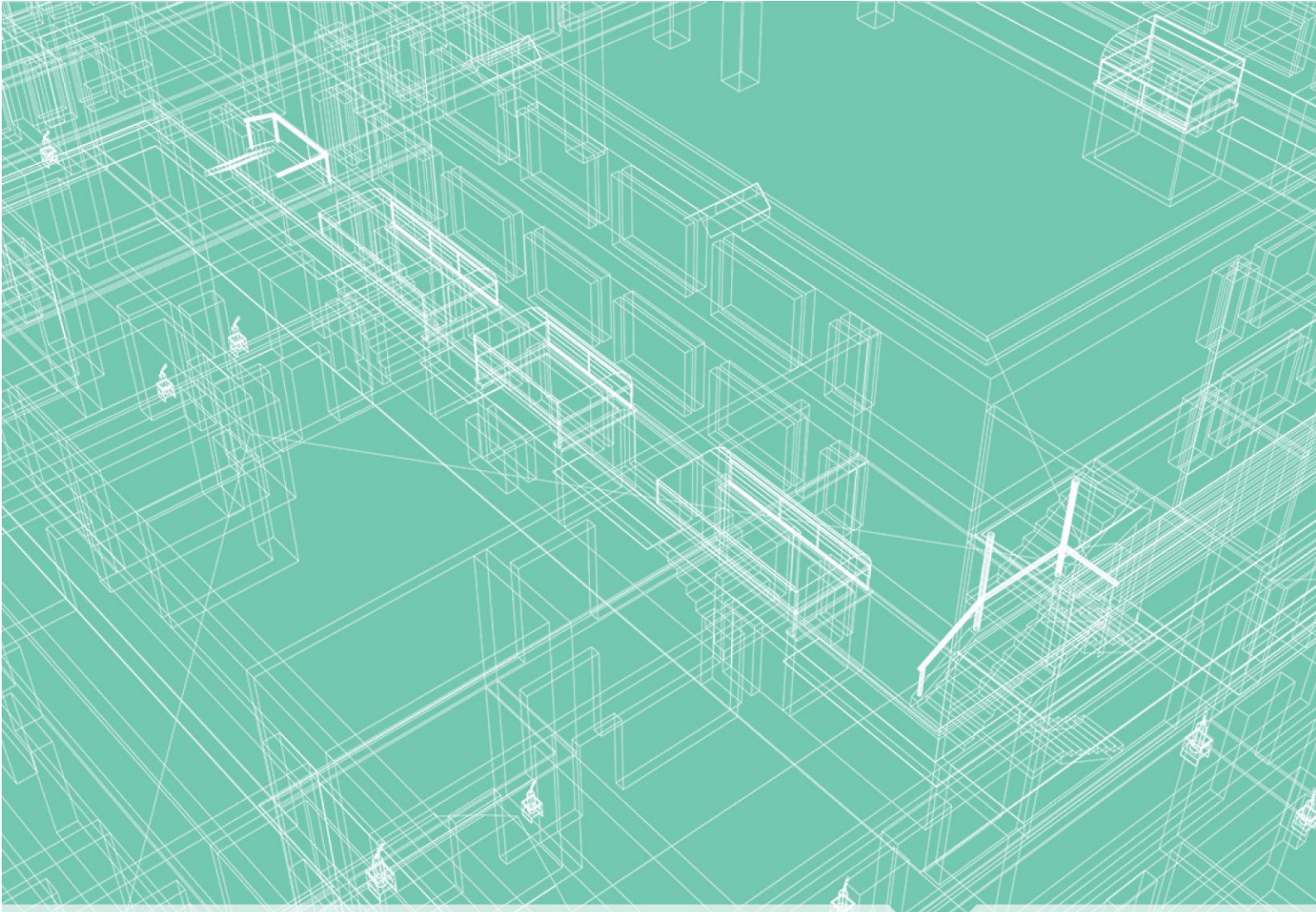

ESD REPORT

LAVENDER ST & MIDDLEMISS ST, LAVENDER BAY

ESD SERVICES

JHA

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DOCUMENT CONTROL SHEET

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Project Name	Lavender St & Middlemiss St, Lavender Bay
Description	ESD Report
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EXECUTIVE SUMMARY

The proposed development seeks approval for the rezoning of the site and development consent for the construction of a residential development.

