy sensors. Sub-meters must be provided for monitoring and preparing targeted approach for future optimization.	To reduce the energy demand and move towards the Department of Education's Net-Zero Energy target.

CONSTRUCTION		
Mitigation Number/ Name	**Mitigation Measure**	**Reason for Mitigation Measure**
On-site renewable energy generation	A 25 kW Photovoltaic system must be incorporated in the design.	To enable the project to contribute towards the Department of Education's Net-Zero Energy target.
Minimise potable water consumption	Certified WELS rated water fixtures to reduce wastage of water. Tapping into the existing rainwater collection and storage to meet non-potable water demand.	To reduce the stress on natural resources and water demand.
Embodied Reporting	▪ Must implement environmentally friendly materials and responsible procurement to reduce the stress on virgin materials. ▪ Must divert 90% of the construction waste from landfill	To align with Sustainable Buildings SEPP and Green Star guidelines to drive a sustainable design and operational building.
OPERATION		
Mitigation Number/ Name	**Mitigation Measure**	**Reason for Mitigation Measure**
Formal Green Star Certification / Green Star Buildings v1 / 5 Star	For operations, meter, measure and monitor the building performance to address the requirements from Green Star Buildings framework, which is representative of an Industry Best-practice outcome.	The environmental performance and Indoor Environmental Quality (IEQ) of the building must be maintained to perform beyond the minimum regulatory compliance standard and achieve a high-performance outcome. Conduct post-occupancy audits as part of facilities management to monitor building performance.
Embodied Reporting	Potential waste streams that would occur during the operational stage must be identified, and a 'reduce-reuse-recycle' strategy must be implemented.	To align with Sustainable Buildings SEPP and Green Star guidelines to drive sustainable operation of the building.

8.0 Conclusion

The proposed construction of new school hall and COLA at the Sutherland Public School is subject to assessment under Division 5.1 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting, or likely to affect, the environment by reason of the proposed activity.
As outlined in this REF, the proposed activity can be justified on the following grounds:

- it responds to an existing need within the community
- it generally complies with, or is consistent with all relevant legislation, plans and policies
- it has minimal environmental impacts
- adequate mitigation measures have been proposed to address these impacts.

The activity is not likely to significantly affect threatened species, populations, ecological communities or their habitats, and therefore it is not necessary for a Species Impact Statement and/or a BDAR to be prepared. The environmental impacts of the proposal are not likely to be significant. Therefore, it is not necessary for an EIS to be prepared and approval to be sought for the proposal from the Minister for Planning and Public Spaces under Division 5.2 of the EP&A Act. On this basis, it is recommended that the department determine the proposed activity in accordance with Division 5.1 of the EP&A Act subject to the implementation of mitigation measures identified within this report.

9.0 Appendices

9.1 Appendix A- NCC (2022) Section-J Report

9.2 Appendix B- Net-Zero Energy Statement

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STEENSEN VARMING

Mechanical and Electrical Services Schematic Design - Net Zero Energy Statement

Sutherland Public School Hall (SPSH), NSW

Sydney, 20th December, 2024
Ref. No. 247069 CER S00 [00]

Chris Arkins
Director

chris.arkins@steensenvarming.com
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This Net Zero Energy Statement accompanies an Environmental Impact Statement (EIS) pursuant to Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act), in support of a Review of Environmental Factors (REF) Application for the proposed Sutherland Public School Hall, located 38-54 Eton Street, Sutherland NSW 2232.

This Net Zero Energy Statement has been prepared to address the relevant requirements under Section 3.4 of the NSW Sustainable Buildings State Environmental Planning Policies (SB SEPP) 2022, as defined under Section 35C of the Environmental Planning and Assessment Regulation 2021 (EP&A).

This statement addresses the Secretary's Environmental Assessment Requirements (SEARs) issued for the project, notably:

Ref. No.	SB SEPP Requirement	Section of Statement where response is provided
3.4	In deciding whether to grant development consent to development to which this section applies, the consent authority must consider whether the development will minimise the use of on-site fossil fuels, as part of the goal of achieving net zero emissions in New South Wales by 2050.	This Net Zero Energy Statement addresses this item.

We note that Steensen Varming are only engaged up to the completion of the Schematic design phase.

The following initiatives have been included in the design; however, it remains the responsibility of the appointed design and construct contractor to ensure these initiatives are designed in detail and implemented during the construction phase.

While the mechanical and electrical services have been designed to be fossil fuel-free by way of being all-electric systems, it remains the responsibility of School Infrastructure NSW (SINSW) to procure 100% renewable electricity in enabling a net zero emissions operation. This is in accordance to the NSW Department of Education's commitment to sustainability and net zero emissions in operation as per goal-5 of their "Our 9 goals to 2030" initiative.

This allows the project to be capable of operating at net zero emissions once 100% renewable electricity is procured by Schools Infrastructure NSW, in line with the 1st January 2030 target, set out by NSW Department of Education (NSW DoE) and the SB SEPP target set out for 1st Jan 20250.

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On-site Fossil Fuel Usage

The mechanical and electrical services strategy for the proposed activity has been designed to be all-electric from day 1 of operation. Also, all refrigerants for the mechanical systems are specified to have an Ozone Depletion Potential (ODP) of zero.

The electrical services design incorporates electric power outlets to serve the following equipment (provided by others) - domestic hot water heaters and kitchen equipment.

Passive Design Features

The following passive design features have been integrated in order to minimise energy consumption.

- The buildings' orientation is considerate of the site's constraints, solar exposure, and overall functionality requirements.
- The shading strategy has been developed in respect to the buildings' orientation and to minimise unwanted heat gains and associated energy consumption. The external shading design has aimed at maximising glare-free daylight ingress and as a result reducing the use of artificial lighting, use of cooling, and these systems' energy consumption.
- The façade has been designed in consideration of:
    - Daylight provision to all spaces to improve visual comfort and in minimising the use of artificial lighting. Detailed daylight simulations have been undertaken as part of the Environmental Sustainability Design (ESD) scope of works, to document daylight compliance with regulations and EFSG V2.0 guidelines. Around 57% of the primary occupied space is designed to receive at least 160 lux due to daylight, for around 80% of the nominated hours.
    - Efficient natural ventilation for the main hall to improve thermal comfort, indoor air quality, and to reduce the use of mechanical ventilation, thereby reducing energy consumption. The natural ventilation to the main multi-purpose hall is provided through the use of louvres, windows, and doors, with an effective opening area of minimum 6.25% of the floor area being served.
    - Building envelope designed for at least 10% improvement in thermal performance over the minimum compliance requirements of Section-J of the National Construction Code (NCC) 2022.

Technical Design Features

The following technical design features have been integrated into the design to minimise energy consumption.

- The air-conditioning system for the small office spaces is a variable refrigerant type of system which is considered the most suitable solution for the required space, and which delivers good efficiencies, particularly at lower thermal loads.
- To supplement the natural ventilation strategy for the main hall, ceiling mounted fans are to be installed to implement a mixed mode ventilation strategy to ensure thermal comfort during peak summer days.
- The mechanical ventilation system applies CO_2 monitoring in all spaces to activate the fans upon exceedance of the CO_2 threshold. This approach works in conjunction with the natural ventilation strategy in providing a high level of indoor air quality and a smooth transition between natural and mechanical ventilation, leading to reduced energy consumption.

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- The lighting fixtures are highly efficient LED (Light Emitting Diode) technology and the lighting for the main hall space will be programmed for automatic control.
- The lighting control system and related lighting equipment are to facilitate various moods and provide high flexibility and adaptability to cater for different uses and events and future changes in function. Time switches, occupancy sensors and photo sensors are suggested to be used to control lighting when and where appropriate.
- An Energy Monitoring System (EMS) will be applied to monitor the energy usage across the project. The energy and water usage data are available to staff and can be used to inform the students thereby assisting in their understanding of their consumption patterns, leading to improved, more resource-conscious user behaviour.

Renewable Energy Generation and Storage

The following initiatives have been implemented for the project's energy generation and storage capabilities.

