

Stephen Road Multi-level Warehouse

49-61 Stephen Road, Banksmeadow

REV 02

SSDA Sustainability Report



E-LAB Consulting
Where Engineering and Science Inspire Design.



DOCUMENT VERIFICATION

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Executive Summary

E-LAB Consulting has been commissioned by ESR Developments (Australia) Pty Ltd to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the State Significant Development Application (SSD-65924461) for the proposed construction and operation of two three-storey warehouse and distribution centre buildings at 49-61 Stephen Road, Banksmeadow.

This report presents a summary of the ESD strategies proposed and commitments made for the development. The developer is aiming to deliver an affordable, sustainable outcome for the project by demonstrating a strong commitment to sustainability in its design, construction, and operation.



Figure 1: Aerial Photograph (Source: Urbis)

The proposed sustainability elements include:

- Committed to achieving **5 Star Green Star Buildings v1 Certification** for the proposed warehouse;
- Committed to achieving **5.5 Star NABERS energy** and minimum **3 Star NABERS water rating** for the office components;
- Reporting on the embodied emissions;
- Committing to Net Zero (refer to project's Net Zero Statement);
- No gas on site to reduce fossil fuel consumption;
- Significant on-site energy generation through a major solar PV array on the roof to reduce operational energy and GHG emissions associated with the site;
- Water Sensitive Urban Design Principals being upheld;
- Water recycling through rainwater storage with excess discharged into bio-retention and detention areas;
- Targeting 90% of Construction and Demolition diverted from landfill;
- Providing parking capacity for electric vehicles to prepare for a decarbonised future;
- Urban heat island effect mitigation strategies; and
- Following a range of sustainability initiatives across the site spanning energy efficiency, thermal performance, indoor environment quality, waste management, and comfort.

The strategies and initiatives presented in this report demonstrate a strong commitment to sustainability in line with the Bayside Council Development Control Plan and the State Environmental Planning Policy (Sustainable Buildings) 2022 and are to be further developed during subsequent stages of the project.

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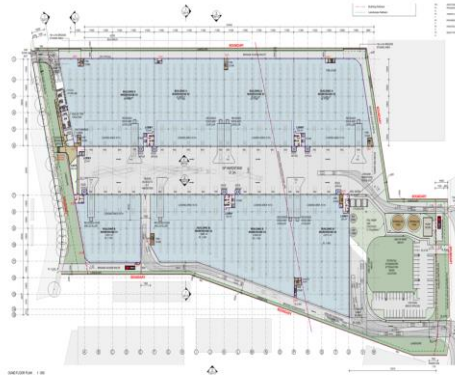
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Introduction

1. INTRODUCTION

This section provides a brief overview of :

- a. The purpose of this document
- b. The project background
- c. The project site and context
- d. Response to SEARS
- e. Response to Bayside Council Development Control Plan
- f. Response to the State Environmental Planning Policy (Sustainable Buildings)

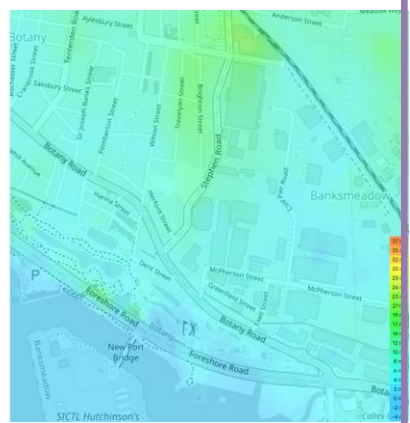


Sustainability Frameworks

2. SUSTAINABILITY FRAMEWORKS

This section provides a brief overview of :

- a. Bayside Development Control Plan
- b. State Environmental Planning Policy (Sustainable Buildings)
- c. Green Star Buildings v1
- d. NABERS Energy and Water
- e. NABERS Embodied Emissions Reporting
- f. Performance Standards for Net Zero Ready Energy Buildings

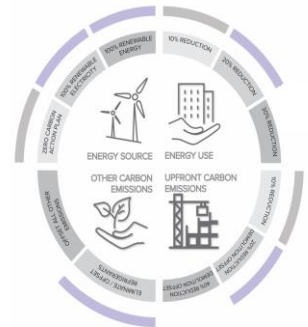


Project Design Response

3. PROJECT DESIGN RESPONSE

This section provides a brief overview of :

- a. EPA Principles
- b. Energy
- c. Water Consumption & WSUD
- d. Materials
- e. Comfort and Quality
- f. Urban Heat Island Mitigation
- g. Section J
- h. Sustainable Transport



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- a. The purpose of this document
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Planning Policy (Sustainable Buildings
2022)

1.1 Project Overview

The subject site is located at 49-61 Stephen Road, Banksmeadow, within the Bayside local government area (LGA). The site is legally described as Lot A in Deposited Plan 190526, Lot 1 Deposited Plan 1095110, and Lot 1 Deposited Plan 311767. The site is identified in the Ground Floor Plan on the preceding page.

Key features of the site are as follows:

- The site is bounded by Stephen Rd and Coal Rd.
- The site has been developed and currently accommodates the Allnex Resins manufacturing site. The site presents a two-storey office building towards the Stephen Road frontage, with 20 warehouse and ancillary use buildings as well as numerous chemical storage tanks.

Key features of the locality:

The site is located in the Banksmeadow Industrial Precinct, approximately 10km from Sydney CBD, 1.5 kilometres from Port Botany and 3km from Sydney Airport. The site is located in close proximity to existing employment and industrial areas including the Botany Port and Sydney Domestic and International Airports

The site is surrounded predominantly by a mix of industrial and warehouse and distribution uses to the north, east and south, and residential land uses to the west.

Due to the existing and current use of the site and the handling and manufacturing of chemical products, a stormwater retention/remediation treatment pond is located along the Coal Pier Road frontage along the eastern boundary.

Existing planted vegetation is located along the site's boundaries predominately along the western and northern setback areas assisting in screening the development from Stephen Road and the Southgate Industrial Estate development to the north. A cleared grassed area is located to the rear of the site beside a stormwater retention and treatment pond

1.2 Project Description

The proposed SSDA seeks approval for the following:

- Site establishment works, including demolition of all existing built form, tree removal, minor excavation / bulk earthworks and remediation of the site.
- Construction and operation of two three-storey warehouse and distribution centre buildings including the following key components:
 - Approximately 57,020m² of total GFA comprising:
 - 51,181m² of warehouse area.
 - 4,775m² of office area.
 - 964m² of lobby space.
 - 100m² café.
 - Two warehouse buildings of three storeys containing:
 - Twelve (12) units within Warehouse A (3 levels).
 - Twelve (12) units within Warehouse B (3 levels).
- Total of 313 car and motorbike parking spaces
- End of trip facilities.
- Site landscaping works totaling 5,000m² (10.38% of the site), and
- Provision of building/business identification signage