The SSDA specifically involves the following works:

- Demolition of the existing buildings on site;
- Site excavation, and other preparatory site works;
- Construction of a 32 and 23-storey residential flat building including 3% designated affordable housing consisting of approximately a total of 160 dwellings,
- Five levels of basement parking,
- Vehicular access from Lavender Street and loading access from Middlemiss Street,
- A new public accessible open space, including through-site link and site landscaping and
- Site amalgamation,
- Utility and services augmentation as required.

To accommodate the proposed SSDA, a concurrent rezoning is sought to increase the site's maximum building height.

JHA Consulting Engineers has prepared this Environmentally Sustainable Design (ESD) Report to support the State Significant Development Application (SSDA) for the proposed Lavender St & Middlemiss St at Lavender Bay.

The project demonstrates its commitment to environmental, social and economic sustainability by delivering high-performance, resilient and inclusive facilities designed for long-term community benefit. Key sustainability outcomes have been developed in alignment with the Secretary's Environmental Assessment Requirements (SEARs) (SSD-86797708, issued 30th June 2025) Requirement #15, the Sustainable Buildings SEPP 2022 and NCC 2022 Section J.

This report should be read in conjunction with the architectural design documentation by SJB Architects and other specialist consultant reports. It draws on concept design inputs and stakeholder feedback to guide implementation of the ESD strategy.

The following key initiatives have been integrated into the project:

- Energy and Emissions: High-efficiency HVAC systems, LED lighting with controls, rooftop solar PV, and comprehensive sub-metering.
- Indoor Environmental Quality: Acoustic treatments, biophilic elements, low-VOC materials, and thermal comfort controls to support health and wellbeing.
- Natural Ventilation and Views: Cross-ventilation and visual connection to landscaped outdoor areas to enhance occupant comfort and productivity.
- Water and Ecology: Rainwater harvesting, WELS-rated fixtures, and strategies to reduce potable water demand and improve stormwater quality.
- Low-Carbon Materials: Use of materials with low embodied carbon and recycled content.
- Inclusion and Access: Universal design elements including accessible toilets, step-free entries, and compliant circulation paths to ensure equitable access.

These strategies reflect the project's commitment to environmental leadership, resource efficiency, and inclusive, high-performing learning spaces.

Declaration		
Qualified Professional Name	Eddith Chu	
Qualified Professional Qualifications	Bachelor of Renewable Energy Engineering, Master of Engineering Management Engineering, NABERS Accredited Assessor, GSAP, NatHERS Accredited Assessor	
	The undersigned declares that this 250554 Lavender St & Middlemiss St, Lavender Bay - ESD Report [A] has been prepared in response to the following SEARs requirements issued for the Project on 30 June 2025 (EIS) and 2 July 2025 (Rezoning Report) for SSD-86797708:	
SEARs item no.	**SEARs Issue and Assessment Requirement**	**Relevant Section of this Report that addresses SEARs Requirement**
15.1	Identify how ESD principles (as defined in section 193 of the EP&A regulation) are incorporated in the design and ongoing operation of the development.	Chapter 3, Appendix A & B
15.2	Where relevant, provide an assessment of the development against the standards for non-residential development set out in Chapter 3 of State Environmental Planning Policy (Sustainable Buildings) 2022.	Chapter 3, Appendix A & B
Signed		
Dated	04/03/2026	

CONTENTS

1 INTRODUCTION

The purpose of this report is to demonstrate how the proposed development complies with the Environmentally Sustainable Development (ESD) requirements set out in the Secretary's Environmental Assessment Requirements (SEARs) and Chapter 2 of the Sustainable Buildings SEPP (SB SEPP). The report supports the development application for the project, which includes 160 new residential units and associated facilities at 64-66 Lavender St & 3-7 Middlemiss St, Lavender Bay.

This document serves as a performance specification, outlining the ESD requirements, relevant actions, and supporting documentation necessary to meet the project's environmental targets and ratings. It defines the design strategies to be implemented by Consultants, Contractors, and Subcontractors to achieve the specified sustainability outcomes.