- A 25-kW rated rooftop photovoltaic (PV) system has been designed to provide a portion of the project's electricity usage.
- Furthermore, a spatial allowance has been made to ensure a total of 20% of the roof space (including the above) is available for future PV installation, on each building.
- The main switchboard has been designed to allow for future battery installation.
- The PV supply is connected to the main switchboard so the surplus energy, if available, could be shared with adjacent buildings.

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Evidence

The following evidence has been provided to demonstrate electricity as the fuel source for mechanical services.

Document Reference Number	Description
Sutherland Public School – New Hall Mechanical Services Schematic Design Report	Excerpt from Mechanical Design Report outlining the HVAC system description, as being all-electric. Domestic hot water usage. No gas usage.

Excerpt from the Mechanical System Descriptions report.
Reference: 'Sutherland Public School – New Hall Mechanical Services Schematic Design Report'
Date: 20/12/2024
Revision: 0
Author: Alan Sharkey, Senior Associate, Steensen Varming

3.0 Mechanical Services

3.1 Mechanical Systems Overview

A summary of the mechanical systems serving this building are as follows:

Systems	Description (serving the Hall)
Air conditioning systems	**Admin office/kitchen areas**: Cassette type heat VRF reverse cycle heat recovery system air conditioners providing simultaneous heating and cooling. **High heat Load rooms/ Communications rooms:** Dedicated DX air conditioning split systems. These systems require outdoor plant space for their associated outdoor condenser units.
Smoke hazard management system	The stage currently has an area less than 50m². Therefore, does not require a dedicated smoke exhaust system. Mechanical systems will shut down in accordance with NCC and AS 1668.1 requirements.
Heating only systems	**Hall:** Electric radiant panel heaters. **Stage**: Electric radiant panel heaters
Mechanical Ventilation systems	A dedicated outside air supply grilles will be provided adjacent to indoor cassette type units when the flow rate is above 20 l/s due to the limitations of the direct duct connected size. Where outside air is shared over multiple indoor units a mechanical assisted fan and filter ventilation system will be provided. **Toilets, Stores, PV cupboard, Communications rooms, Kitchen hoods:** Mechanical extract ventilation systems will be provided in accordance with AS1668.2.
Natural ventilation	Natural ventilation is provided to the Hall. The windows/louvres will be manually operated except for any high-level openings in the hall. Opening must be based on the effective opening areas and not the structural openings.
Controls	1X weather and VOC stations, CO2 monitoring sensors, VOC sensors in selected areas. (Any energy metering and monitoring will be captured as part of the electrical services scope).

If a building becomes architecture, then it is art. Clearly, if a building is not functionally and technically in order, then it isn't architecture either – it's just a building.
Arne Jacobsen

Mechanical Engineering
Lighting Design
Sustainable Design
Electrical Engineering

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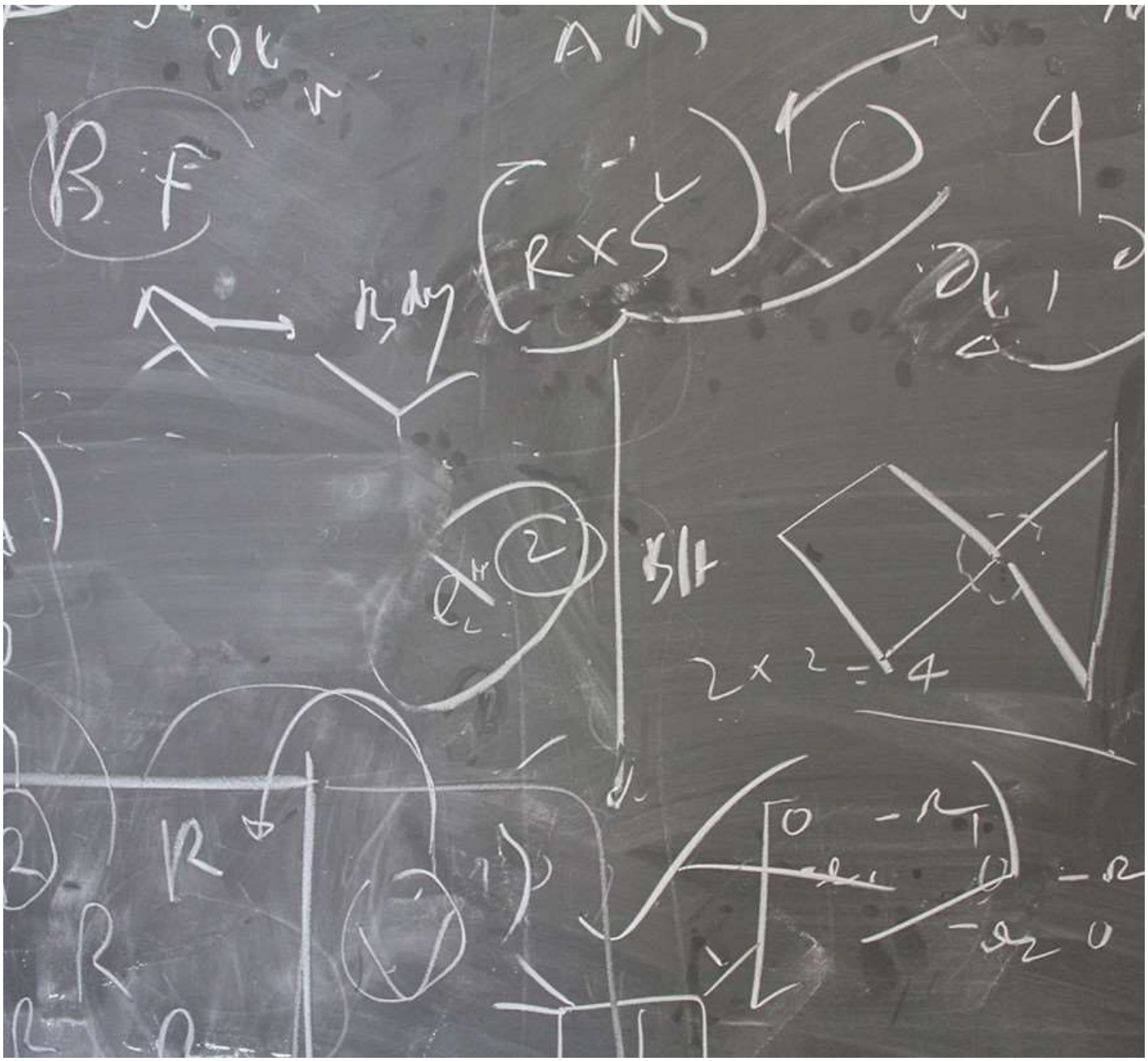
SUSTAINABILITY

STEENSEN VARMING

Sutherland Public School Hall
NCC (2022) Section-J Report



Document Revision and Status

Date	Rev	Issue	Notes	Checked	Approved
01/12/2024	00	Schematic Design	For information	DV	AS

Sydney December 1st , 2024
Project No. 247069

Suveera Kakkar
Sustainability Consultant

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Table of contents

1.0 Executive Summary

This report has been prepared by Steensen Varming, for the proposed Sutherland Public School Hall (SPSH) development. The purpose of the report is to present the assessment conducted on the proposed architectural design against the compliance requirements of Section-J (Energy Efficiency) of the National Construction Code 2022 (NCC 2022). This report outlines the minimum performance requirements for the proposed building envelope, in accordance with the 'Deemed to Satisfy' (DTS) approach of Section-J NCC 2022.

The objective of Section-J of NCC 2022 is to reduce greenhouse gas emissions by efficiently using energy in buildings. To achieve this objective, buildings must meet or exceed the minimum performance requirements outlined in Section-J. This report will specifically focus on the building envelope requirements of the 2022 NCC Section-J, Parts J1 to J5. (It is assumed that the relevant members of the design team will ensure compliance with the other component parts of Section-J6 to J9 and hence this report does not include details of these sub-sections).

1.1 Rationale for suggested compliance approach

In terms of the building envelope elements (external walls, roofs, ceilings, roof lights, external glazing, and floors) reviewed within this report, a simplistic compliance approach with the prescribed DTS requirements of the NCC has been deemed suitable. Compliance with the DTS requirements of Section-J is necessary, not only to ensure suitable energy performance characteristics for statutory compliance, but also because any departure from a DTS approach would bring with it the need to demonstrate compliance with the intent of Section-J, via alternative verification methods.