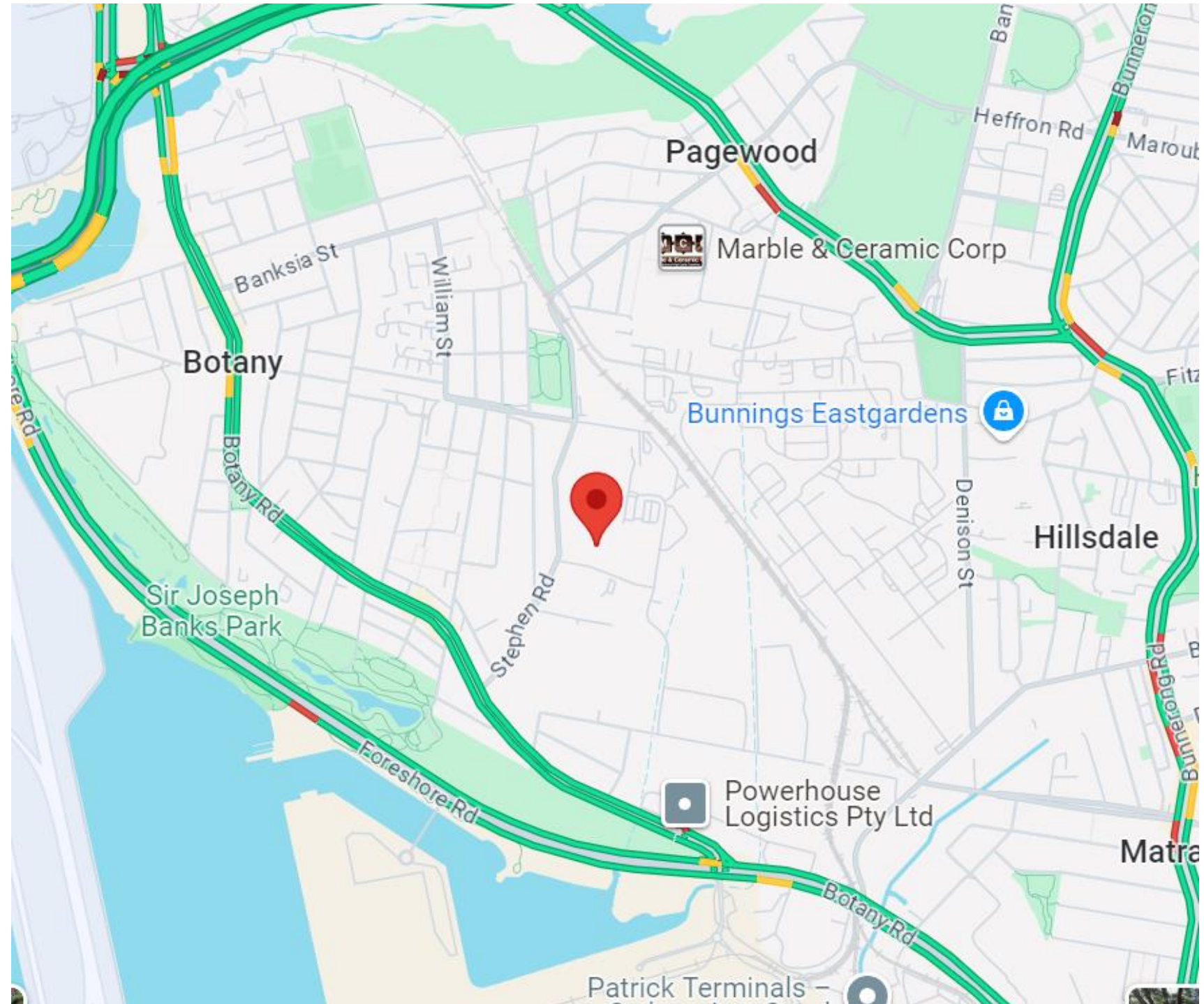


Figure 2: Subject Site (Source: Google Maps)



1.3 Response to the Secretary’s Environmental Assessment Requirements (SEARS)

Requirement	Response
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.	This report outlines how ESD Principles (as defined in clause 7(4) of Schedule 2 of the EPA) are incorporated in the design and ongoing operations of the development.
Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	Section 3.2 of this report outlines the substantial energy efficiency measures to minimise the development’s greenhouse gas emissions including carbon emissions.
Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government’s goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.	Sections 3.2, 3.3 and 3.4 of this report outline how the development minimises its environmental impact through sustainable design and operation.
If Chapter 3 of SEPP (Sustainable Buildings) 2022 applies: • demonstrate how the development has been designed to address the provisions set out in in Chapter 3.2(1). • provide a NABERS Embodied Emissions Material Form to disclose the amount of embodied emissions attributable to the development in accordance with section 35BA of the EP&A Regulation.	Chapter 3 of SEPP (Sustainable Buildings) 2022 is applicable for this project since the office area > 1000m². Section 1.5 of this report outlines the requirements of Chapter 3.2(1) and the projects response. Section 2.5 of this report outlines the NABERS Embodied Emissions Form.



1.4 Response to the Bayside Development Control Plan 2022

This section outlines how the development will address the Bayside DCP controls. These are:

1.4.1 Section 3.3 Energy and Environmental Sustainability - 3.3.1 General

Requirement	Response
Areas of glazing are located to avoid energy loss and unwanted energy gain.	Designed for, demonstrated through Section J and NABERS Commitments. Refer to Architectural documentation submitted as part of this SSDA package.
Development provides appropriate sun protection during summer for glazed areas facing north, west and east, whilst allowing for penetration of winter sunlight.	Designed for. Refer to Architectural documentation submitted as part of this SSDA package.
Extensive areas of glazing that are unprotected from sun during summer are not permitted. Shading devices include eaves, awnings, balconies, pergolas, external louvers, and projecting sunshades. Unprotected tinted windows are not acceptable.	Design has considered glazing ratios. Refer to Architectural documentation submitted as part of this SSDA package.
Lighting for streets, parks and any other public domain spaces provided as part of a development should use energy efficient lighting such as LED lighting.	Refer to Section 3.2 Energy.
Ensure the location of windows, doors and internal layout of the building promotes air movement for cooling.	Refer to Architectural documentation submitted as part of this SSDA package.
For all developments where BASIX is not applicable, the following water efficiency design elements must be included and demonstrated on the plans: a. new or altered showerheads are to have a flow rate of no greater than 9 litres per minute or a 3 star or greater rating b. new or altered toilets are to have a flow rate no greater than 4 litres per average flush or a 3 star or greater rating c. new or altered taps must have a flow rate no greater than 9 litres per minute or 3 star or higher water rating	Refer Section 3.3 Water Consumption and WSUD.



