SUSTAINABILITY

STEENSEN VARMING

Parramatta East Public School (PEPS) Sustainability Report – REF Submission

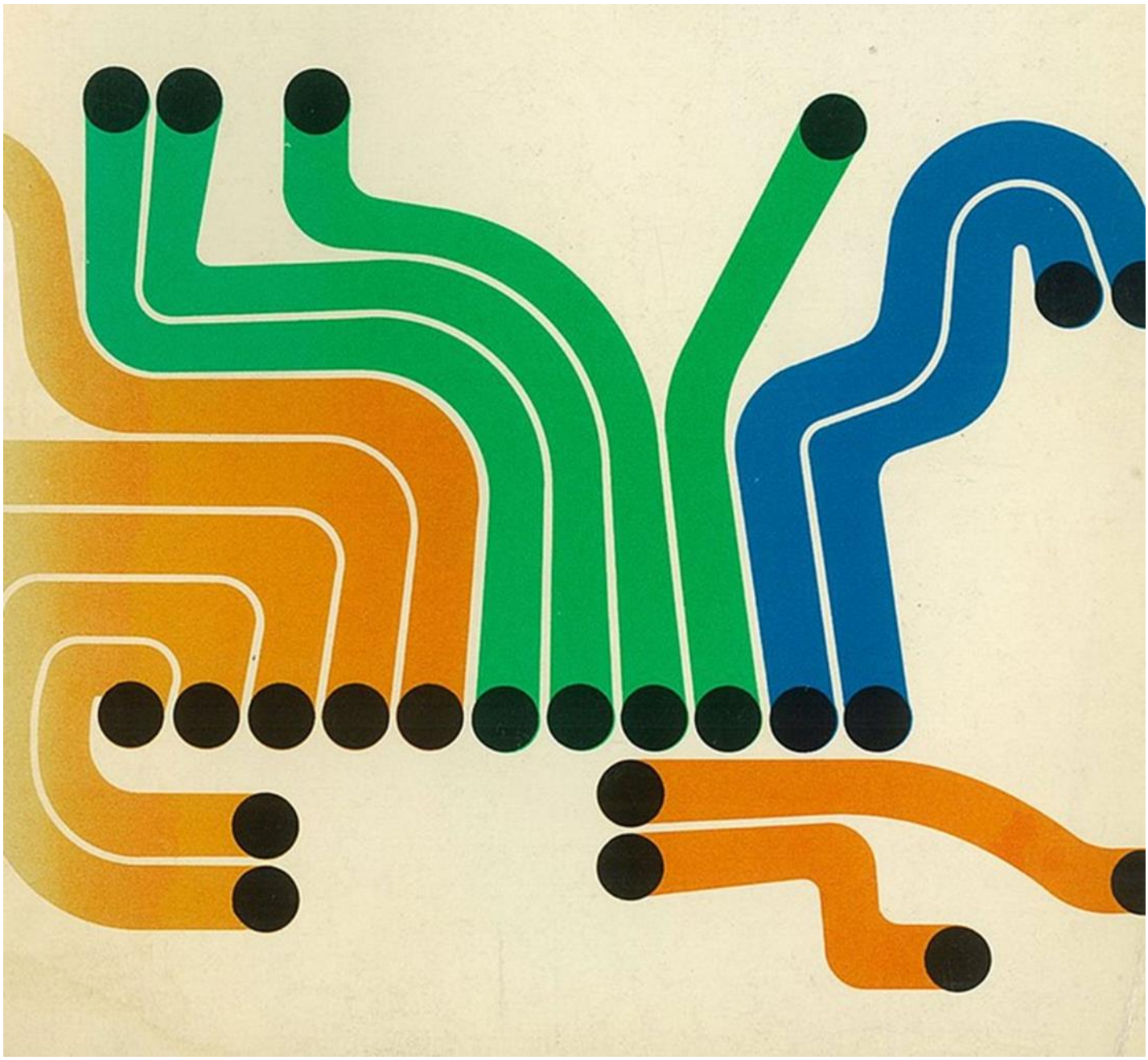

Table of Contents

Sydney, 27th February 2025
Ref. No. 217201

Prepared By:
Diksha Vijapur
Associate

diksha.vijapur@steensenvarming.com

Suveera Kakkar
Sustainability Consultant

suveera.kakkar@steensenvarming.com

1.0 Introduction and declaration

This Environmentally Sustainable Design (ESD) report has been prepared by Steensen Varming on behalf of the NSW Department of Education to assess the potential environmental impacts that could arise from the Parramatta East Public School (PEPS) upgrade (the **Proposal**) at 30-32 Brabyn Street, North Parramatta (the **site**). The works are proposed by the NSW Department of Education to meet the growth in educational demand in Collet Park precinct, and the broader North Parramatta area.

This report has been prepared to assess the potential environmental impacts of the activity prescribed by State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) as "development permitted without consent" on land carried out by or on behalf of a public authority under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37A of the T&I SEPP.