1.2 Scope

Within the NCC 2022, it is a requirement for Class 2 to 9 buildings to achieve efficient use of energy. This requirement is defined in Volume 1 of the NCC 2022 under Section-J and is titled "Energy Efficiency". There are nine Deemed-to-Satisfy subsections, J1 to J9, which focus on separate aspects of energy efficiency. These are:

- J1 – Energy efficiency Performance requirements
- J2 - Energy efficiency
- J3 - N/A
- J4 - Building Fabric
- J5 - Building Sealing
- J6 - Air Conditioning and Ventilation Systems
- J7 - Artificial Lighting and Power
- J8 - Heated Water Supply and swimming pool and spa pool plant
- J9 – Energy monitoring and on-site distributed Energy resources

This report provides advice on sub-sections J1 to J5 and will identify how compliance with the NCC 2022 can be achieved via the DTS pathway. It is assumed that the relevant design professionals will ensure compliance with the relevant

section of the code for their own disciplines, as Steensen Varming will ours. Demarcations of responsibilities are taken as follows:

- J1 – BKA Architecture in consultation with Steensen Varming
- J2 – BKA Architecture in consultation with Steensen Varming
- J3 – N/A
- J4 – BKA Architecture in consultation with Steensen Varming
- J5 – BKA Architecture in consultation with Steensen Varming
- J6 – Mechanical services consultant
- J7 – Lighting services consultant
- J8 – Hydraulics services consultant
- J9 – Electrical services consultant

1.3 Basis of assessment

This report has been prepared based on the following architectural drawings prepared by BKA Architecture :

Sr. No.	Drawing Numbers/ Package	Issue	Revision	Date of Issue
1	SD set Site Plan	Contract documentation 13/12/2024	B	13/12/2024
2	SD Set Roof Plan	Contract documentation 13/12/2024	A	13/12/2024
3	SD Set Elevations	Contract documentation 13/12/2024	A	13/12/2024

2.0 Minimum performance DTS requirements

The current Section-2 of this report presents a summary of the minimum performance requirements of Part J4 Building Fabric, in accordance with a DTS solution. Further details of Parts J1 to J5 are presented in Sections 4 to 7.

2.1 Proposed solution

In accordance with the DTS approach for Section-J, the following Table-1 presents a summary of the minimum thermal performance requirements for the project. The location and extent of each of the elements noted in Table-1 are indicated on Thermal markups prepared for the project, using the architectural drawings. Refer to Appendix B: Thermal markups.

Table 1 - Part J-4 Building Fabric assessment summary.

Section-J Sub-sections	Construction Element	NCC Section-J DTS Minimum Requirement	EFSG/Greenstar Requirement (DTS +10%)
PART J4D4 Roofs/Ceiling constructions	**Roof Constructions** *	R-Value: 3.2	R-Value: 3.52
PART J4D6 Walls and Glazing	**Walls**	R-Value: 1.4	R-Value: 1.4
	Internal Walls	R-Value: 1.4	R-Value: 1.4
	Glazing	U-Value: 5.8 SHGC: 0.81	U-Value: 5.8 SHGC: 0.81
	Roof skylights	No skylights	No skylights
PART J4D7 Floors	**Slab on ground**	R-Value: 2.0**	R-Value: 2.2**
	Suspended floor above or below a non-conditioned space	R-Value: 2.0	R-Value: 2.2

Since the WWR is quite low for the project hall and extensive shading, in order to meet the performance requirement of 10% better than the NCC DTS provision, the glazing solution of U-Value of 5.8 W/m^{2}K and an SHGC of 0.81 would suffice.

NOTE:

1. *Roof overhang beyond the building line is not required to meet the minimum performance requirements
2. Both internal and external walls that form part of the 'Thermal boundary' need to comply with Part J4D6
3. The thermal performance values from table above are applicable only for walls are glazing that are a part of the project's thermal boundary.

4. The performance values noted in the above table are total system R-values (i.e. for the entire construction assembly) and whole window (glazing and framing) system U-values.
5. **It is noted that the project sits on the ground and the ground floor slab has no in-slab heating or cooling system, thus considered to meet the requirement of R-2.2 for slab-on-ground insulation.

2.2 Air-tightness barrier

Part J1P1(e) of NCC 2022 Section-J relates to “the sealing of the building envelope against air leakage”. This is applicable to Class 2 to 9 buildings located in Climate zones 4, 5, 6, 7 and 8. It is therefore applicable to the Sutherland Public School Hall (SPHS) project as it is in Climate zone 5 and is classified as Class 9b.

According to NCC requirements; ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage. An air-tightness barrier should be allowed for in the architectural design, and the specific location and performance of the air-tightness barrier should be finalised in consultation with the façade engineers.

3.0 Classification

3.1 Building classification

As per the advice received from BCA Certifiers, the proposed project of SPHS, is classified as Class 9b, as 'sports venue or the likes' space category.

3.2 Basis of assessment

The image below highlights the extent of project boundary marked in red outline and with the total area for which the DTS assessment is being conducted.

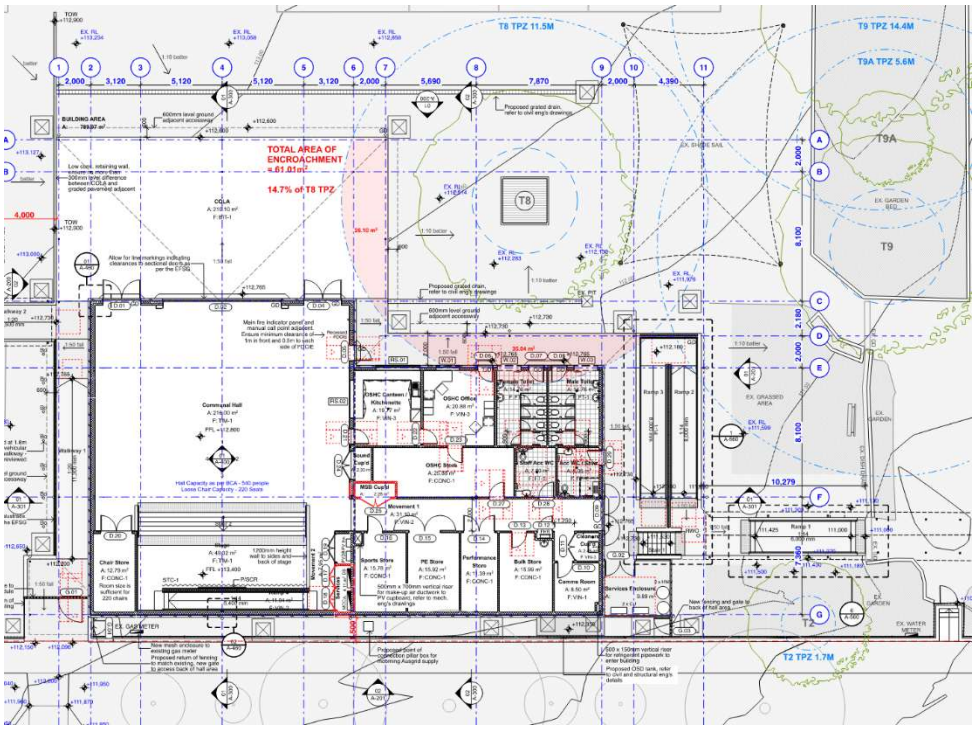


Figure 1- ***Ground Floor plan for multi-purposae hall for Sutherland Public School Hall***

3.3 Climate zone classification

The climate zone is defined by the NCC 2022 as an area for specific locations, having energy efficiency provisions based upon a range of similar climatic characteristics. According, to Figure A and Table 3 of the Definition schedule of NCC 2022, Sutherland is in Climate Zone 5.