1.4 Response to the Bayside Development Control Plan 2022

1.4.1 Section 3.3 Energy and Environmental Sustainability - 3.3.1 Non-Residential Development

Requirement			Response
Development is to be designed and constructed to reduce the need for active heating and cooling by incorporating passive design measures including design, location and thermal properties of glazing, natural ventilation, appropriate use of thermal mass and external shading, including vegetation.			Refer to Section 3.2 Energy.
Rainwater tanks are to be installed for all non-residential developments, including major alterations and additions that have access to a roof form from which rainwater can be feasibly collected and plumbed to appropriate end uses.			Refer to Section 3.3 Water Consumption and WSUD.
Development is to be designed and constructed to meet the rating systems shown in Table 1			Refer to Section 2.4 NABERS Energy and Water (required for the office component of the development only). Committed to achieving 5 Star Green Star Buildings v1 Certification. Refer to Section 2.3 for Green Star pathway.
Development type	Energy	Water	
Hotels (new hotels only)	Minimum 4.5-star NABERS rating or equivalent	Minimum 4-star NABERS rating or equivalent (new hotels only)	
Office development over 1,000sqm NLA (including within mixed use schemes and significant alterations and additions valued at over \$5m)	Base building to achieve a minimum 5-star NABERS rating or equivalent (140kgCO2e/sqm/year)	Base building to achieve minimum 4-star NABERS rating or equivalent (0.65kL of water use/sqm/year)	
Shopping centres/retail development over 15,000sqm GLAR	Base building to achieve minimum 5-star NABERS rating or equivalent (100kgCO2e/sqm/year)	Base building to achieve minimum 4-star NABERS rating or equivalent (0.95kL/sqm/year)	
Industrial development over 20,000sqm GFA	Minimum 5-star Green Star rating or equivalent	Minimum 5-star Green Star rating or equivalent	



1.4 Response to the Bayside Development Control Plan 2022

This section outlines how the development will address the Bayside DCP controls. These are:

1.4.1 Section 3.3 Energy and Environmental Sustainability - 3.3.2 Natural Daylight and Ventilation

Requirement			Response
Buildings must comply with the following minimum ceiling heights to facilitate adequate natural lighting and ventilation:			Refer to Architectural documentation submitted as part of this SSDA package.
Development Type	Habitable Rooms	Non-Habitable Rooms	
Residential	2.7m	2.4m	
Retail & Commercial	3.3m	2.4m	
First Floor & Above of Mixed-Use Building	3.3m	2.4m	
Buildings must be designed to maximise opportunities for cross flow ventilation by providing clear breeze paths and shallow building depths. The maximum internal plan depth of a residential apartment should be 18m from glass line to glass line. Developments that propose greater than 18m must demonstrate how satisfactory daylight and natural ventilation is achieved.			Refer to Architectural documentation submitted as part of this SSDA package.
Windows that can open and which are designed to provide controlled air flow should be installed.			Refer to Architectural documentation submitted as part of this SSDA package.
Buildings must have an adequate number of openings at each level to allow natural light and ventilation, including lift lobbies and entries.			Refer to Architectural documentation submitted as part of this SSDA package.
Office premises must be designed to receive natural light and ventilation. Office floor plates are to have a depth of no greater than 20m if dual aspect, or 10m if single aspect. Office spaces should be designed, through orientation and the inclusion of environmental control devices, to achieve maximum daylight without compromising the internal amenity through glare or heat gain from direct sunlight.			Refer to Architectural documentation submitted as part of this SSDA package.



1.4 Response to the Bayside Development Control Plan 2022

This section outlines how the development will address the Bayside DCP controls. These are:

1.4.1 Section 3.3 Energy and Environmental Sustainability - 3.3.2 Natural Daylight and Ventilation

Requirement	Response
Each industrial unit within an industrial complex must have a reasonable size window at each level to allow natural light and ventilation.	Refer to Architectural documentation submitted as part of this SSDA package.
On deep sites, courtyards and light wells should be provided on the lower levels of mixed use and commercial buildings to achieve natural lighting of every level and cross ventilation and/or stack effect ventilation.	Refer to Architectural documentation submitted as part of this SSDA package.



1.4 Response to the Bayside Development Control Plan 2022

This section outlines how the development will address the Bayside DCP controls. These are:

1.4.1 Section 3.3 Energy and Environmental Sustainability - 3.3.2 Reflectivity

Requirement	Response
A Reflectivity Report that analyses potential solar glare from the proposed building design may be required for tall buildings.	Refer to Architectural documentation submitted as part of this SSDA package.
For buildings in the vicinity of arterial roads/major roads and Sydney Airport, proof of light reflectivity is required and is to demonstrate that light reflectivity does not exceed 20%.	Refer to Architectural documentation submitted as part of this SSDA package.
The placement, orientation and configuration of new buildings and facades must not result in glare that produces discomfort or endangers safety of pedestrians or motorists.	Refer to Architectural documentation submitted as part of this SSDA package.
Materials must be durable and can be easily cleaned and are graffiti resistant.	Committed to and will be incorporated into the design
National Airports Safeguarding Framework Guideline E - Managing Pilot Lighting Distraction should be referred to where relevant. This is available to view at: https://www.infrastructure.gov.au/infrastructure-transport-vehicles/aviation/aviation-safety/aviation-environmental-issues/national-airports-safeguarding-framework/national-airports-safeguarding-framework-principles-and-guidelines .	Refer to Architectural documentation submitted as part of this SSDA package.



1.4 Response to the Bayside Development Control Plan 2022

This section outlines how the development will address the Bayside DCP controls. These are:

1.4.1 Section 3.3 Energy and Environmental Sustainability - 3.3.5 Energy Assessment

Requirement	Response
A report on energy and water efficiency is to be submitted with a development application for any building works with a construction cost of \$1,000,000 or more. The report must address how the principles of this DCP Part have been incorporated which should include but not necessarily be limited to: a. Whether the building has achieved a NABERS or Green Star rating. b. Passive solar design principles used to avoid the need for additional heating and cooling. c. How energy efficiency has been incorporated into the design in general, such as the incorporation of building articulation to allow daylight into ground and first floor levels. d. Justification of hot water systems selection. e. Overshadowing of adjoining properties. f. Total anticipated energy consumption. g. Water efficient fixtures and water conservation measures. h. How demand for water and discharge of wastewater will be minimised. i. Incorporation of renewable energy types such as solar hot water heating. j. Use of recycled building materials and materials with low embodied carbon. k. Use of materials that are non-polluting in manufacture, use and in disposal. l. Use of roof lights and vents to internal service rooms at roof top level to minimise reliance on artificial light and ventilation. m. Use of advanced air conditioning systems and new technologies such as chilled beam air conditioning and waste heat recovery systems for larger buildings. n. Incorporate water conservation measures as referred to in this DCP.	Refer to Section 2.4 NABERS Energy and Water (required for the office component of the development only). Committed to achieving 5 Star Green Star Buildings v1 Certification. Refer to Section 2.3 for Green Star pathway.