This report has been prepared in accordance with the Guidelines for Division 5.1 assessments (the Guidelines) by the Department of Planning, Housing and Infrastructure (DPHI). The ESD design strategies for this activity have been developed in accordance with the following guidelines and standards:

- Government Resource Efficiency Policy (GREP)
- Sustainable Buildings State Environmental Planning Policy (SB SEPP)
- SINSW Educational Facilities Standards & Guidelines
- National Construction Code of Australia (NCC) 2022
- Green Star Buildings V1

This document also includes a Net-Zero Energy Statement provided in Appendix A.

1.1 Summary of the Activity

The activity comprises upgrades to PEPS to provide replacement teaching facilities in place of the existing temporary and permanent facilities that are no longer fit for purpose, involving the following works:

- Site preparation and required earthworks.
- Demolition of existing Buildings C, D, E and F, and associated structures including adjacent ramps and walkways.
- Construction of the following:
    - A new 3-storey school building (referred to as Block R) including teaching spaces, library/administration, and staff/student amenities.
    - Upgrade of soft and hard landscape and playground areas.
    - A new at-grade parking area.
    - Formalised waste area, with access being retained from Gaggin Street.
    - Public Domain Works with upgrades to the pedestrian access south of the school, and new kiss and ride zone on Albert Street East.
    - Entrance and School logo signage along the Northern Albert Street East frontage of Block R.
- Refurbishment works to existing buildings.
- Removal of trees as required and retention where possible; and
- Installation and augmentation of services and infrastructure as required.

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

The proposed site plan is provided in Figure 1.

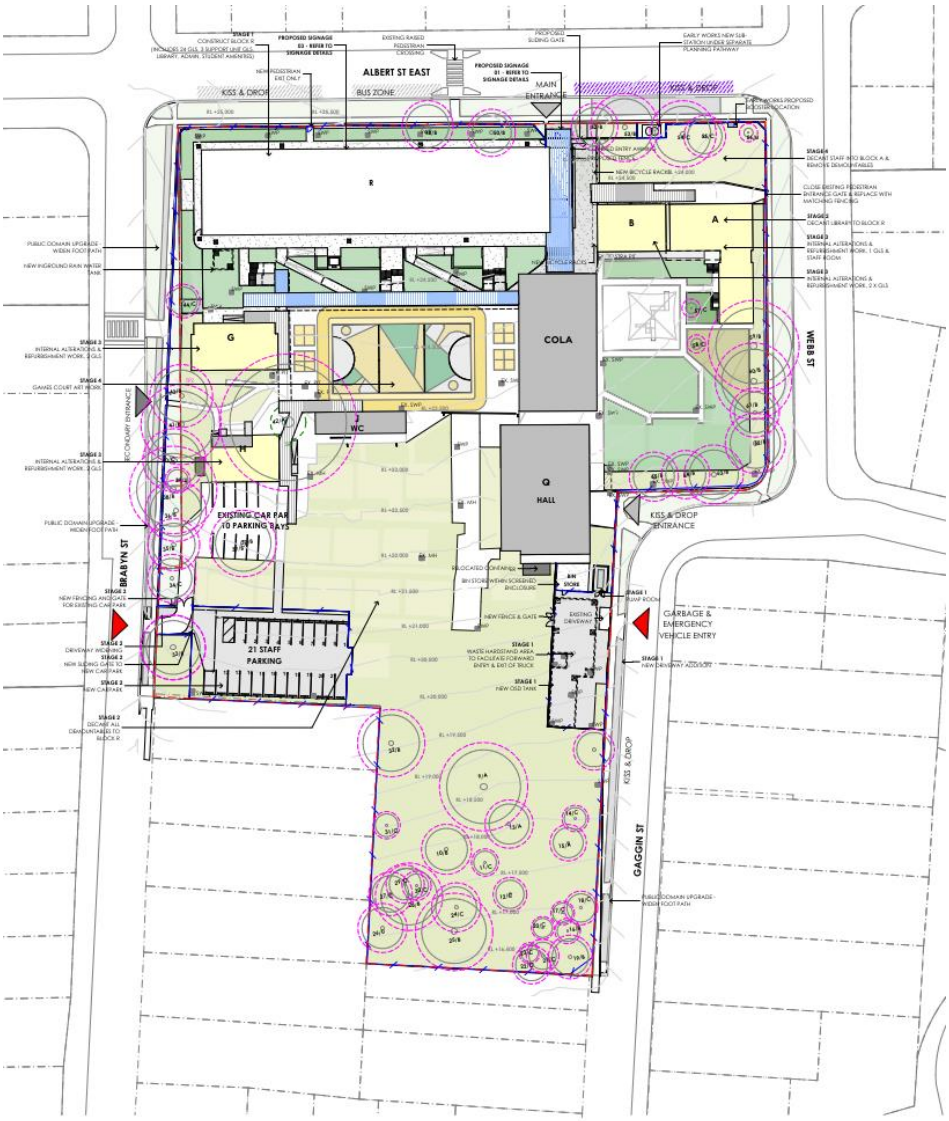

Figure 1 - The Parramatta East Public School, Proposed Site Plan (SD 100%), JDH Architects (27/09/24)

2.0 Site

The site is located at Brabyn Street within the City of Parramatta Local Government Area. Parramatta East Public School is located in the suburb of North Parramatta, within the City of Parramatta Local Government Area (LGA). The site is approximately 1.5km northeast of the Parramatta CBD, and 24km west of the Sydney CBD.