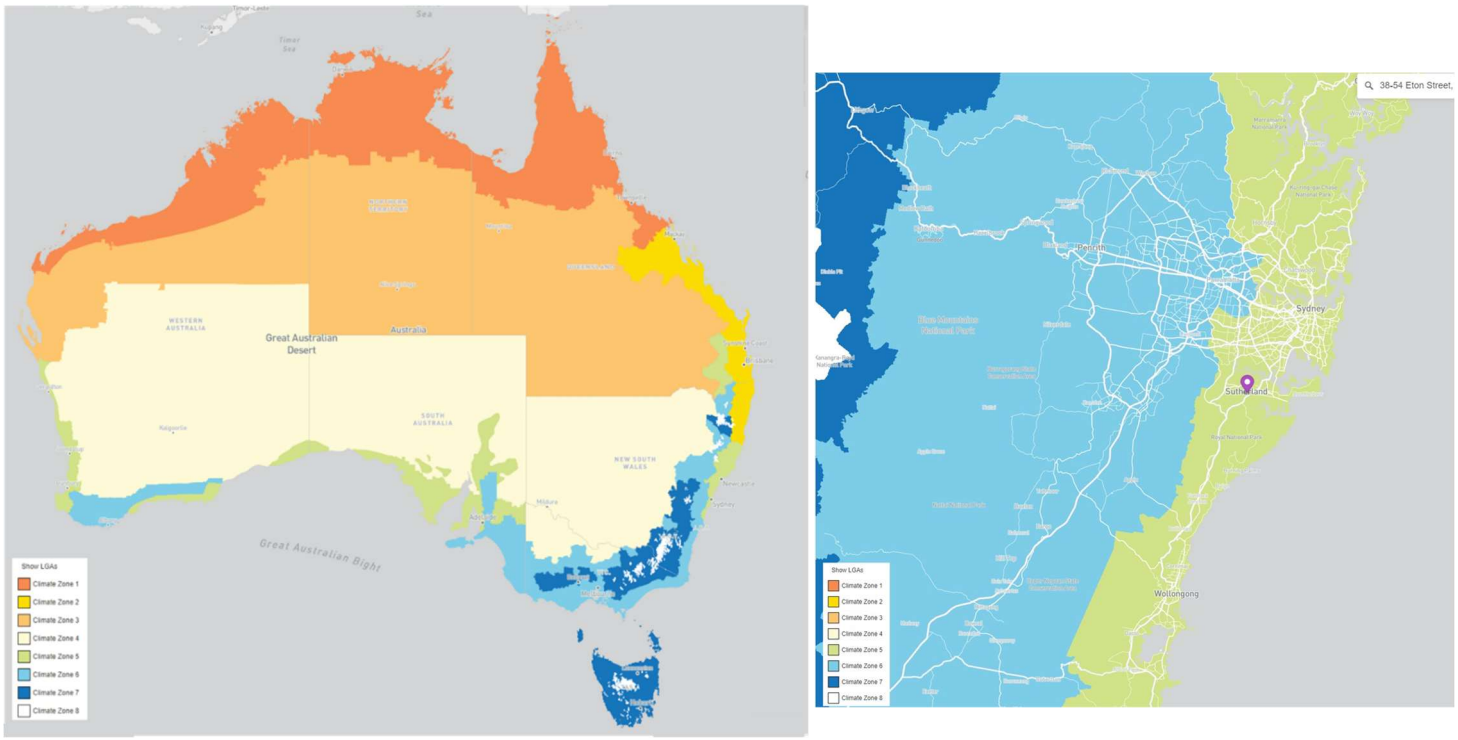


Figure 2: Climate Zone Classification Map marking Sutherland in Zone 5.
(Source: Climate Zone Map | ABCB)

4.0 Part J-1

Part J1 outlines the objectives of Section J of NCC 2022. The objectives are to:

(a) reduce energy consumption and energy peak demand; and
(b) reduce greenhouse gas emissions; and
(c) improve occupant health and amenity.

The above objectives must be satisfied by addressing the performance requirements of J1P1 and J1P4, applicable to the SPHS classification of Class 9b.

4.1 Performance requirements – Energy Efficiency

4.1.1 J1P1 Energy use

A building, other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, including its services, must have features that facilitate the efficient use of energy appropriate to —

(a) the function and use of the building; and
(b) the level of human comfort required for the building use; and
(c) solar radiation being—
    (i) utilised for heating; and
    (ii) controlled to minimise energy for cooling; and
(d) the energy source of the services; and
(e) the sealing of the building envelope against air leakage; and
(f) for a conditioned space, achieving an hourly regulated energy consumption, averaged over the annual hours of operation, of not more than—
    (i) for a Class 6 building, 80 kJ/m².hr; and
    (ii) for a Class 5, 7b, 8 or 9a building other than a ward area, or a **Class 9b school,** 43 kJ/m².hr; and
    (iii) for all other building classifications, 15 kJ/m².hr.

4.1.2 J1P4 Renewable energy and electric vehicle charging

A building must have features that facilitate the future installation of on-site renewable energy generation and storage and electric vehicle charging equipment.

To be addressed in the electrical services design documentation.

4.1.3 J1 Provisions that are not applicable

Provisions J1P2 and J1P3 are applicable only to a sole-occupancy unit of a Class 2 building or a Class 4 part of a building. Not applicable to the current project, that is classified as Class 9b.

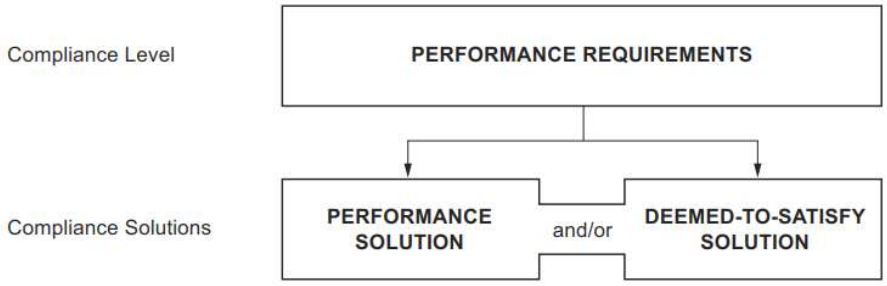
4.2 Proposed Compliance approach

As per Part A2 of NCC 2022, compliance with the NCC is achieved by complying with:

(a) the Governing Requirements of the NCC; and
(b) the Performance Requirements.

Performance Requirements are satisfied by one of the following:

(a) Performance Solution.
(b) Deemed-to-Satisfy Solution.
(c) A combination of (a) and (b).



NOTE 1:

For this project, the requirements of J1P1 and J1P4 have been addressed in the current design via a DTS pathway:

- For the building envelope: DTS requirements are noted in this document.
- For the renewable energy and electric vehicle charging refer to Electrical services documentation and specifications, in conjunction with the architectural drawings.

5.0 Part J-2 Energy efficiency

This Part sets out the application of the Deemed-to-Satisfy Provisions of Part J2.

5.1 Part J2D1 – Deemed-to-Satisfy Provisions

(1) Where a Deemed-to-Satisfy Solution is proposed, Performance Requirements J1P1 to J1P4 are satisfied by complying with—

(a) J2D2; and
(b) J3D2 to J3D15; and
(c) J4D2 to J4D7; and
(d) J5D2 to J5D8; and
(e) J6D2 to J6D13; and
(f) J7D2 to J7D9; and
(g) J8D2 to J8D4; and
(h) J9D2 to J9D5.

5.2 Part J2D2 – Application of Section-J

(1) For a Class 2 to 9 building, other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, Performance Requirement J1P1 is satisfied by complying with—

(a) Part J4, for the building fabric; and
(b) Part J5, for building sealing; and
(c) Part J6, for air-conditioning and ventilation; and
(d) Part J7, for artificial lighting and power; and
(e) Part J8, for heated water supply and swimming pool and spa pool plant; and
(f) J9D3, for facilities for energy monitoring.

6.0 Part J-4 Building Fabric requirements

6.1 Part J4D2– Application

As stated in the NCC 2022, in NSW, the DTS provisions of Part J4 apply to the building elements forming the envelope of a Class 2 to 9 building. Part J4 therefore applies to the SPHS project, that is comprised of spaces classified as Class 9b.