The project is designed to align with the following sustainability standards:

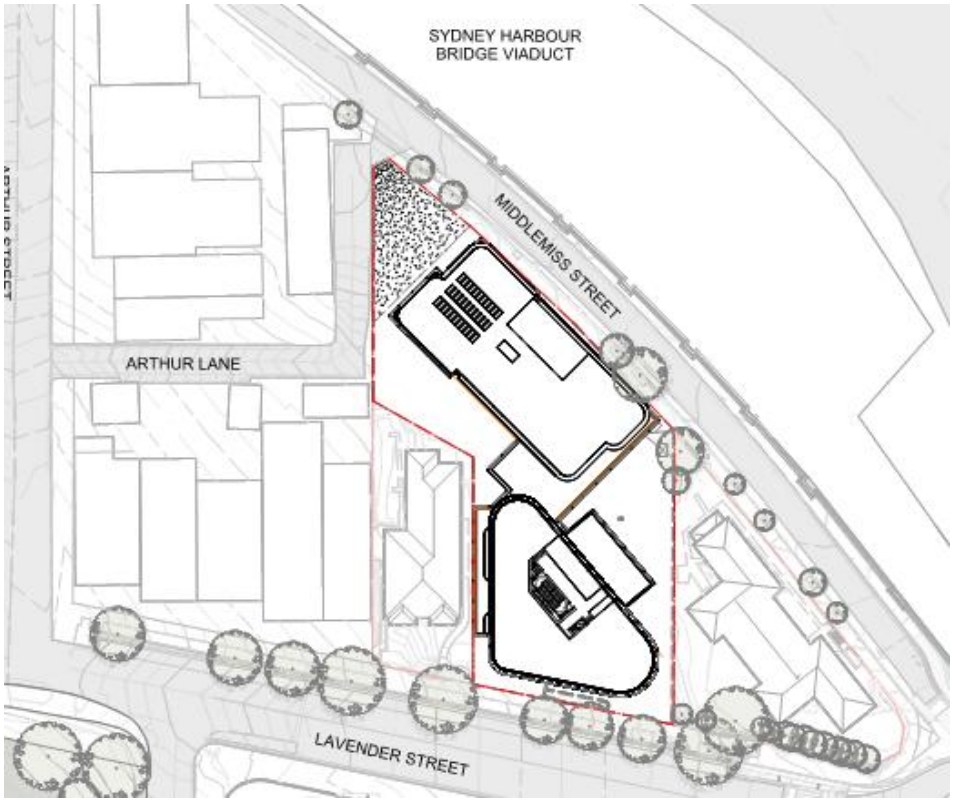
- Sustainable Buildings SEPP 2022 - BASIX
- National Construction Code (NCC) 2022 Section J

1.1 PROJECT DESCRIPTION

The proposed development for the Lavender St & Middlemiss St located at 64-66 Lavender St & 3-7 Middlemiss St will result in the construction of 2 new towers with 72 and 88 new residential units and associated amenities.

Building type and function: Class 2

NCC Climate Zone: Climate Zone 5



Location of the site

1.2 SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

In accordance with section 4.39 of the Environmental Planning & Assessment Act 1979 (EP&A Act), SEARs for SSD-86797708 have been issued. This report has been prepared to respond to the issued SEARs, as set out in the table below.

SEARs	Response/Location in Report
SSD-86797708 SEARs	
Identify how ESD principles (as defined in section 193 of the EP&A regulation) are incorporated in the design and ongoing operation of the development.	The development applies ESD strategies through passive design—high-performance glazing, shading, natural ventilation, and optimal orientation—to cut energy use and emissions across construction and operation.
Where relevant, provide an assessment of the development against the standards for non-residential development set out in Chapter 3 of State Environmental Planning Policy (Sustainable Buildings) 2022.	The proposed development is classified as a Class 2 Residential building. Accordingly, Chapter 3 (Non-residential) of the *State Environmental Planning Policy (Sustainable Buildings) 2022* (SB SEPP) is not applicable to this application. The development is instead subject to the residential requirements outlined in Chapter 2 and the associated BASIX framework. Notwithstanding the non-applicability of Chapter 3, the development incorporates several sustainability initiatives that align with broader environmental objectives, as detailed below: ▪ Energy & Water Performance (Sec. 4): - Development will meet minimum energy standards. - NatHERS ratings are targeted to meet/exceed typology requirements. (Appendix B) ▪ On-site Renewable Energy (Sec. 4): - Rooftop solar PV and other systems considered. - Integration subject to feasibility, detailed design, and structural capacity.
Chapter 2 of SB SEPP 2022	**Response/Location in Report**
Chapter 2 – Residential Requirements (Class 2)	
Sustainability Standards for Residential Development (BASIX)	Appendix A: BASIX Certificate

1.3 STAKEHOLDERS CONSULTATION

The stakeholders consulted and/or contributed to the development of this report are listed below.