The site currently comprises a single lot to make up Parramatta East Public School, referred to as **Lot 100, DP1312418**, and the land is owned by the Minister for Education and Early Learning.

The site has an area of approximately 1.782Ha, is of an irregular shape, and is bounded by Brabyn Street to the West, Albert Street East to the North, and Gaggin Street/Webb Street to the East. The project area is contained within the site and represents where the proposed works will be undertaken, with an area of approximately 1.492Ha.

An aerial image of the site and project area is shown at Figure 2 below.

Figure 2: Site Aerial (Source: Nearmap, Ethos Urban)

2.1 Significance of Environmental Impacts

Based on the identification of potential issues, and an assessment of the nature and extent of the impacts of the proposed activity, it is determined that:

- The extent and nature of potential impacts are low and will not have significant impact on the locality, community and/ or the environment.
- Potential impacts can be appropriately mitigated or managed to ensure that there is minimal impact on the locality, community and/or the environment.

3.0 REF Reporting Requirements & Responses

This section addresses the REF requirements applicable to the proposal, as well as the requirements of the Sustainable Buildings SEPP 2022.

3.1 Project response to Section 171 of the EP&A Regulation 2021

The following environmental factors have been specified in Review of environmental factors—the Act, s 5.10(a):

- the environmental impact on the community,
- the transformation of the locality,
- the environmental impact on the ecosystems of the locality,
- reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality,
- the effects on any locality, place or building that has—
    - aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance, or
    - other special value for present or future generations,
- the impact on the habitat of protected animals, within the meaning of the *Biodiversity Conservation Act 2016*,
- the endangering of a species of animal, plant or other form of life, whether living on land, in water or in the air,
- long-term effects on the environment,
- degradation of the quality of the environment,
- risk to the safety of the environment,
- reduction in the range of beneficial uses of the environment,
- pollution of the environment,
- environmental problems associated with the disposal of waste,
- increased demands on natural or other resources that are, or are likely to become, in short supply,
- the cumulative environmental effect with other existing or likely future activities,
- the impact on coastal processes and coastal hazards, including those under projected climate change conditions,
- applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1,
- other relevant environmental factors.

Of the above REF environmental factors, the factors that are applicable to the proposed activity are outlined in the following table, with a corresponding response.

Table 1 REF Requirements and Relevant Responses and References

Item	REF Requirement	Project Response and reference in Report
1.0	Any environmental impact on a community	**Section 2.1** To provide world class education for growing communities.
2.0	Any environmental impact on the ecosystems of the locality	**Section 4.1** Construction being done on the brownfield
3.0	Any risk to the safety of the environment	**Section 4.2** Climate change Risk assessment
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, 4.8** Reduction in energy demand, Net-zero by 2050 Goal, Green Energy, Minimise waste.

The ESD initiatives proposed for the new Parramatta East Public School (PEPS) aim to reduce the environmental impacts typically associated with buildings during the construction and ongoing operation of the building.

The following key strategies have been adopted within the proposed design, to ensure a sustainable outcome:

- **Optimised Indoor Environmental Quality (IEQ)**
  Design high quality spaces to promote comfortable and productive learning environments, while supporting the functional demand of the building, i.e., a learning / teaching environment. Key design emphasis is on providing optimised Indoor Environmental Quality (IEQ) and occupant comfort, including optimised indoor air quality, thermal, acoustic, and visual comfort. This is achieved through a high level of internal natural daylight and ventilation within the proposed buildings.

- **High-performance building envelope**
  Incorporate a high-performance building envelope, to ensure energy efficiency as well as occupant comfort (including thermal, visual, and acoustic comfort).

This is demonstrated by adopting a 20% improvement of the DTS requirement of Section J as a project requirement.

- **Incorporate passive design**
  Incorporate appropriate passive design strategies, such as improved fabric thermal performance and active design strategies that include low energy active systems (mechanical and lighting systems) to ensure a low-energy and low-maintenance design outcome.

- **Water Sensitive Urban Design**
  Adopt Water Sensitive Urban Design (WSUD) principles that include rainwater reuse for landscape irrigation, planting of low water species and stormwater management.

- **Minimise construction and operational waste**
  Adopt practices to minimise construction and operational waste including recycling of construction and operational waste. This includes consideration for use of modular and prefabricated components in design, selection of recycled and reprocessed materials, returning package to the supplier, purchasing policies and auditing/ monitoring for the same.

- **Sustainable material selection and waste handling**
  Utilise environmentally preferable materials, such as low carbon concrete and steel, selection of sustainable materials with low VOC's and formaldehyde content and have their Environmental Product Declaration (EPD) certificates.