6.2 Part J4D3 – Thermal construction – General

6.2.1 DTS requirements

a) Where required, thermal insulation must comply with AS/NZS 4859.1 and be installed so that it:
   i. abuts or overlaps adjoining insulation, other than at supporting members such as studs, noggings, joists, furring channels and the like, where the insulation must be against the member; and
   ii. forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
   iii. does not affect the safe or effective operation of a *service* or fitting.

b) Where reflective insulation is to be installed in the wall and roof, the reflective insulation must be installed with –
   i. the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and
   ii. the reflective insulation closely fitted against any penetration, door or window opening; and
   iii. the reflective insulation adequately supported by framing members; and
   iv. each adjoining sheet of roll membrane being –
      A. overlapped not less than 50 mm; or
      B. taped together.

c) Where required, bulk insulation must be installed so that –
   i. it maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and
   ii. in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.

d) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification 36.

e) The required Total R-Value and Total System U-Value, including allowance for thermal bridging, must be
   i. calculated in accordance with AS/NZS 4859.2 for a roof or floor; or
   ii. determined in accordance with Specification 37 for wall-glazing construction; or

iii. determined in accordance with Specification 39 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces.

6.2.2 Proposed construction

All constructions including walls, window-glazing, ceilings, floors and roof developed by BKA Architecture, must meet the criteria laid out in the sections J4D2 to J4D7, in order to meet the minimum performance requirements prescribed in NCC 2022 Section-J.

6.3 Part J4D4 – Roof and ceiling construction

6.3.1 DTS requirements

a) A roof or ceiling must achieve a Total R-Value greater than or equal to:
   - **i.** in climate zones 1, 2, 3, 4 and **5, R3.7 for a downward direction of heat flow; and**
   - ii. in climate zone 6, R3.2 for a downward direction of heat flow; and
   - iii. in climate zone 7, R3.7 for an upward direction of heat flow; and
   - iv. in climate zone 8, R4.8 for an upward direction of heat flow.

b) In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.45.

6.3.2 Proposed roof and ceiling construction.

Architectural drawings documented by BKA Architecture have been reviewed, to identify the location and extent of roof and ceiling constructions that need to meet the thermal performance requirement of J4D4 (Refer: Marked-up plans in Appendix-B of this report).

6.4 Part J4D5 – Roof lights

6.4.1 DTS requirements

Roof lights must have:

(a) a total area of not more than 5% of the floor area of the room or space served; and

(b) transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of—
   (i) for Total system SHGC, in accordance with Table J4D5; and
   (ii) for Total system U-Value, not more than U3.9.

Table J4D5: Roof lights – Total system SHGC

Roof light shaft index Note 1	Total area of *roof lights* up to 3.5% of the *floor area* of the room or space	Total area of *roof lights* more than 3.5% and up to 5% of the *floor area* of the room or space
<1.0	≤ 0.45	≤ 0.29
≥ 1.0 to < 2.5	≤ 0.51	≤ 0.33
≥ 2.5	≤ 0.76	≤ 0.49

Table J4D5 Notes:

1) The roof light shaft index is determined by measuring the distance from the centre of the shaft at the roof to the centre of the shaft at the ceiling level and dividing it by the average internal dimension of the shaft opening at the ceiling level (or the diameter for a circular shaft) in the same units of measurement.
2) The area of a roof light is the area of the roof opening that allows light to enter the building.
3) The total area of roof lights is the combined area for all roof lights serving the room or space.

6.4.2 Proposed roof light constructions

As per the current architectural design, there are no roof lights proposed for this project. Hence, J4D5 requirements are not applicable to the project.

6.5 Part J4D6 – Wall and Glazing

6.5.1 DTS requirements

a) The Total System U-Value of wall-glazing construction must not be greater than:
   (i) for a Class 2 common area, a Class 5, 6, 7, 8 or **9b building** or a Class 9a building other than a ward area, **U2.0;** and
   (ii) for a Class 3 or 9c building or a Class 9a ward area—
      A. in climate zones 1, 3, 4, 6 or 7, U1.1; or
      B. in climate zones 2 or 5, U2.0; or
      C. in climate zone 8, U0.9.
b) The Total System U-Value of display glazing must not be greater than U5.8.
c) The Total System U-Value of wall-glazing construction must be calculated in accordance with Specification 37.
d) Wall components of a wall-glazing construction must achieve a minimum Total R-Value of—
   (i) where the wall is less than 80% of the area of the wall-glazing construction, R1.0; or
   (ii) where the wall is 80% or more of the area of the wall-glazing construction, the value specified in Table J4D6a.

Table J4D6a: Minimum wall Total R-Value - Wall area 80% or more of wall-glazing construction area

Climate zone	Class 2 common area, Class 5, 6, 7, 8 or 9b building or a Class 9c building other than a *ward area*	Class 3 or 9c building or Class 9a *ward area*
1	2.4	3.3
2	1.4	1.4
3	1.4	3.3
4	1.4	2.8
5	1.4	1.4
6	1.4	2.8
7	1.4	2.8
8	1.4	3.8

e) The solar admittance of externally facing wall-glazing construction must not be greater than—
   (i) for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area, the values specified in Table J4D6b; and
   (ii) for a Class 3 or 9c building or a Class 9a ward area, the values specified in Table J4D6c.

f) The solar admittance of a wall-glazing construction must be calculated in accordance with Specification 37.

g) The Total system SHGC of **display glazing must not be greater than 0.81** divided by the applicable shading factor specified in S37C7.

Table J4D6b: Maximum wall-glazing construction solar admittance - Class 2 common area, Class 5, 6, 7, 8 or 9b building or Class 9a building other than a ward area

Climate zone	Eastern aspect *solar admittance*	Northern aspect *solar admittance*	Southern aspect *solar admittance*	Western aspect *solar admittance*
1	0.12	0.12	0.12	0.12
2	0.13	0.13	0.13	0.13
3	0.16	0.16	0.16	0.16
4	0.13	0.13	0.13	0.13
5	0.13	0.13	0.13	0.13
6	0.13	0.13	0.13	0.13
7	0.13	0.13	0.13	0.13
8	0.2	0.2	0.42	0.36

Table J4D6c: Maximum wall-glazing construction solar admittance - Class 3 or 9c building or Class 9a ward area

Climate zone	Eastern aspect *solar admittance*	Northern aspect *solar admittance*	Southern aspect *solar admittance*	Western aspect *solar admittance*
1	0.07	0.07	0.10	0.07
2	0.10	0.10	0.10	0.10
3	0.07	0.07	0.07	0.07
4	0.07	0.07	0.07	0.07
5	0.10	0.10	0.10	0.10
6	0.07	0.07	0.07	0.07

Climate zone	Eastern aspect *solar admittance*	Northern aspect *solar admittance*	Southern aspect *solar admittance*	Western aspect *solar admittance*
7	0.07	0.07	0.08	0.07
8	0.08	0.08	0.08	0.08

6.5.2 Proposed wall and glazing construction

Wall-glazing construction, for the purposes of Section-J in Volume One, means the combination of wall and glazing components comprising the envelope of a building, excluding—

(a) display glazing; and
(b) opaque non-glazed openings such as doors, vents, fenestration and shutters.

For the SPHS project, the glazing and wall construction have been analysed and the performance requirements for each have been identified and presented in Appendix A.

- For the glazing elements, the facade contractor must ensure that the total system values (frame + glass) are in accordance with the minimum performance values noted in Appendix-A.

- Proposed wall constructions documented by BKA Architecture should meet and exceed the DTS requirements. Location and extent of wall insulation is indicated in Appendix-B of this report.

6.6 Part J4D7 – Floors

6.6.1 NCC requirements

a) A floor must achieve the Total R-Value specified in Table J4D7.
b) For the purposes of (a), a slab-on-ground that does not have an in-slab heating or cooling system is considered to achieve a Total R-Value of R2.0, except—
   (i) in climate zone 8; or
   (ii) a Class 3, Class 9a ward area or Class 9b building in climate zone 7 that has a floor area to floor perimeter ratio of less than or equal to 2.
c) A floor must be insulated around the vertical edge of its perimeter with insulation having an R-Value greater than or equal to 1.0 when the floor—
   (iii) is a concrete slab-on-ground in climate zone 8; or
   (iv) has an in-slab or in-screed heating or cooling system, except where used solely in a bathroom, amenity area or the like.
d) Insulation required by (b) for a concrete slab-on-ground must—
   (i) be water resistant; and
   (ii) be continuous from the adjacent finished ground level—
      A. to a depth not less than 300 mm; or
      B. for the full depth of the vertical edge of the concrete slab-on-ground.