1.5 Response to the State Environmental Planning Policy (Sustainable Buildings) 2022

This section outlines how the development will address the State Environmental Planning Policy. These are:

1.5.1 Chapter 3 Standards for Non-Residential Development

Requirement	Response
To ensure minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials,	Refer to Section 3.4 Materials.
Ensure a reduction in peak demand for electricity, including through the use of energy efficient technology,	Refer to Section 3.2 Energy.
Ensure a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,	Refer to Section 3.2 Energy.
Ensure generation and storage of renewable energy,	Refer to Section 3.2 Energy.
Ensure strategy is in place for metering and monitoring of energy consumption,	Under Green Star Pathway, refer to Appendix.
Ensure strategy is in place for the minimisation of the consumption of potable water.	Refer to Section 3.3 Water Consumption & WSUD.
Ensure the embodied emissions attributable to the development have been quantified.	Refer to Section 2.5 NABERS Embodied Emissions Reporting.
Ensure the use of on-site fossil fuels is minimised, as part of the goal of achieving net zero emissions in New South Wales by 2050.	Refer to Section 2.6 Performance Standards for Net Zero Ready Energy Buildings and Net Zero Statement provided separately.
Ensure the development is capable of achieving the standards for energy and water use specified in Schedule 3 of the SEPP.	Refer to Section 2.4 NABERS Energy and Water (required for the office component of the development only).
For the purposes of the above requirement, ensure development is capable of achieving a standard specified in Schedule 3 if there is a NABERS commitment agreement in place to achieve the standards.	Refer to Section 2.4 NABERS Energy and Water (required for the office component of the development only).

2. SUSTAINABILITY FRAMEWORKS

This section provides a brief overview of :

- Bayside Development Control Plan
- State Environmental Planning Policy (Sustainable Buildings)
- Green Star Buildings v1
- NABERS Energy and Water
- NABERS Embodied Emissions Reporting
- Performance Standards for Net Zero Ready Energy Buildings



2.1 Bayside Development Control Plan 2022

The Bayside Development Control Plan 2022 outlines the requirements for the development in accordance with the principles of green building design, which include:

- Use energy efficiently
- Minimise the use on non-renewable energy
- Reduce the peak demand on energy supply systems
- Reduce greenhouse gas emissions
- Reduce the use of potable water
- Make buildings more comfortable for occupants all year round
- Reduce energy bills and the lifecycle cost of energy services

2.2 State Environmental Planning Policy (Sustainable Buildings)

In NSW there are currently no consistent sustainability provisions for that consent authorities can refer to when assessing non-residential buildings. To address this, the new Sustainable Buildings State Environmental Planning Policy (SEPP) asks consent authorities to consider how the building will address the following sustainability requirements:

- Minimise waste from associated demolition and construction, including choice and reuse of building materials,
- Reduce in peak demand for electricity, including through the use of energy efficient technology,
- Generate and store renewable energy,
- Reduce reliance on artificial lighting and mechanical heating and cooling through passive design;
- Meter and monitor energy consumption,
- Minimise consumption of potable water.
- Report on the embodied emissions
- Prepare a Net Zero Statement
- Achieve 5.5 Star NABERS energy (for the office component only)
- Achieve 3 Star NABERS water (for the office component only)



2.3 Green Star Buildings v1

The development also aims to meet and exceed industry best practice sustainability requirements within its design as part of the sustainability commitments associated with construction and operation. The development is recommended to will be targeting at minimum a **5 Star Green Star Buildings v1 rating**, by achieving ESD in the seven categories (+ leadership) identified in the Green Building Council of Australia’s benchmarking tool:



Responsible

Recognises activities that ensure the building is designed, procured, built and handed over in a responsible manner.



Places

Supports the creation of safe, enjoyable, integrated and comfortable places.



Healthy

Promotes actions and solutions that improve the physical and mental health of occupants.



People

Encourages solutions that address the social health of the community.



Resilient

Encourages solutions that address the capacity of the building to bounce back from short-term shocks and long-term stresses



Nature

Encourages active connections between people and nature and rewards creating biodiverse green spaces in cities.



Positive

Encourages a positive contribution to key environmental issues of carbon, water and the impact of materials.



Leadership

Recognises projects that set a strategic direction, build a vision for industry or enhance the industry’s capacity to innovate.

2.3 Green Star Buildings v1 - Climate Positive Pathway

The Climate Positive Pathway is worth 15 points (plus one Leadership Point) and from 2023 onwards, all 5-star project will be required to achieve the climate positive pathway. The following elements are required:

- Upfront Carbon Emissions: Building upfront carbon emissions are at least 20% less than those of a reference building and demolition works are offset
- Energy Use: The building's energy use is at least 20% less than a reference building, or for office buildings, its energy use is modelled to perform at a 5.5 star NABERS Energy with 25% modelling margin
- Energy Source: 100% of the building's energy comes from renewables (i.e. through onsite renewable energy and a renewable energy contract for ESR scope of energy)
- Other Carbon Emissions: Emissions from refrigerants are eliminated or offset





A 5 Star Green Star Buildings v1 pathway has been developed for this development. A summary of the points targeted is presented in the table below.

Category	Points Available	5-star Pathway
Responsible	17	6
Healthy	14	9
Resilient	8	2
Positive	30	16
Places	8	3
People	9	1
Nature	14	4
Leadership	5	3
Total	105	44
Min. Required for 5-star	-	(35)

Please refer to the Green Star Buildings v1 Pathway in the Appendix for more detail into the credit requirements and responsible parties.

2.4 NABERS Energy and Water

For compliance with the Sustainable Buildings SEPP, large commercial developments that must obtain a NABERS Energy and Water rating include offices over 1000m².

Thus, the office component of this development is required to achieve the following NABERS Energy and Water ratings:

- 5.5 star NABERS energy rating and
- 3 star NABERS water rating.

The proposed strategy to achieve these ratings are as follows:

- Energy and water initiatives are detailed in the following sections of the report: Section 3.2 Energy and 3.3 Water Consumption & WSUD.
- To meet the energy and water standard application requirements, the development must identify preferred Section J energy reporting pathway, effective water-saving measures and submit [NABERS Energy and NABERS Agreement to Rate](#) with development application.

Office
Buildings
(>1000m²)