The following diagram shows the key ESD strategies and a site analysis for PEPS:

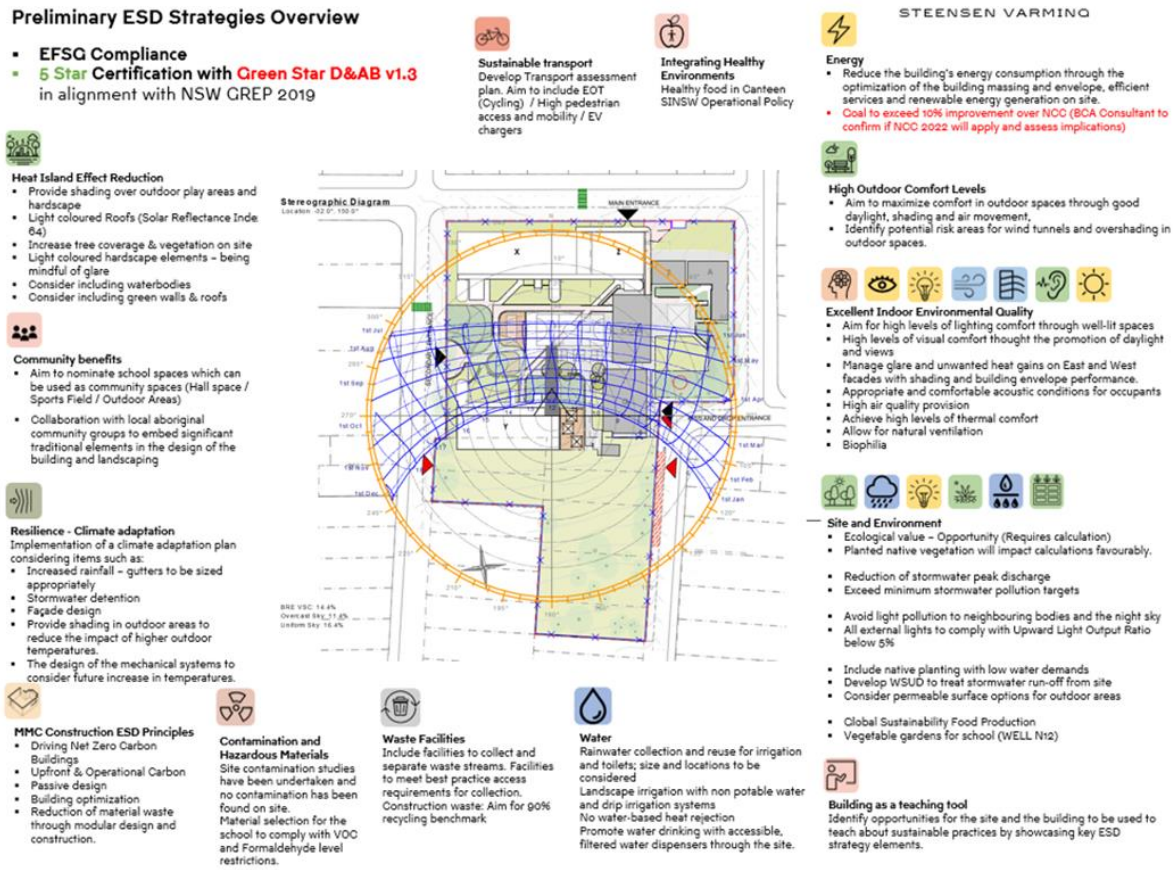

Figure 3: Site analysis

3.2 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 activity 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 2 Project response to SEPP Sustainable buildings 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 4.4: 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.

4.0 Sustainability Approach

The following sustainability initiatives are being considered for the design in consultation with SINSW Sustainability team and governing guidelines such as Sustainable Buildings SEPP, EFSG and Green Star Design & As-Built v1.3. 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.

4.1 Impact on Biodiversity

This is a brownfield project with development occurring on an existing school site. The design team will aim to retain and endeavour to improve the ecological value of site when opportunity arises. The project stakeholders have also conducted soil contamination test for the existing site to implement relevant mitigation measures.

The landscape strategy, guided by' Sustainable Sites' objective, 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.

4.2 Resilience

In accordance with 'Adaptation and Resilience' of Green Star, 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, NSW is projected to experience the following:

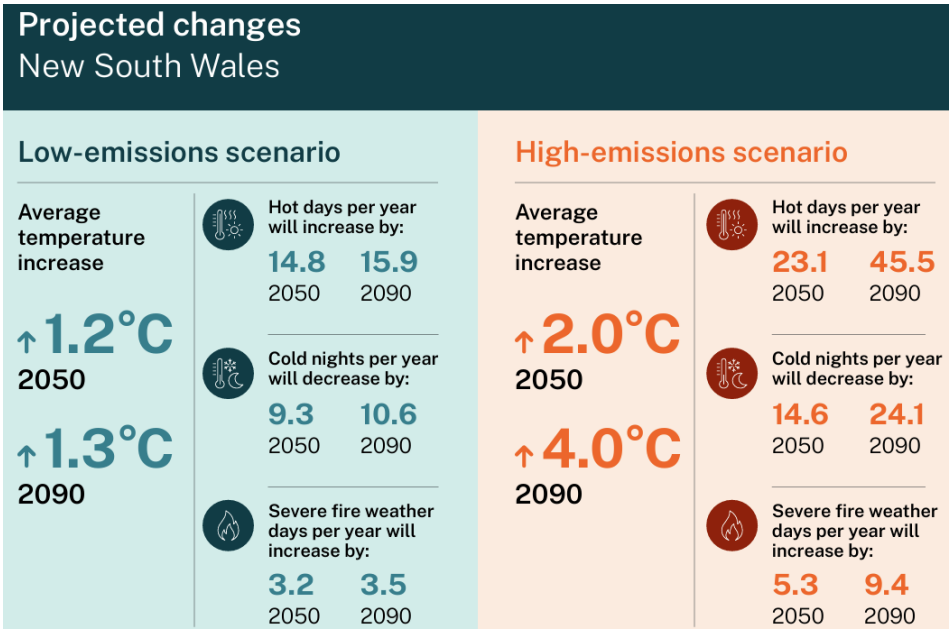

Figure 4: Summary diagram of climate projections for NSW. Source: NARCLiM 2 Climate Change Snapshot / NARCliM2-Snapshot-NSW.pdf

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 risk workshop has been undertaken during the Schematic Design phase, to discuss the possible risks associated with climate change projections which could impact the project in line with EFSG DG02.08. The aim of the assessment is to develop adaptation strategies to eliminate or reduce those risks as much as possible and increase the resilience of the project against climate change. A Climate Change Adaptation and Risk Assessment Matrix has been developed to capture the list of climate change risks and a review of how the design has addressed these risks based on the discussions at the Climate Change workshop.

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 held.

Table 3: 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	• Sheltered walkways for occupant safety. • Material specification to include durability and resilience.
	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 power 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 activity includes:

- Passive Design Optimisation (Increased thermal performance of the building envelope/ Shading / Air tightness / Heat recovery / etc.)
- Designed for natural ventilation and good air flow in indoor and outdoor areas (all classrooms and staff spaces) to allow for some increase in temperatures during peak times while maintaining comfortable conditions.
- Active design systems: Increase in plant capacity in buildings to accommodate higher ambient temperatures.
- Landscape strategy to include provision of trees, planting and covered walkways for shading and to connect outdoor spaces with buildings and use of soft landscape, hardscaping and roofing materials with high Solar reflectance

index (SRI) to reduce the heat island effect and improve outdoor thermal comfort.
- Reduced stormwater runoff through rainwater harvesting from roofs and selection native species with low irrigation (potable 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.

4.3 Passive design

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 pathway, and overall functionality requirements.
- The shading strategy has been developed in respect to the buildings' orientation and to minimise energy consumption and glare risk, while maximising daylight ingress and as a result reducing the use of artificial lighting, use of cooling, and these systems' energy consumption.

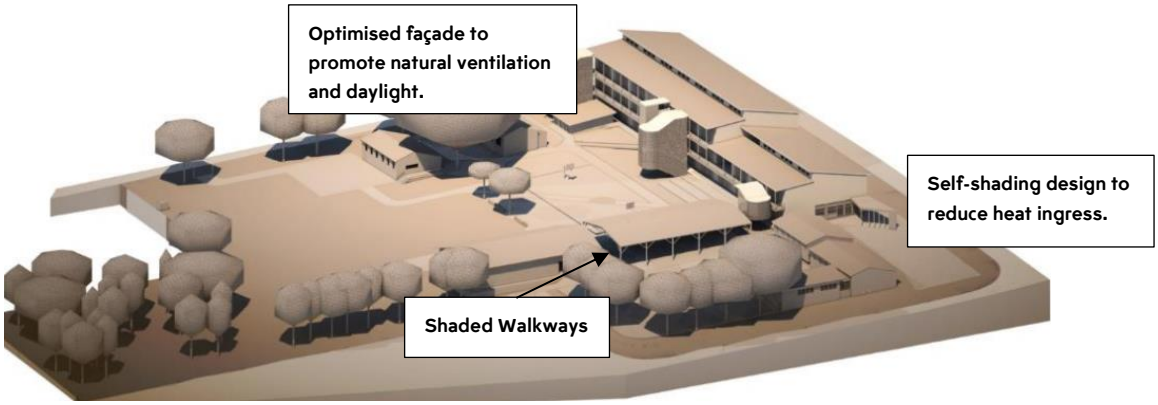

Figure 5: Passive Design Strategy.