Table J4D7: Floors – Minimum Total R-Value

Location	*Climate zone* 1— upwards heat flow	*Climate zones* 2 and 3 — upwards and downwards heat flow	*Climate zones* 4, 5, 6 and 7 — downwards heat flow	*Climate zone* 8 — downwards heat flow
A floor without an in-slab heating or cooling system	2.0	2.0	2.0	3.5
A floor with an in-slab heating or cooling system	3.25	3.25	3.25	4.75

Table notes:

- For calculating the Total R-Value of a floor, the sub-floor and soil R-Value must be calculated in accordance with Specification 39 or Section 3.5 of CIBSE Guide A.

6.6.2 Proposed floor construction

Refer to Appendix-B for thermal markups indicating the location and extent of the floor constructions that are required to achieve compliance with J4D7.

7.0 Part J5 – Building sealing

Part J5 of the NCC 2022 contains the requirements of the Deemed-to-Satisfy compliance for building sealing. The purpose of this subsection is to ensure that additional heating and cooling loads will not be introduced through building leakage.

7.1.1 J5D2 - Application

As stated by the 2022 NCC, Part J5D applies to Class 2 to 9 buildings in climate zone 6. Part J5, therefore applies to the proposed project.

7.1.2 J5D3 - Chimneys and Flues

The chimney or flue of an open burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue.

7.1.3 J5D4- Roof Lights

The Part J5D4 of the NCC Section-J requirements is not applicable to the proposed project, as there are no Roof lights.

7.1.4 J5D5– Windows and doors

The Part J5D5 of the NCC Section-J 2022 requirements is applicable to the proposed project. The requirements stated below, should be included in the architectural specifications.

a) A door, openable window or the like must be sealed:
   (i) when forming part of the envelope; or
   (ii) in climate zones 4, 5, 6, 7 or 8.

b) The requirements of (a) do not apply to:
   (i) a window complying with AS 2047; or
   (ii) a fire door or smoke door; or
   (iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.

c) A seal to restrict air infiltration:
   (i) for the bottom edge of a door, must be a draft protection device; and
   (ii) for the other edges of a door or the edges of an openable window or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.

d) An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, rapid roller door, revolving door or the like, other than:

(i) where the conditioned space has a floor area of not more than 50 m^2; or
(ii) where a café, restaurant, open front shop or the like has:
A. a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and
B. at all other entrances to the café, restaurant, open front shop or the like, self-closing doors.

e) A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like.

7.1.5 J5D6 – Exhaust fans

Exhaust fans when serving any conditioned space within the SPHS project, must be fitted with a sealing device such as a self-closing damper or the like, so as to comply with Part J5D6. Mechanical services consultant must include this requirement within the mechanical services specification.

a) An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving—
(i) a conditioned space; or
(ii) a habitable room in climate zones 4, 5, 6, 7 or 8.

7.1.6 J5D7 – Construction of ceilings, walls and floors

a) Ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage in accordance with (b):
(i) when forming part of the envelope; or
(ii) in climate zones 4, 5, 6, 7 or 8.

b) Construction required by (a) must be—
(i) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or
(ii) sealed at junctions and penetrations with—
A. close fitting architrave, skirting or cornice; or
B. expanding foam, rubber compressible strip, caulking or the like.

c) The requirements of (a) do not apply to openings, grilles or the like required for smoke hazard management.

7.1.7 J5D8 – Evaporative coolers

An evaporative cooler must be fitted with a self-closing damper or the like:
a) when serving a heated space; or
b) in climate zones 4, 5, 6, 7

8.0 Other Section-J requirements

8.1 Part J6 - Air Conditioning and Ventilations Systems

Mechanical services consultant to ensure compliance with Part J6 of the NCC 2022 and all subsections associated therein.

8.2 Part J7 – Artificial Lighting and Power

Electrical services consultant to provide a design solution compliant to Part J7 of the NCC 2022 and all subsections associated therein with regards to power.

8.3 Part J8 - Heated water supply and swimming pool and spa pool plant

Where applicable, the hydraulic services consultant and the Pool Engineer must provide a design solution compliant to Part J8 of the 2022 NCC.

8.4 Part J9 – Energy monitoring and on-site distributed energy resources

Where applicable, the electrical consultant must provide a design solution compliant to Part J9 of the NCC 2022 contains the requirements of the Deemed-to-Satisfy compliance for monitoring of Energy use and facilitate easy retrofit of renewable energy and electric vehicle charging equipment.

8.4.1 J9D2 - Application

As stated by the 2022 NCC, Part J9 applies to Class 2 to 9 buildings in climate zone 6. Part J9, therefore applies to the proposed SPHS project.

8.4.2 J9D3 Facilities for energy monitoring

(a) A building or sole-occupancy unit with a floor area of more than 500 m2 must have energy meters configured to record the time-of-use consumption of gas and electricity.
(b) A building with a floor area of more than 2 500 m2 must have energy meters configured to enable individual time-of-use energy data recording, in accordance with (c), of—

(i) air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and
(ii) artificial lighting; and
(iii) appliance power; and
(iv) central hot water supply; and
(v) internal transport devices including lifts, escalators and moving walkways where there is more than one serving
(vi) the building; and on-site renewable energy equipment; and
(vii) on-site electric vehicle charging equipment; and
(viii) on-site battery systems; and
(ix) other ancillary plant.

(c) Energy meters required by (b) must be interlinked by a communication system that collates the time-of-use energy
data to a single interface monitoring system where it can be stored, analysed and reviewed.

(d) The provisions of (a) do not apply to energy meters serving—
(i) a Class 2 building where the total floor area of the common areas is less than 500 m2; or
(ii) individual sole-occupancy units with a floor area of less than 2 500 m2.

8.4.3 J9D4 Facilities for electric vehicle charging equipment.

(a) Subject to (b), a carpark associated with a Class 2, 3, 5, 6, 7b, 8 or 9 building must be provided with electrical distribution boards dedicated to electric vehicle charging—
(i) in accordance with Table J9D4 in each storey of the carpark; and
(ii) labelled to indicate use for electric vehicle charging equipment.

(b) Electrical distribution boards dedicated to serving electric vehicle charging in a carpark must—
(i) be fitted with a charging control system with the ability to manage and schedule charging of electric vehicles in response to total building demand; and
(ii) when associated with a Class 2 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 12 kWh from 11:00 pm to 7:00 am daily; and
(iii) when associated with a Class 5 to 9 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 12 kWh from 9:00 am to 5:00 pm daily; and
(iv) when associated with a Class 3 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 48 kWh from 11:00 pm to 7:00 am daily; and
(v) be sized to support the future installation of a 7 kW (32 A) type 2 electric vehicle charger in—
A. 100% of the car parking spaces associated with a Class 2 building; or
B. 10% of car parking spaces associated with a Class 5 or 6 building; or

C. 20% of car parking spaces associated with a Class 3, 7b, 8 or 9 building; and

(vi) contain space of at least 36 mm width of DIN rail per outgoing circuit for individual sub-circuit electricity metering to record electricity use of electric vehicle charging equipment; and

(vii) be labelled to indicate the use of the space required by (vi) is for the future installation of metering equipment.

Table J9D4: Electric vehicle distribution board requirement for each storey of a carpark

Carpark spaces per *storey* for electric vehicles	Electrical distribution boards for electric vehicle charging per *storey*
0 - 9	0
10 - 24	1
25 - 48	2
49 - 72	3
73 - 96	4
97 - 120	5
121 - 144	6
145 - 168	7

8.4.4 J9D5 Facilities for solar photovoltaic and battery systems

(a) The main electrical switchboard of a building must—

(i) contain at least two empty three-phase circuit breaker slots and four DIN rail spaces labelled to indicate the use of each space for—

A. a solar photovoltaic system; and

B. a battery system; and

(ii) be sized to accommodate the installation of solar photovoltaic panels producing their maximum electrical output on at least 20% of the building roof area.