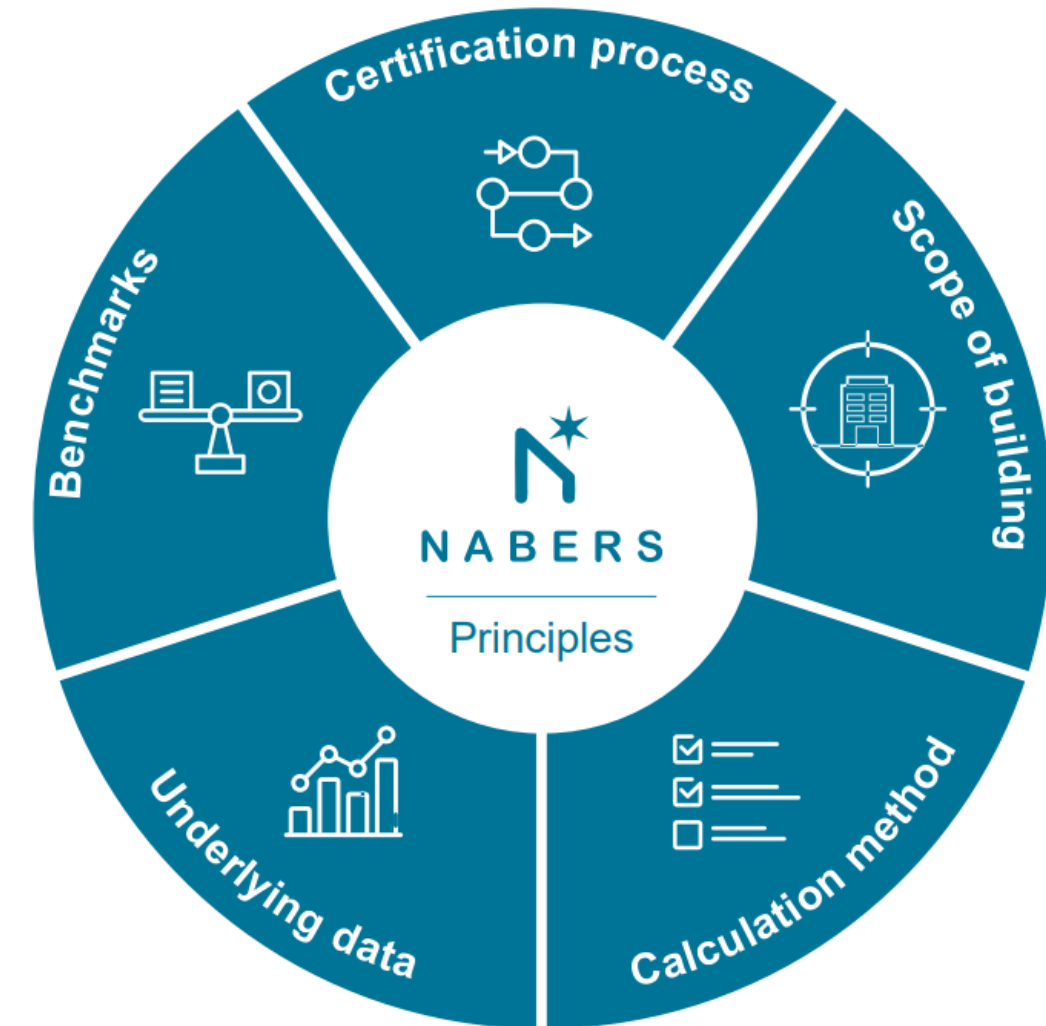


2.5 NABERS Embodied Emissions Reporting

For compliance with the Sustainable Buildings SEPP, reporting of the embodied emissions of non-residential building are required. Disclosure of embodied emissions will be via the NABERS embodied emissions material form. This interim form will be in used until the NABERS embodied emissions framework and related emissions factors comes into effect in 2024.

In alignment with best practice, we've identified the key initiatives to help reduce the embodied emissions of the development:

- Use salvaged and/or recycled materials
- Optimise systems for material efficiency
- Specify low carbon concrete
- Specify materials that naturally sequester carbon
- Specify materials manufactured with renewable energy
- Design for durability
- Get to know the supply chain for your specified project.



2.6 Performance Standards for Net Zero Ready Energy Buildings

In alignment with best practice, the development's commitment to sustainability, the project proposes to be ready for net zero carbon emissions.

This includes the following strategies:

- Preparing a Net Zero Statement
- Reducing energy loads and usage;
- At least 90% of C&D waste is diverted from landfill;
- On-site renewable energy through a large photovoltaic array; and
- Eliminating gas to remove fossil fuel consumption and prepare for a decarbonised grid.
- Committing to become Carbon Neutral in operation by 2035 under ESR's sustainability strategy

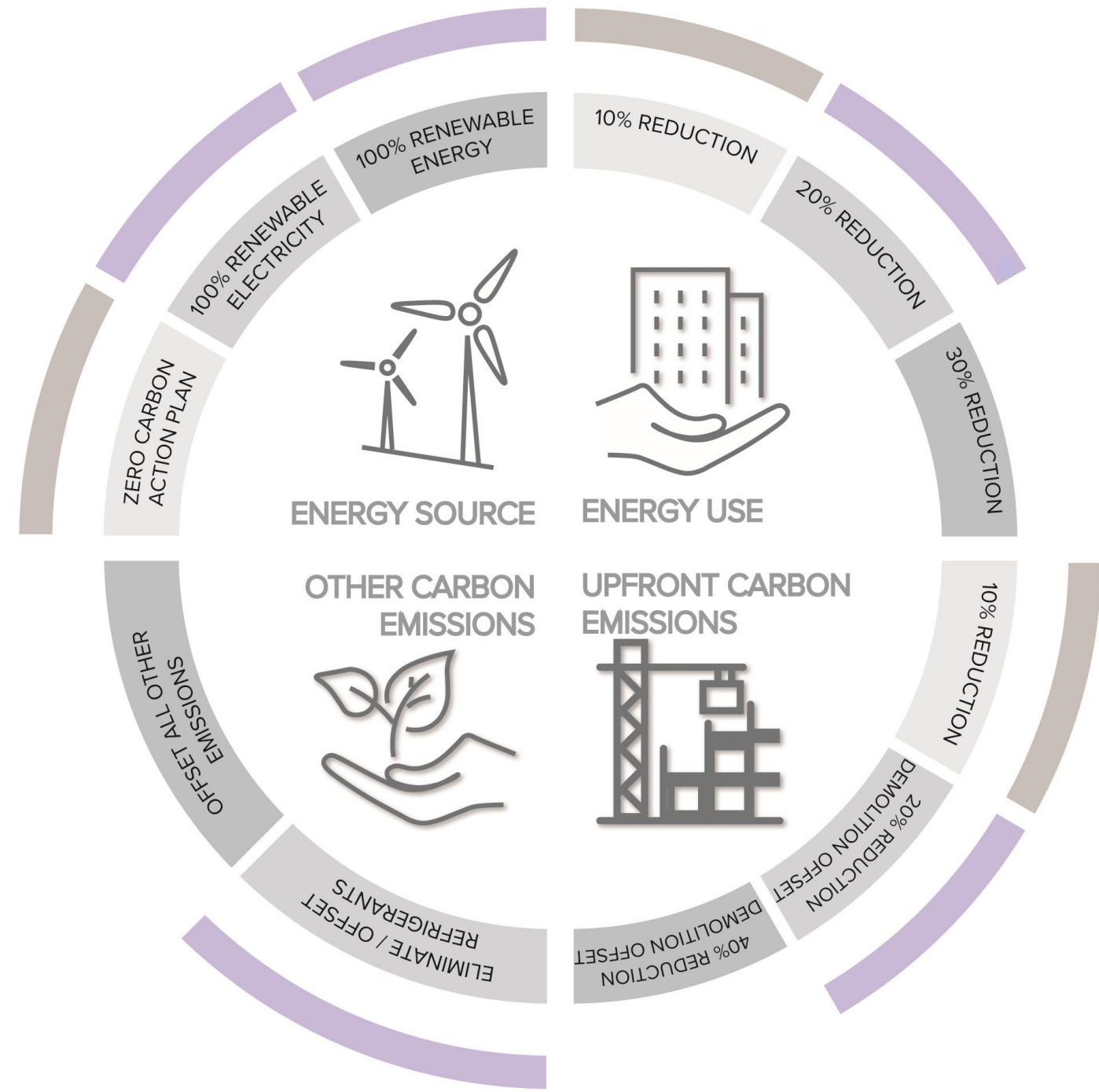


Figure 3: Net Zero (Source: Energy Matters)