- The façade has been designed in considerations of:
  - Abundant daylight 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 Green Star certification.
  - Efficient natural ventilation for all teaching spaces to improve thermal comfort, indoor air quality, and to reduce the use of mechanical ventilation and cooling systems, thereby reducing energy consumption.
  - The natural ventilation to the teaching spaces is provided using louvres, windows, and doors, with an effective opening area of minimum 6.25% of the floor area.
  - Building envelope performance (airtightness and thermal) will be enhanced via architectural detailing, and by procuring prefabricated façade components where suitable.
  - Performance glazing – Glazing selected to ensure optimised thermal performance, admitting as much daylight as possible, while controlling the transmission of solar heat and thermal conduction.
  - Glazing ratio – Glazing ratios have achieved an equilibrium between allowing daylight to enter buildings while reducing solar and conductive heat gains.
- A Mixed Mode Ventilation strategy has been adopted for improved indoor air quality, whilst also reducing energy consumption associated with air-conditioning. When external and internal conditions are favourable, external

windows to each building / space can open to facilitate natural ventilation. The air-conditioning system has been designed to allow for a space-by-space user-activation of the cooling/heating, thereby minimising energy consumption.
- Compliance with the Section J requirements of the National Construction Code (NCC) 2022.

4.4 Reduction in peak demand for electricity

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.

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

- The mechanical ventilation system applies CO2 monitoring in all spaces 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.
- All the air-conditioning systems utilise push-buttons with a run-on timer for activation and de-activation of the air-conditioning in all spaces. This ensures that the air-conditioning is only activated when desired by the users and the run-on timer ensures the system deactivates after a set period (typically 2 hours).
- The lighting system applies passive infrared (PIR) sensors for all spaces to ensure the artificial lighting system is only activated once the space is occupied, and to ensure that the system is deactivated shortly after de-occupation of the space.
- In addition to the above, the lighting system applies daylight sensors to adjust the artificial lighting to the required levels.
- A **Solar photovoltaic (PV)** array located on rooftop has been included in the design. Energy generated onsite can be reused onsite. Allowing for 70kW PV panels system and area for future expansion covering 20% of total roof area in alignment with NCC2022 to maximise solar generated power use.
- **Comprehensive System Commissioning** will be performed by Head contractor under the supervision of Asset Maintenance Unit (AMU)/SINSW Commissioning Team to ensure the building functions as designed. PEPS will be amongst the first few upcoming high schools to be 100% electric powered.
- **Building energy performance improvement** – The project is targeting to exceed minimum NCC compliance by 10%.

4.5 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.

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 6 Energy Hierarchy

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

- The air-conditioning system is a variable refrigerant type of system which is considered the most suitable solution for a school building, and which delivers good efficiencies, particularly at lower thermal loads.
- The lighting fixtures are highly efficient LED technology with daylight sensors to adjust the artificial lighting to the required levels.
- A Solar photovoltaic (PV) array located on rooftop of the new building block has been included in the design. Energy generated onsite can be reused onsite. Allowing for 70kW PV panels system and area for future expansion covering 20% of total roof area in alignment with NCC 2022 to maximise solar generated power use.
- The main switchboard will be designed in accordance with NCC 2022 Section-J requirements, to allow for PV and future battery installation.

4.6 Metering and Monitoring of Energy Consumption

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

- The project will sub-meter significant energy uses via the Building Management System (BMS) to track and manage energy consumption.
- The sub-metering data will be utilised to understand energy usage and distribution.
- The main switchboard will be designed in accordance with NCC 2022 Section-J requirements, to allow for PV and future battery installation.

4.7 Minimise Potable Water Consumption

The following hierarchy alongside the Green Star Design & As-Built v1.3 and Educational Facilities Standards & Guidelines (EFSG) has been considered as the basis of water strategies/ initiatives implemented within the proposed the PEPS.

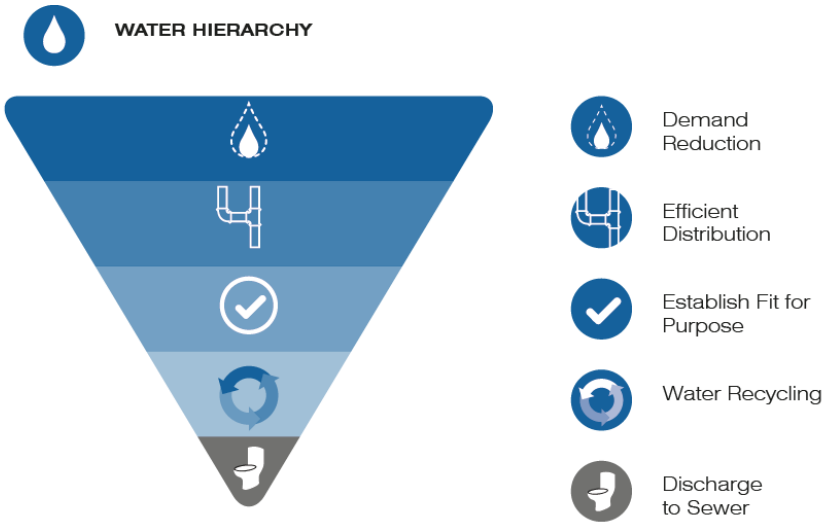

Figure 7 Water Hierarchy

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

- **Water efficient fixtures / fittings, systems.** That include fittings such as taps, showerheads, toilets, zip taps, dishwashers etc certified under the WELS rating scheme will be purchased and installed.
- **Rainwater Reuse** - Rainwater collection and reuse to landscape include irrigation have been considered for this development.
- **Efficient water management** including water reuse, wastewater management, leaks detection through automatic water meter monitoring system.
- **Drip and demand-controlled irrigation** have been implemented to optimise the potable water supply for landscape irrigation.
- **Native species of plants** and low water demand landscape are implemented as landscape design strategies to ensure reduced water consumption.