(b) At least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels, except for buildings—

(i) with installed solar photovoltaic panels on—

A. at least 20% of the roof area; or

B. an equivalent generation capacity elsewhere on-site; or

(ii) where 100% of the roof area is shaded for more than 70% of daylight hours; or

(iii) with a roof area of not more than 55m2; or

(iv) where more than 50% of the roof area is used as a terrace, carpark, roof garden, roof light or the like

9.0 Appendix-A Section-J assessment calculations

9.1 Appendix-A Wall and window area summary

After identifying the building's thermal envelope (Appendix B) a wall and window area calculation was conducted. A summary of these calculations for wall and window areas is included in the table below. The areas presented below formed the basis of Section-J DTS Assessment.

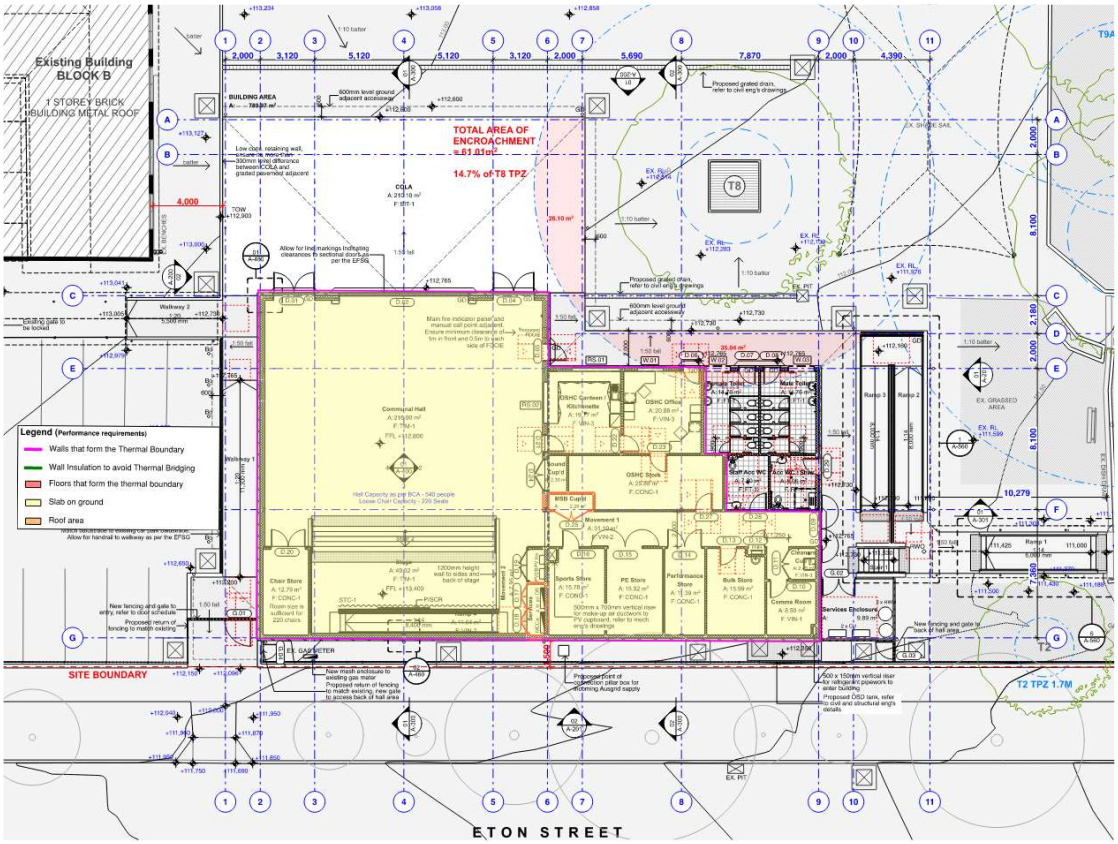
Wall & Window Areas				
Orientation	**Total Wall Area (m^2)**	**Total Window Area (m^2)**	**Effective Wall Area (m^2)**	**WWR (%)**
North	126.8	1.4	125.4	1.1%
South	92.8	1.4	91.4	0.9%
East	155.1	15.9	139.2	10.3%
West	176.4	0	176.4	0%

The areas noted above for walls and windows for each orientation formed the basis for the DTS assessment. Areas for both walls and windows were input in the Section-J DTS calculator to determine the project's thermal performance requirements, as summarised in Table 1 under section 2.1 of this report.

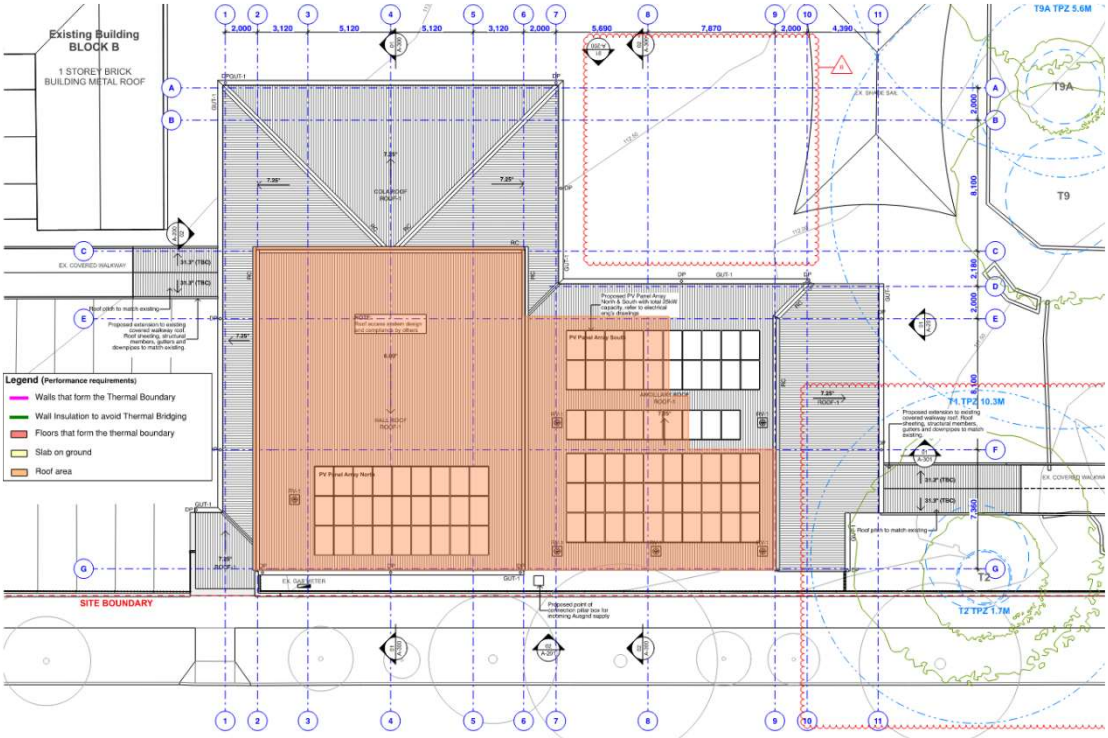
9.2 Appendix-B Thermal Lines for opaque construction

The Appendix-B provides mark-ups of thermal lines which indicate thermal insulation location and type, for the opaque and transparent construction components of the Thermal Envelope (i.e., Roof, floors, windows and walls).