Stakeholders	Role
Central Element	Design Manager
SJB Architects	Architect
JHA Consulting Engineers	Mechanical, Electrical, Hydraulics, Fire, VT, ESD

2 SUSTAINABLE BUILDINGS SEPP 2022

The NSW Government is committed to ensuring that new and renovated buildings are sustainable and resilient for future climate and bring NSW closer to net zero emissions. To achieve the goal a new State Environmental Planning Policy (Sustainable Buildings) 2022 (Sustainable Buildings SEPP) was made in August 2022 and was made effective from 1 October 2023. Based on the type of building (residential or non-residential) different sustainability standards apply as follows:

- Sustainability Standards for Residential Development (BASIX)

2.1 SUSTAINABILITY STANDARD FOR RESIDENTIAL DEVELOPMENT [BASIX]

As per the Environmental Planning and Assessment Regulation 2021, a ***BASIX building*** means a building that contains ***at least 1 dwelling*** but does not include the following: -

- Hotel or motel accommodation,
- A boarding house, hostel or co-living housing that: -
    - Accommodates more than 12 residents, or
    - Has a gross floor exceeding 300 square meters.

In accordance with Chapter 2.1 of Sustainable Building SEPP 2022, the SB SEPP is applicable to all ***BASIX building*** that involves:

- ***development that involves the erection, but not the relocation, of a BASIX building***,
- development that involves a change of building use by which a building becomes a BASIX building,
- development that involves the alteration of a BASIX building, if the estimated development cost is $50,000 or more,
- development for the purposes of a swimming pool or spa, or combination of swimming pools and spas, that: -
    - services 1 dwelling only, and
    - has a capacity, or combined capacity, of 40,000 litres or more.

Hence the ***Sustainability Standards for Residential Development (BASIX)*** applies to this development. Please refer to the BASIX Certificate provided separately for compliance.

3 SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS (SEARS) RESPONSE

3.1 IDENTIFY HOW ESD PRINCIPLES (AS DEFINED IN SECTION 193 OF THE EP&A REGULATION) ARE INCORPORATED IN THE DESIGN AND ONGOING OPERATION OF THE DEVELOPMENT.

The development integrates the following four principles of ecologically sustainable development as defined in Section 193 of the Environmental Planning and Assessment (EP&A) Regulation 2021:

3.1.1 THE PRECAUTIONARY PRINCIPLE

This principle requires that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

- Project Response: The design team has proactively integrated high-performance glazing and shading to mitigate the risk of future climate-driven temperature increases.
- Waste Management: A comprehensive Waste Management Plan has been devised to ensure responsible handling of demolition and construction materials, aiming to divert 80% of waste from landfills to prevent long-term environmental contamination.
- Equipment Selection: The use of high-efficiency air-cooled heat rejection systems instead of water-based systems reduces the risk of water scarcity impact and potential Legionella concerns.

3.1.2 INTER-GENERATIONAL EQUITY

The principle of inter-generational equity is that the present generation should ensure the health, diversity, and productivity of the environment are maintained or enhanced for the benefit of future generations.

- Emissions Reduction: By utilizing rooftop solar PV and high-efficiency LED lighting with automatic controls, the project significantly reduces its operational carbon footprint, contributing to the mitigation of long-term climate change for future residents.
- Resource Conservation: The project specifies WELS-rated fixtures (e.g., 5-star taps and urinals) to conserve potable water, ensuring this vital resource remains available for future generations.
- Durability: The commitment to high-quality building fabric and low-embodied carbon materials ensures a long-lived, resilient structure that will not become a premature burden on future waste streams.

3.1.3 CONSERVATION OF BIOLOGICAL DIVERSITY AND ECOLOGICAL INTEGRITY

This principle dictates that the conservation of biological diversity and ecological integrity should be a fundamental consideration in the design and operation of the development.

- Urban Heat Island Mitigation: The use of light-colored roofing material with low solar absorptance helps mitigate elevated local temperatures, supporting the local micro-environment and ecological stability.
- Stormwater and Ecology: Rainwater harvesting and strategies to improve stormwater quality protect the local aquatic ecosystems from runoff pollutants.
- Biophilic Design: The inclusion of biophilic elements and visual connections to landscaped outdoor areas supports a connection between occupants and the natural environment.