4.8 Minimisation of waste

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. In addition, the project is targeting the following waste-related ESD strategies for the contractor to implement during construction:

- The builder or head contractor has an environmental management system in place to manage its environmental impacts on site.
- The builder or head contractor has an environmental management plan to cover the scope of construction activities.
- The builder would contractually be required to divert 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.

4.9 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 a later stage after the REF submission.

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 development. 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 are to be considered:

- 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

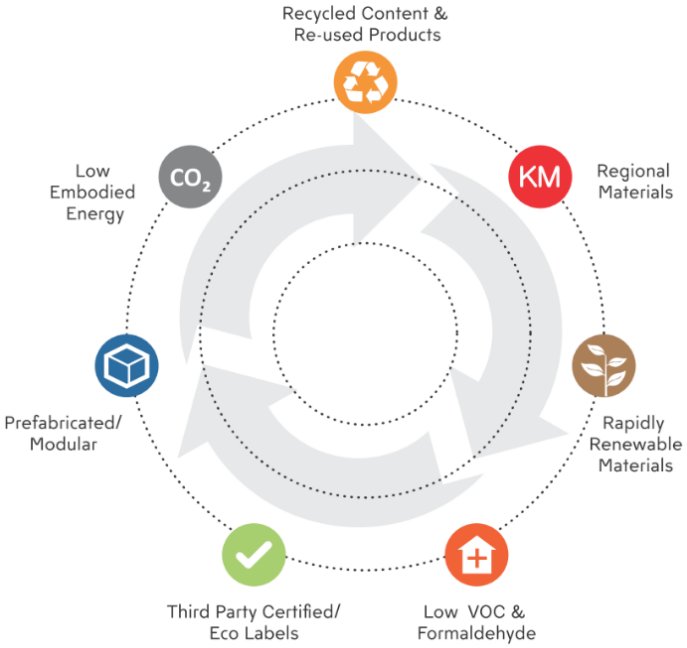

Figure 8 Material selection strategies

4.10 Green Star Certification

The project is formally registered with the Green Building Council of Australia (GBCA) and is targeting a 5 star rating under the GBCA's Green Star Design & As-Built v1.3 evaluation tool. The design team has aimed for 68 points (i.e. 60 core points and 8 buffer points).

5.0 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 4 Mitigation Measures for the activity

PRE-CONSTRUCTION		
Mitigation Number/ Name	**Mitigation Measure**	**Reason for Mitigation Measure**
Formal Green Star Certification / Green Star Design & As-Built V1.3 / 5 Star rating	A holistic approach to sustainability must be implemented, by addressing the requirements from Green Star Design & As-Built V1.3 framework, which is representative of an Industry Best-practice outcome.	To ensure the environmental performance 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, thermal performance and natural ventilation. ("High" implies an improvement beyond the minimum regulatory compliance requirement).	To reduce operational energy consumption and Greenhouse Gas Emissions and contribute towards improving Indoor Environmental Quality.
Reduction in energy demand	The following strategies must be incorporated:	To reduce the energy demand and move towards the NSW Department of Education's Net-Zero Energy target.

	Air Conditioning systems must utilise pushbuttons with a run-on timer for activation and de-activation of the air-conditioning in all spaces. 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.	
CONSTRUCTION		
Mitigation Number/ Name	**Mitigation Measure**	**Reason for Mitigation Measure**
Minimise potable water consumption	Certified WELS rated water fixtures, as nominated in the architectural specifications, must be incorporated to reduce wastage of water.	To reduce the stress on natural resources and water demand.
On-site renewable energy generation	A 70kW Photovoltaic system, as shown on the electrical services drawings, must be installed prior to building handover.	To enable the project to contribute towards the Department of Education's Net-Zero Energy target.
Embodied Reporting	Must implement environmentally friendly materials and responsible	To align with Sustainable Buildings SEPP embodied carbon reporting requirements and Green Star guidelines to

	procurement to reduce the stress on virgin materials. Must divert 90% of the construction waste from landfill, by the end of the construction phase.	drive a sustainable design and operational building.
Formal Green Star Certification / Green Star Design & As-Built V1.3 / 5 Star rating	During construction, implement all the requirements from Green Star Design & As-Built V1.3 framework, which is representative of an Industry Best-practice outcome. Supporting evidence must be submitted to the GBCA for formal certification process within 12 months of Practical Completion.	To ensure a high environmental outcome for the finished building, on the basis of implementing a holistic approach to sustainability.

6.0 Evaluation of Environmental Impacts

To support the sustainability targets for the project, a Green Star Pre-Assessment has been carried out. At this stage, a rating of 5-Stars is targeted through the Green Star Design & As-Built V1.3 tool. The associated requirements are addressed in the current design and expected to be implemented during the construction phase. The outcome of this process will ensure that the environmental impacts associated with the proposed activity are mitigated.