3. PROJECT DESIGN RESPONSE

This section provides a brief overview of :

- a. EPA Principles
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- e. Comfort and Quality
- f. Urban Heat Island Mitigation
- g. Section J
- h. Sustainable Transport



3.1 EPA Principles

The proposed development will follow the golden standard in sustainability principles throughout the development. This includes the design, construction, and operational elements of the project. The key overarching principals are aligned with the definition of Ecologically Sustainable Development as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2021. These include:

The Precautionary Principle:

Philosophy: Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

Project Response: The project is committed to incorporating elements to minimise impacts on the environment, as outlined below in this section of this report. A commitment to improvement on minimum benchmarks demonstrates the development's commitment to sustainability.

The Principle of Inter-generational Equity:

Philosophy: The present generation should ensure that the health, diversity, and productivity of the environment is maintained or enhanced for the benefit of future generations.

Project Response: The project is committed to incorporating careful selections into the project design. The design team will address key elements such as energy, potable water, and material consumption to do what is within the project's control to allow each following generation to have an opportunity for ecological equality.

The Principle of the conservation of biological diversity and ecological integrity:

Philosophy: Conservation of biological diversity and ecological integrity should be a fundamental consideration

Project Response: The project is committed to planting native vegetation and using integrated landscaping to enhance the overall ecological and biodiversity of the site. Rainwater and stormwater will be carefully managed and controlled to minimise impacts on surroundings.

3.1 EPA Principles

Principles relating to improved valuation, pricing, and incentive mechanisms:

Philosophy: Environmental factors should be included in the valuation of assets and services. The users of goods and services should pay prices based on the full life cycle costs of providing goods and service.

Project Response: The project will target a construction waste diversion target of 90%, as well as developed specific project waste management strategies. These combine to ensure the project pays for the waste and damage it creates. Further, it is designed to be low-energy and low-water consumption, which provides an incentive for residents through lower utility bills.

The Principle of Waste Minimisation:

Philosophy: All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.

Project Response: The project will target a construction waste diversion target of 90%, as well as developed specific project waste management strategies. Construction materials are chosen to be low impact in their manufacture, including best practice PVC and FSC/PeFC timber throughout where possible. This impacts waste both created by the site, as well as upstream and downstream waste categories.

The above principles are addressed by 5 key themes, being Sea, Land, Water, Air and People. These 5 key themes are centred around reducing harm as far as practicable across the practice of buildings and infrastructure, both in their construction and operation.

3.2 Energy

ESR’s Net Zero Carbon Policy outlines ESR’s commitment to achieving net zero emissions by 2050 align with the 1.5°C pathway. This is to be achieved through comprehensive and complete consideration of how the development consumes resources, including energy, water, and material efficiency.

The energy efficiency strategy generally follows the energy efficiency pyramid of design in Figure 4. In the first instance demand for greenhouse gases should be reduced. Consideration should be to remove the need for energy to be consumed where possible. Beyond this, energy can be more efficient, through efficient lighting, mechanical systems, and appropriate services.

Once the system has reduced all available energy-consuming elements and made the remaining systems as efficient as possible, renewable energy sources will be considered. PV will be installed at a rate that maximises the coverage of the non-trafficable roof area. Only after all the above steps have been completed should offsets be used to close the gap and achieve neutrality.

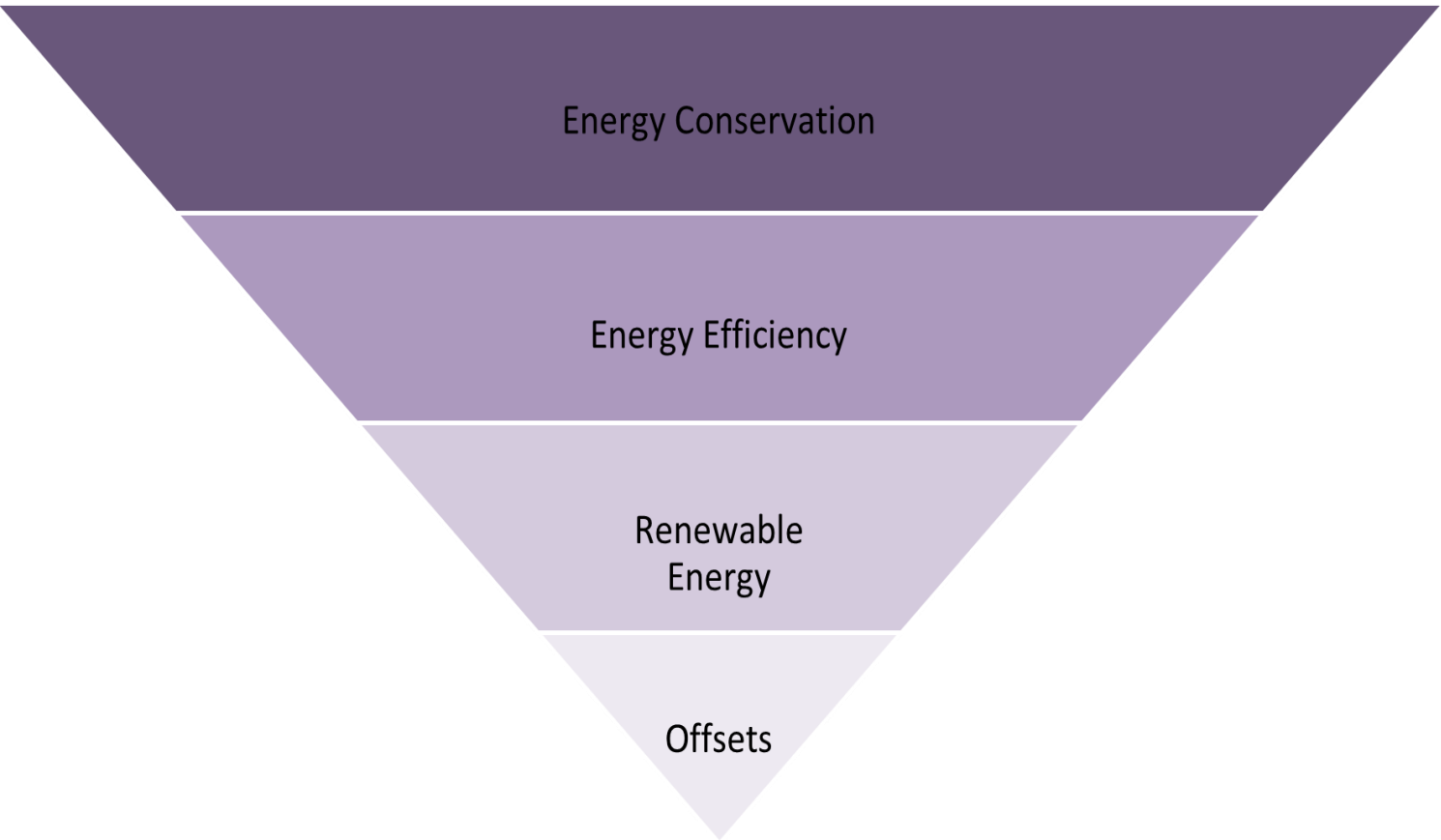
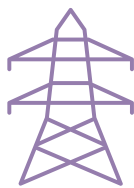


Figure 4. Energy efficiency pyramid: pathway to carbon neutrality

3.2 Energy



Electrification - No gas will be used on site, enabling the development to be ‘net zero ready’ and allow the benefits of decarbonisation of the grid to be realised.