3.1.4 IMPROVED VALUATION, PRICING AND INCENTIVE MECHANISMS

This principle involves the inclusion of environmental factors in the valuation of assets and services, ensuring those who generate waste or emissions bear the cost.

- Energy Monitoring: Comprehensive sub-metering for electricity and solar PV generation allows for accurate tracking and management of energy use. This ensures that energy costs are transparently valued and can be managed effectively during the building's operation.
- Efficiency as Value: By designing systems that surpass the minimum requirements of NCC 2022 Section J, the project internalizes the "cost" of energy efficiency into the initial capital investment, providing long-term economic value through reduced utility costs.
- Waste Minimization: Reusing cut and excavation materials for backfilling on-site reduces the economic and environmental costs associated with transporting and disposing of waste.

3.2 WHERE RELEVANT, PROVIDE AN ASSESSMENT OF THE DEVELOPMENT AGAINST THE STANDARDS FOR RESIDENTIAL DEVELOPMENT SET OUT IN CHAPTER 2 OF STATE ENVIRONMENTAL PLANNING POLICY (SUSTAINABLE BUILDINGS) 2022.

3.2.1 PROJECT RESPONSE

Where relevant, the proposed development has been assessed against the sustainability standards for residential development set out in Chapter 2 of the State Environmental Planning Policy (Sustainable Buildings) 2022 (SB SEPP). The assessment addresses the applicable requirements as follows:

3.2.1.1 Energy and Water Performance Standards

- Where relevant, the development will comply with the minimum energy performance standards in accordance with Section 2 of the SB SEPP.
- A NatHERS (Appendix B) and BASIX report (Appendix A) has been prepared for the project in demonstrate the Energy and Water target to be met.

3.2.1.2 On-site Renewable Energy

- On-site renewable energy system has been designed and staged across all buildings of the site.
- Where viable, systems will be integrated into the design to offset base building energy demand, subject to detailed design and structural capacity analysis.

4 PROPOSED ESD INITIATIVES

The proposed development is committed to incorporating best practices ESD initiatives that are appropriate to the intended usage of the buildings. In particular, the proposed ESD initiatives that address the General Sustainability Provisions requirements are detailed below.

4.1 CONSTRUCTION WASTE MINIMISATION

4.1.1 CONSTRUCTION WASTE MANAGEMENT PLAN

Effective waste collection and disposal are crucial for safeguarding the environment and public health today. To ensure responsible handling of demolition and construction waste, a comprehensive waste management plan will be devised and implemented. This plan will encompass strategies for minimizing waste generation, maximizing material reuse, recycling, and reprocessing, and reducing the volume of materials destined for landfill. Cut and excavation materials will also be reused for backfilling or for grading purposes to level the site where possible. As part of the project's waste minimization efforts, the aim is to divert up to 80% of construction and demolition waste from ending up in landfills.

4.2 PEAK ELECTRICITY DEMAND REDUCTION

4.2.1 HEATING, COOLING AND VENTILATION SYSTEMS

The air-conditioning and ventilation systems will be designed to surpass the minimum requirements of the NCC 2022 Section J Energy Efficiency Part J6. The NCC Section J requirements for Part J6 includes minimum requirements for the energy efficient design and control of HVAC systems to reduce and recover energy.

A high-efficiency air-cooled heat rejection system is proposed. The control mechanisms for the air-conditioning system will be engineered to minimize energy consumption by ensuring the schedule and setpoints are appropriate to the intended operation of the buildings.

To enhance efficiency further, ductwork systems will be designed to minimize system pressure losses, thereby reducing the power required by fan motors. This includes selecting equipment that minimizes coil and fitting drops, as well as employing appropriately sized ductwork to minimize friction losses.

In spaces such as bathrooms/toilets, laundries, and equipment plant areas, natural ventilation will be prioritized wherever feasible. Mechanical ventilation will be incorporated only where necessary to ensure air quality and temperature levels.

4.2.2 LIGHTING

The lighting design will comply with NCC 2022 Section J Energy Efficiency Part J7. The illumination density will be in accordance with J7D3. To minimize energy consumption and optimize lighting efficiency, the proposed development will be using LED fittings. The energy efficient light fittings will be complemented by an automatic control system featuring timer controls, PIR occupancy sensors and/or microwave occupancy sensors as appropriate to enhance operational efficiency.