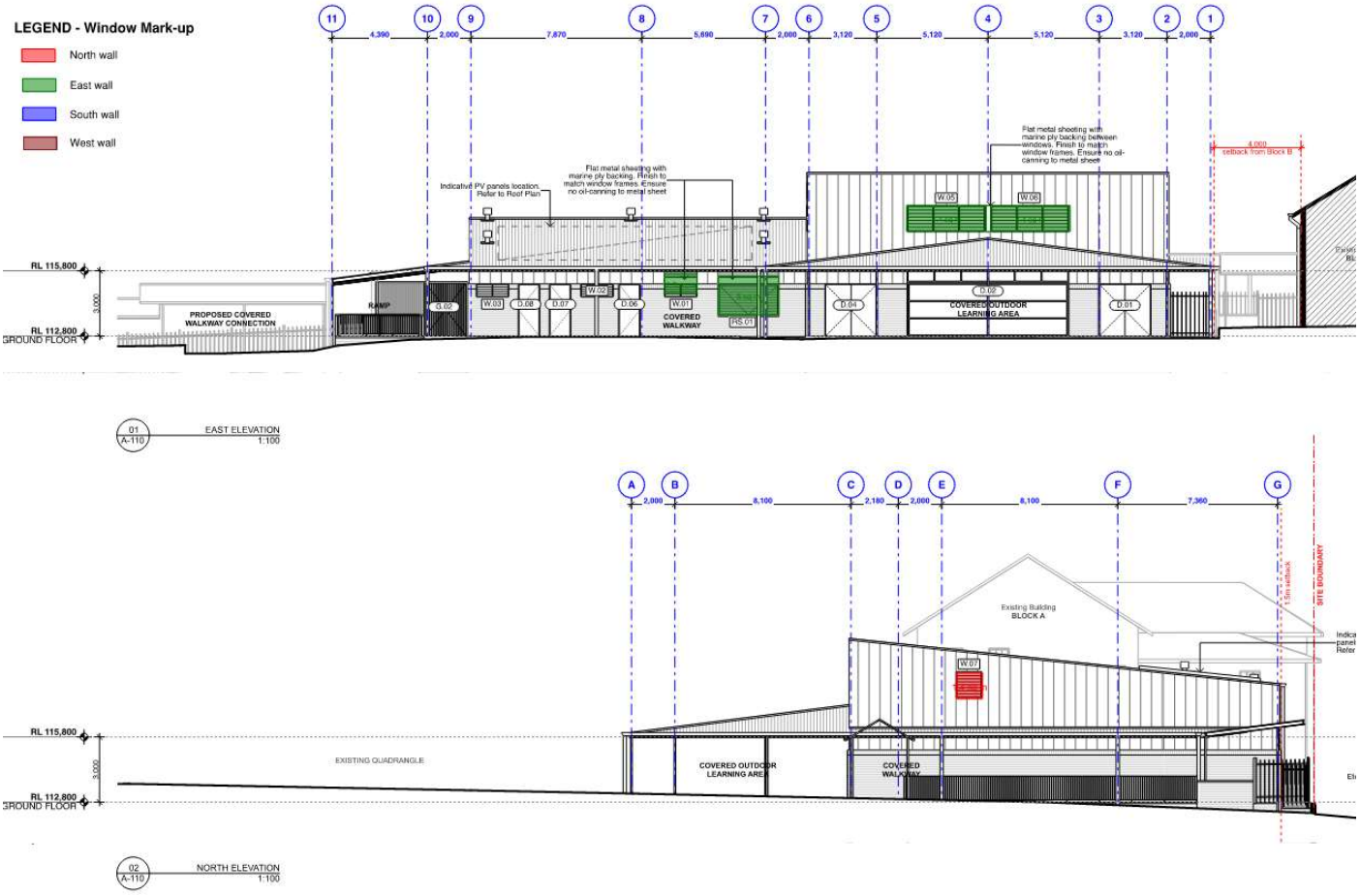
GROUND FLOOR PLAN

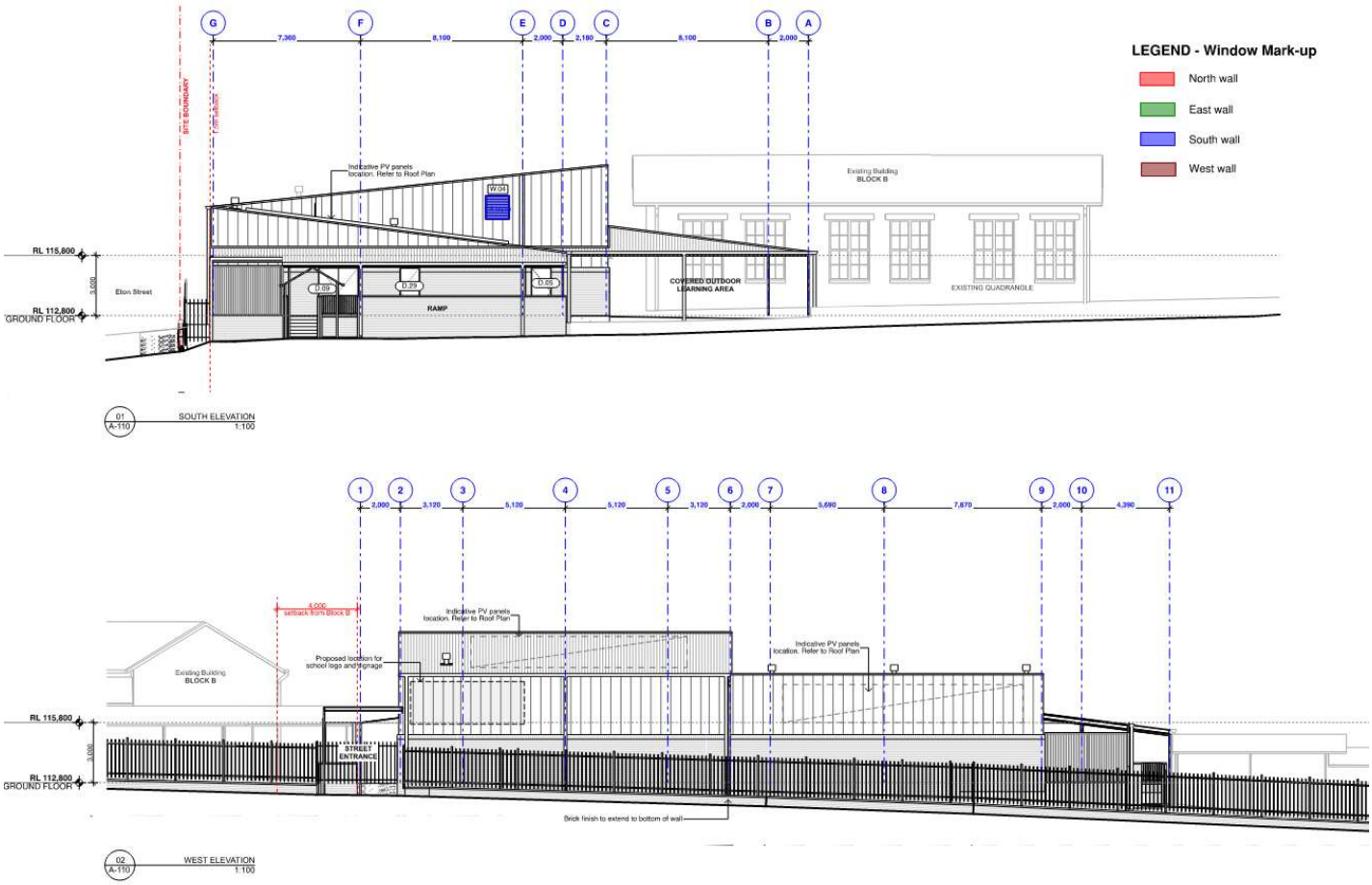


ROOF PLAN


Existing Building
BLOCK B
1 STOREY BRICK
BUILDING METAL ROOF
T9A TPZ 5.6M
T9A
T9
T1 TPZ 10.3M
T2
T2 TPZ 1.7M
Legend (Performance requirements)
Walls that form the Thermal Boundary
Wall Insulation to avoid Thermal Bridging
Floors that form the thermal boundary
Slab on ground
Roof area
SITE BOUNDARY

9.3 Appendix-C Elevation Drawings with Glazing Markup




LEGEND - Window Mark-up
North wall
East wall
South wall
West wall
G
F
E
D
C
B
A
7,360
8,100
2,000
2,180
8,100
2,000
SITE BOUNDARY
Indicative PV panels location. Refer to Roof Plan
W-01
Existing Building
BLOCK B
RL 115,800
RL 112,800
GROUND FLOOR
3,000
Eton Street
D-09
D-09
RAMP
D-05
COVERED OUTDOOR LEARNING AREA
EXISTING QUADRANGLE
01
A-110
SOUTH ELEVATION
1:100
1
2
3
4
5
6
7
8
9
10
11
2,000
3,120
5,120
5,120
3,120
2,000
5,690
7,870
2,000
4,390
4,000
setback from block B
Indicative PV panels location. Refer to Roof Plan
Proposed location for school logo and signage
Indicative PV panels location. Refer to Roof Plan
Existing Building
BLOCK B
RL 115,800
RL 112,800
GROUND FLOOR
3,000
STREET ENTRANCE
Brick finish to extend to bottom of wall
02
A-110
WEST ELEVATION
1:100