Renewable Energy - The roof area provides an excellent opportunity for installation of a solar photovoltaic system. The sizeable system will generate renewable electricity to offset grid use and minimise stress on the grid at peak times. PV will be installed at a rate that maximises the coverage of the non-trafficable roof area. Further consideration will be required to appropriately size the number of photovoltaic panels.



Efficient Lighting Systems - High efficiency low-flicker LED lighting throughout, including in common areas with efficiency controls to meet the requirements of NCC 2022 Section J Part J7. Controls will include motion sensors, time clocks and zoned switching.



Controls, Energy Metering and Monitoring - Energy meters and monitoring systems will be provided to comply with NCC 2022 Section J Part J9 requirements. Preference for natural ventilation and comfort through adaptive cooling and shading. Mechanical ventilation including heating and cooling to be controlled effectively with bespoke controls and systems reducing energy consumption when not required.



Hot Water - Hot water is likely to be provided by energy efficient heat pump systems. These systems are highly efficient and can be run off the solar PV system to reduce the operational carbon of the development.



Integration of Cool Roofing - roofing with a high albedo will reduce Urban Heat Island effect and reduce load on the HVAC system.

3.3 Water Consumption & WSUD

To achieve responsible water consumption and water sensitive urban design, best practice water-saving initiatives will need to be implemented throughout the project. The following initiatives will be explored to achieve the potable water targets:



Sanitary Fixtures - By implementing low-flow water fixtures, the consumption will be significantly reduced. All sanitary fixtures are to be provided with the minimum WELS ratings identified below:

Taps - 6 Star WELS

Toilets - 5 Star WELS

Urinals - 6 Star WELS (0.8 L per flush)

Showers - 3 Star WELS (<9 L/min)



Landscape Irrigation - Efficient irrigation systems will be considered, including underground surface drip systems, moisture sensors, and the use of native plants in the landscaping plan. Native plants have evolved to thrive in the Australian environment and are typically more resilient than their exotic counterparts. They typically require less water and are more likely to survive the predicted increase in extreme drought conditions due to climate change. Native vegetation also stores a significant amount of carbon, helping to mitigate climate change.



Recycled water and rainwater - the development will supply most of the toilet flushing, irrigation, and washdown needs from a minimum 100kL on-site rainwater tank. Rainwater will be captured from the roof of the buildings to reduce potable water demand. Additionally, stormwater re-use to be considered where possible to maximize usage which can be incorporated into landscape irrigation as well.

The development’s design is deliberately working to reduce potable water consumption by in the first instance reducing water use by implementing low-flow water fixtures and efficient irrigation system, then offsetting it through rainwater tanks. The rainwater tanks are designed to meet as much of the site irrigation needs as possible.

3.4 Materials

In line with the principals of sustainability outlined in the EPA, the project will have a significant focus on materiality. The scope of consideration includes the following action items within the project response:

- **Construction Waste** - At least 90% of construction and demolition waste is diverted from landfill. This diverts and ensures reuse or recycling of a high portion of site waste.
- **Low VOC and Low Formaldehyde Materials** - paints, adhesives, sealants, floor coverings, carpets and engineered wood will be selected appropriately to provide a healthier and low-impact environment. Such efforts provide a cleaner and better environment for all.
- **Best-Practice PVC** - cables, pipes, flooring, and blinds will be selected and specified to be Best Practice PVC. This ensures upstream performance will be met and has significant benefit for the overall environment during the construction process.
- **Best Practice Steel** - Where possible, steel will come from a sustainable steel manufacturer, who has an action plan.
- **FSC/PeFC Timber throughout** - where possible, timber, including virgin and engineered timber through construction and fitout elements under the builder's control will be specified as FSC/PeFC. This ensures the timber provided to site is of the highest standard and sourced from sustainable sources.
- **Sustainable Concrete** - where possible deemed practical from the LCA, concrete to implement sustainable mixtures of cement such as fly ash or blast slag to reduce embodied carbon.
- **Waste Management Plan** - Development of an ongoing Waste Management Plan so waste can be sorted, separated, and recycled. This will assist ongoing diversion from landfill for the development. Operational waste to be managed to ensure diversion continues during operations and ensure ample recycling storage is provided along which will aid in reducing landfill waste.

3.5 Comfort and Quality

To ensure the best quality for users and visitors inside the space, the development will commit to the following key initiatives:

- **Visual Comfort** - Maximising high-quality light into the office spaces, with views to the sky and nature where possible.
- **Acoustic Excellence** - Designing the building layout to be protected from noise from external sources. Delicate material selection, acoustic attenuation, and designing the shape of the building and openings accordingly achieves the performance.
- **Thermal Comfort** - Appropriate mix of vernacular design, overhangs, adaptive comfort and high levels of insulation in the roof and facades. Adaptive cooling will be integrated into the design based on tenant needs and high-occupancy spaces. Section J modelling will capture the benefits.
- **Lighting Comfort** - Use of high colour rendering index (CRI > 85) LED lighting throughout the entire development. Low-glare lighting with baffles or louvres to limit UGR.
- **Glazing Requirement** - ensuring external glass does not to exceed 20% reflectivity to minimize discomfort from glare and reflected heat.

- **Generous Natural Planting** - Greenery through natural planting throughout the development assists in a connection to nature for users and passers-by. It also has a cooling effect, reducing the Urban Heat Island burden on the project.

The above combine to ensure the development is responsible, efficient, beautiful, and in the best interest of not just the developers, but the residents, community, and society as a whole.

3.6 Urban Heat Island Mitigation

The site experiences the urban heat island effect warmer than Sydney’s baseline, so reducing heat at the local scale is recommended.

In response to the fact Sydney is getting hotter, the site’s baseline heatwave temperature experiences peaks approx. 6-9°C above the baseline, as defined by the NSW government for Urban Heat Island Effect (<https://www.seed.nsw.gov.au/>).

To minimise the urban heat island effect and provide a more comfortable environment for occupants, the development is to consider the following initiatives:

- Implement native landscaping throughout the site, particularly around satellite office spaces where occupants are likely to spend extended periods.
- Incorporate green walls and roofs where appropriate.
- Extensive tree planting with wide canopies throughout the above ground car park
- Introduction of architectural treatments to foster façade shading.