To capitalize on natural daylight, where appropriate, lighting in regularly occupied spaces will be provided with a daylight sensor to adjust artificial light output or turn lights off when sufficient natural daylight is available to the space. For larger areas, perimeter lighting will be segregated into distinct zones to maximize natural light utilization.

External luminaires will adhere to AS 4282:1997 to prevent light pollution and maintain compliance with specified benchmarks for night sky illumination. This will ensure that the project's external lighting does not contribute to light pollution in the surrounding environment and wasting energy at the same time.

4.2.3 DOMESTIC HOT WATER

The project will use heat pump-based technology for domestic hot water to generate hot water energy efficiently.

4.3 MATERIALS

Appropriate building design and material selection will help ensure that thermal comfort can be maintained without overreliance on mechanical systems. Passive design strategies, including the use of performance glazing, shading elements, and effective insulation, will reduce demand for mechanical air conditioning. This will lead to a meaningful reduction in both energy consumption and greenhouse gas emissions.

4.3.1 BUILDING ENVELOPE PERFORMANCE

The building fabric will be designed to meet and/or improve upon the minimum BASIX requirements for the building envelope. Thermal breaks will be incorporated into walls, floors, and roofs where appropriate to ensure a continuous thermal barrier on the building envelope, reducing the flow of thermal energy between conductive materials.

4.3.1.1 BUILDING FABRIC

Building Elements	Indicative BASIX Requirements
Envelope Roof/Ceiling	Insulation Material R-value of 3.0 $K.m^2/W$
Envelope Walls	Insulation Materia R-Value of 2.0 $K.m^2/W$
Spandrel Panels	Insulation Materia R-Value of 1.7 $K.m^2/W$
Envelope Floors	Insulation Materia R-Value of 2.0 $K.m^2/W$

To achieve the above requirements, insulation will be required for the building's walls and roof/ceilings. Insulation serves to mitigate heat transfer, thereby reducing heat loss during winter and heat gain in summer. By effectively managing thermal flow, insulation significantly decreases the heating and cooling demands placed on air-conditioning systems.

Additionally, employing light-coloured roofing material with low solar absorptance (SA) is recommended. This will help deflect more sunlight, thereby minimising summer heat buildup in the roof space. Furthermore, it contributes to mitigating elevated local temperatures, known as the heat island effect. Notably, this approach will also enhance the efficiency of solar PV panels, as their efficiency improves under cooler conditions.

4.3.1.2 EXTERNAL GLAZING

Glazing is a major source of unwanted heat gain in the summer and can cause significant heat loss in the winter due to its low insulation performance. Therefore, a high thermal performance glazing system is recommended. Performance glazing substantially reduces heat transmission. This reduces conduction heat loss in winter and reduces the amount of direct solar heat gains in summer. This will correspond to a reduction of both heating and cooling loads.

The indicative glazing specifications to comply with BASIX assessment is provided below.

Glazing	Indicative Specifications
External Glazing	Refer NatHERS Certificate & Façade specification

4.3.2 SHADING AND DAYLIGHTING

Solar access offers significant benefits for indoor environmental quality by providing access to natural daylight and reducing reliance on artificial lighting. However, excessive solar access, particularly direct solar radiation heat, can lead

to increased HVAC energy demands and thermal discomfort. To harness the advantages of solar access while mitigating its drawbacks, passive design principles are employed.

Passive solar heating aims to harness solar heat for free heating in winter while preventing excessive heat gain in summer. Similarly, passive cooling strategies aim to block heat entry during summer months. These principles leverage site-specific solar access to optimize indoor environmental quality and reduce HVAC energy consumption through tailored shading solutions.

In the proposed building, appropriate external shading devices in the form of eaves will be strategically utilised to block the intense summer sun while allowing the lower winter sun to penetrate for passive heating. These passive design features not only enhance daylighting and external views for occupants but also reduce the need for artificial lighting, leading to improved alertness, mood, and productivity. Additionally, connecting occupants to nature through external views fosters a positive and constructive experience within the built environment.