7.0 Appendix A

7.1 Net-Zero Energy Statement

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 2 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

Mechanical and Electrical Services Schematic Design - Net Zero Energy Statement

Parramatta East Public School, NSW

Sydney, 27th February, 2025
Ref. No. 217201 CER S00

Chris Arkins
Director

chris.arkins@steensenvarming.com
+61 / 02 9967 2200

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 new school located at Brabyn Street, Parramatta, NSW, 2150.

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

This statement addresses the Environmental Assessment Requirements for the project, notably:

Ref. No.	REF Requirement	Section of Statement where response is provided
3.4	If Chapter 3 of SEPP (Sustainable Buildings) 2022 applies:	
	- provide a net zero statement (as defined in section 35C of the EP&A Regulation) that includes:	- This Net Zero Energy Statement addresses this item
	- evidence of how the development will either be fossil fuel-free after the occupation of the development commences or transition to be fossil fuel-free by 1 January 2035.	- This Net Zero Energy Statement addresses this item
	- details of any renewable energy generation and storage infrastructure implemented and any passive and technical design features that minimise energy consumption.	- This Net Zero Energy Statement does not address this item.
	- estimations of annual energy consumption for the building (if available)	- A preliminary energy modelling was conducted, and Energy Modelling Report was prepared by Steensen Varming at Schematic Design stage. As the design progresses into Detailed Design phase, another iteration of energy modelling will need to be conducted to analyse system performance and energy efficiency achieved.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 2 9967 2200
e : info@steensenvarming.com

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

The following initiatives have 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 Schools Infrastructure 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.

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 its operation. While the project has a roof mounted 70 kW Photovoltaic system to generate renewable energy for on-site utilisation, there will be a need to procure Green Power. SINSW will have to procure Green Power to be able to attain 100% net zero emissions in operation. 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 1 January 2035 target, set out in Section 35C(2)(b) of the EP&A Regulation 2021.

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 pathway, and overall functionality requirements.
- The shading strategy has been developed in respect to the buildings' orientation and to minimise energy consumption and glare risk, while maximising 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 considerations of;
    - Abundant daylight 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 Green Star certification.
    - Efficient natural ventilation for all teaching spaces to improve thermal comfort, indoor air quality, and to reduce the use of mechanical ventilation and cooling systems, thereby reducing energy consumption.
    - The natural ventilation to the teaching spaces is provided through the use of louvres, windows, and doors, with an effective opening area of minimum 6.25% of the floor area.
    - Compliance with the Section J requirements of the National Construction Code (NCC) 2022.

Technical Design Features

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

- The air-conditioning system is a variable refrigerant type of system which is considered the most suitable solution for a school building, and which delivers good efficiencies, particularly at lower thermal loads.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 2 9967 2200
e : info@steensenvarming.com

- 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.
- All the air-conditioning systems utilise push-buttons with a run-on timer for activation and de-activation of the air-conditioning in all spaces. This ensures that the air-conditioning is only activated when desired by the users and the run-on timer ensures the system deactivates after a set period (typically 2 hours).
- The lighting fixtures are highly efficient LED (Light Emitting Diode) technology.
- The lighting system applies passive infrared (PIR) sensors for all spaces to ensure the artificial lighting system is only activated once the space is occupied, and to ensure that the system is deactivated shortly after de-occupation of the space.
- In addition to the above, the lighting system applies daylight sensors to adjust the artificial lighting to the required levels.
- 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 70-kW rated rooftop photovoltaic (PV) system has been designed to provide a portion of the project's electricity usage on the roof of the new building block.
- 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.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 2 9967 2200
e : info@steensenvarming.com

Estimated Energy Consumption & GHG Emissions

Estimated energy consumption is not yet available for the project. Detailed energy modelling shall be undertaken by responsible parties as the design progresses, to help inform the design and its targeted Green Star requirements, as well as verify the design for regulatory compliance. This will include an estimation of PV-solar electrical contribution to the site and an estimation of grid-purchased electricity and associated direct and indirect emissions.

Chris Arkins
Director
BEng Mechanical, Accredited Green Star Professional, FIEAust, EngExec, CPEng, NER, APEC Engineer, IntPE(Aus), FCIBSE

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 2 9967 2200
e : info@steensenvarming.com

Evidence

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

Document Reference Number	Description
217201 Report B01 Schematic Design Report PEPS [01]	Excerpt from Schematic Design Report's mechanical systems sections outlining the HVAC system description, as being all-electric. Domestic hot water usage. No gas usage.

Excerpt from the Schematic Design Report for Mechanical System Descriptions.
Reference: '217201 Report B01 Schematic Design Report PEPS [01]'
Date: 16/08/2024
Revision: 01
Author:
Faraan Shareef, Associate Mechanical Engineer, Steensen Varming
Richard Hopkins, Electrical Engineer, Steensen Varming
Diksha Vijapur, Associate- Sustainability, Steensen Varming
Tamara Hanna, Senior Lighting Designer, Steensen Varming