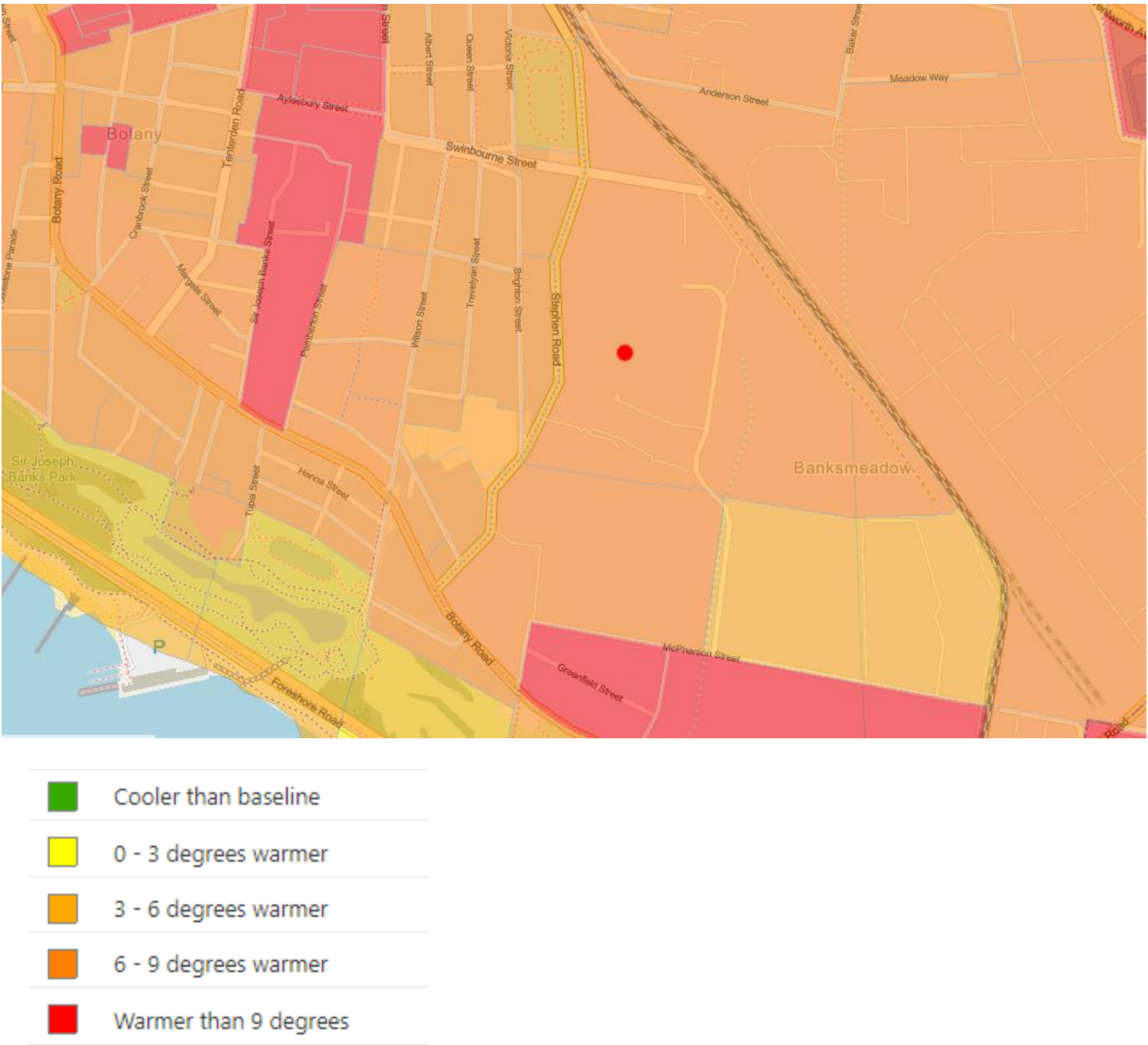


Figure 5. Urban heat island effect at the site. (Source: SEED Database)

3.7 Section J

The proposed development will be subject to compliance with Section J under the NCC 2022 code. This code places strict environmental performance requirements on the building envelope and services within the building.

The project will demonstrate compliance via verification method J1V3 - verification using a reference building (energy modelling). The design of the building fabric will need to demonstrate compliance with this clause through dynamic modelling of the building against a reference case.

The scope of the Section J compliance is limited to areas that meet both of the following criteria:

- Non-Residential areas
- Conditioned Spaces

As such, this includes most areas within the development. This modelling will highlight the passive design elements that the warehouse has in place to reduce energy loss and unwanted energy gain through glazing which includes appropriate placement according to orientation, shading elements such as eaves, balconies and sunshades. Deemed-to-satisfy conditions will be tested in terms of orientation through NCC calculators.

3.8 Sustainable Transport

The development at 49-61 Stephen Road, Banksmeadow, will offer convenient access to nearby bus stops and the Botany Road transport corridor. From here, there is easy access to Sydney's comprehensive public transport network, ensuring straightforward travel across the city.

A Green Travel Plan is to be developed to indicate innovative solutions to minimise reliance on private vehicle use, which will accompany the Green Star strategies, including, dedicated parking space for fuel efficient vehicles, EV infrastructure, carpooling/car sharing facilities, EOT facilities for occupants deciding to travel via bicycle use etc.

The development shall provide the provisions to support the shift away from fossil fuel transport by providing the infrastructure for electric vehicle (EV) charging in the carpark including electric trucks to support the warehouse.

The development should consider a minimum of 25% car parking spaces be equipped with future EV charging capacity. This also supports the development's commitment to transitioning to a carbon neutral economy.

4. CONCLUSION

This report provides an outline of the proposed development's Ecologically Sustainable Design initiatives and commitments. The ESD strategies proposed will assist the development in achieving high levels of sustainability and environmental performance. These strategies include:

- Committed to a **5 Star Green Star Buildings v1 Certification** for the development;
- Committed to achieving **5.5 Star NABERS energy** and **3 Star NABERS water rating** for the office components;
- Reporting on the embodied emissions;
- Committing to Net Zero (refer to project's Net Zero Statement);
- No gas on site to reduce fossil fuel consumption;
- Significant on-site energy generation through a major solar PV array on the roof to reduce operational energy and GHG emissions associated with the site;
- Water Sensitive Urban Design Principals being upheld;
- Water recycling through rainwater storage with excess discharged into bio-retention and detention areas;
- At least 90% of Construction and Demolition are diverted from landfill;
- Low VOC and formaldehyde finish to improve air quality
- Providing parking capacity for electric vehicles to prepare for a decarbonised future;
- Urban heat island effect mitigation strategies; and

- Following a range of sustainability initiatives across the site spanning energy efficiency, thermal performance, indoor environment quality, waste management, and comfort.

The strategies and initiatives presented in this report demonstrate a strong commitment to sustainability which meet and exceed expectations for the development. Further opportunities for optimisation of the building's performance will be developed during subsequent stages of the project.



APPENDIX

Green Star Pathway