4.4 INDOOR ENVIRONMENTAL QUALITY

For this project, incorporating the best practice initiatives related to Indoor Environmental Quality (IEQ) is crucial to creating a healthy, comfortable, and productive environment for the occupants. Some sustainable IEQ initiatives tailored within the buildings are listed below.

4.4.1 MAXIMIZE NATURAL VENTILATION AND DAYLIGHT

DUs, common areas, and corridors have been designed to support cross-ventilation, reducing reliance on mechanical cooling and promoting fresh air movement throughout the building. Openable windows and vents further enhance natural airflow.

The design also maximises access to natural daylight through generous windows, lowering the need for artificial lighting. Strategic glazing placement and clear sightlines to landscaped outdoor areas provide visual connection to nature. High VLT (Visible Light Transmittance) glazing allows generous daylight penetration, improving comfort and supporting occupant wellbeing.

4.4.2 AIR FILTRATION SYSTEMS

The buildings will incorporate high-efficiency air filtration systems such as MERV-13 or HEPA filters to remove airborne pollutants, allergens, and particulate matter. This will improve air quality and ensure a healthier indoor environment for occupants.

4.4.3 LOW-VOC MATERIALS

The facility will ensure low-VOC (volatile organic compounds) paints, adhesives, finishes, and materials are being used in the buildings to reduce the release of harmful chemicals.

4.4.4 THERMAL COMFORT

The buildings will incorporate strategies such as individual thermostats, external and internal shading devices to maintain ambient indoor temperatures.

4.4.5 ACOUSTIC DESIGN

Acoustic design measures have been included to create a comfortable learning environment. Acoustic ceilings, double-glazed windows, and insulated internal walls will reduce noise transfer between spaces. These interventions help maintain low noise levels in the DUs, enhancing comfort and speech intelligibility.

4.5 RENEWABLE ENERGY

4.5.1 PHOTOVOLTAICS

To reduce the building's grid electricity consumption and greenhouse gas emissions with an onsite renewable source, a roof-mounted photovoltaic system (PV) is proposed for the project. It is recommended that the PV system should be sized to cover at least 20% of the roof area of a building.

The batteries storage of renewable electricity generated by the solar PV system is not recommended nor is it necessary as this is a daytime building and it will consume the solar electricity as it is generated.

4.6 ENERGY METERING AND MONITORING

4.6.1 ELECTRICITY METERING AND MONITORING

Electricity metering and sub-metering will be provided in accordance with Section J requirements to monitor and manage electricity consumption in the building. Sub-metering is to be provided to enable individual time-of-use energy data recording of the on-site renewable energy equipment. The sub-meters required will 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.

4.7 WATER CONSERVATION

The following water conservation initiatives are proposed to help reduce the use of potable water.

4.7.1 FITTINGS AND FIXTURES

Water-efficient fixtures and fittings will be installed in accordance with the Australian Government's Water Efficiency Labelling Scheme (WELS) to reduce potable water consumption. All fixtures and fittings will meet the minimum WELS Rating as specified in the table below.

Water Fittings / Fixtures	Minimum WELS Rating Proposed for the Buildings	Highest Available Rating (AS/NZS 6400-2016)
Showerheads	4 (>6.0, but <= 7.5L/min)	4
Toilets	4	5
Urinals	5	5
Bathroom Taps	5	6
Dishwashers (excluding commercial equipment)	5	6
Washing Machines (excluding commercial equipment)	4	6

4.7.2 HEAT REJECTION SYSTEM

The project will use of air-cooled heat rejection systems as opposed to water-based heat rejection to reduce water demand.

5 CONCLUSION

The proposed development at Lavender St & Middlemiss St demonstrates a clear commitment to environmentally sustainable design, aligning with the principles of the SB SEPP 2022, SEARs, and recognised industry frameworks. The project integrates passive design, resource efficiency, climate resilience, and inclusive design strategies to deliver high-performance learning environments that are comfortable, adaptable, and low impact.

Through a considered approach to energy use, water conservation, material selection, and indoor environmental quality, the development supports both immediate and long-term sustainability outcomes. Measures to build climate resilience further demonstrates the project's commitment to sustainable design and inclusive values.

This report provides the foundation for integrating sustainability into the design, construction and operational stages of the project. It should be read in conjunction with the supporting architectural and consultant documentation and will be updated as required to ensure compliance with statutory obligations and best practice benchmarks throughout the project lifecycle.

APPENDIX A – BASIX CERTIFICATE