

CELINE - 37 Archer Street – Mixed Use Development Ecologically Sustainable Development Report for SSDA; Net Zero Statement for SSDA

Issue	File Ref.	Description	Author	Date
A	2401077	Draft ESD Report for SSDA	TD/AR	08/04/2025
B	2401077	Final ESD Report and Net Zero Statement for SSDA	TD/AR	29/04/2025

Limitations of this report: The report is prepared using design and systems assumptions at a development application level of resolution (before tender and detailed construction level of design and specification). It should be recognized that final detailed design (for construction certificate) will be refined and adjusted after procurement of the building contractor and after final specification and construction details are resolved. Analysis at this stage relies on comparisons of proposed activities against averages (often at different rated performance levels) as complete bottom up data is not yet available.

Report author: Troy Daly is a GBCA Green Star Accredited Professional (in Buildings and Communities rating schemes); has over 15 years experience in development projects with strong sustainability goals; holds a Master of Urban And Regional Planning and Bachelor of Economics.



ESD vision and summary of initiatives

The proposal will support the supply of cost efficient and environmentally efficient housing for the Northern District of Sydney. Set up to be resource efficient, able to transition to net zero carbon emissions and climate change resilient.

Energy efficient, BASIX 63, achieved through efficient services and appliances

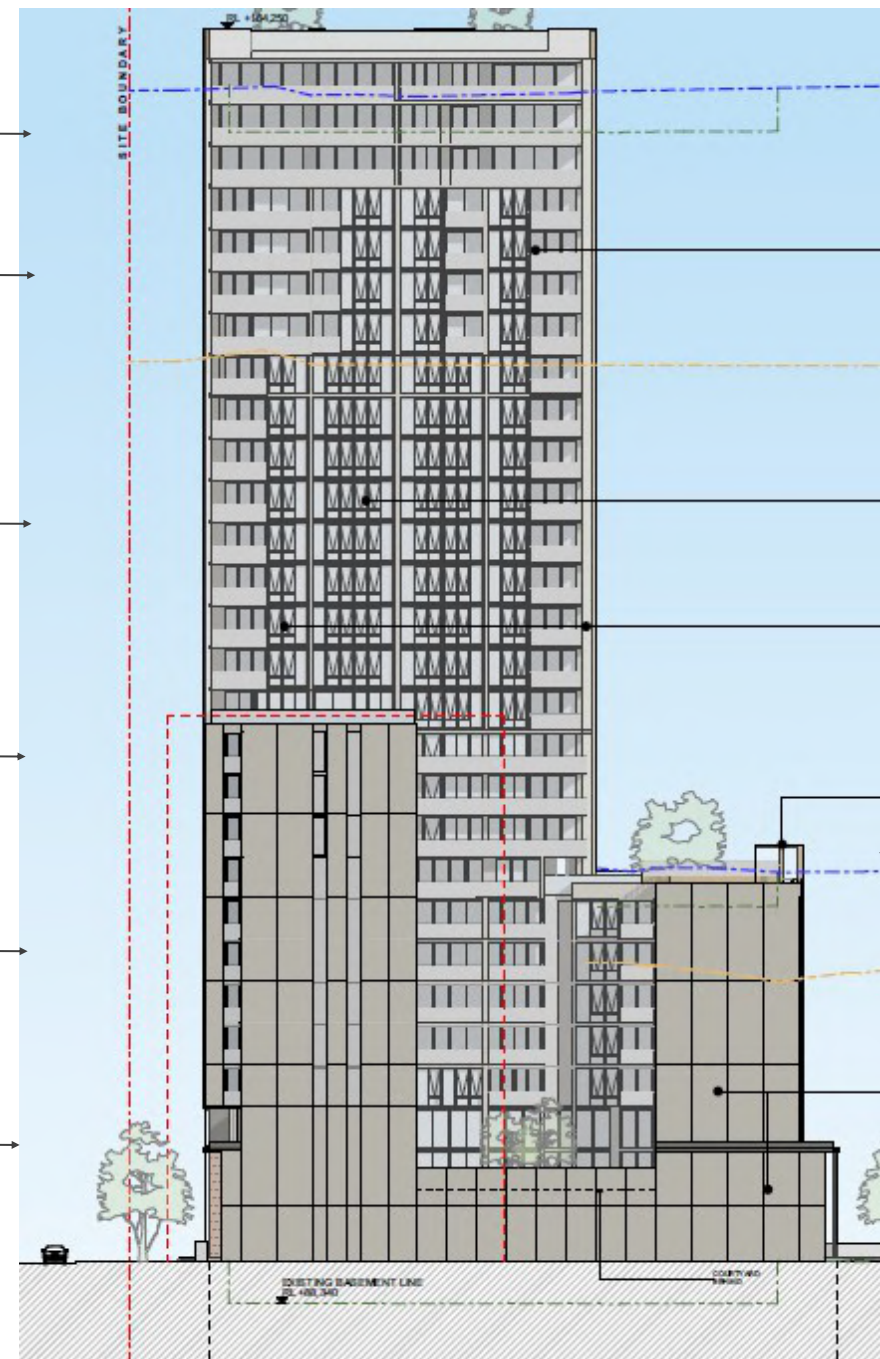
15kW PV array and investigation of 100% renewable electricity options for base building with future embedded network operator/building manager

Climate change risk review to be undertaken to ensure extreme rainfall and heat events can be managed by the building design and services

Provision for future uptake of 100% EVs and provision for electric bikes

Healthy indoor environments supported by natural ventilation solutions, solar and daylight access, procurement of low toxicity materials and management of rail noise

Steps to mitigate urban heating incorporated in design



Major mechanical systems all electric—gas cooking infrastructure able to transition to electric at end of useful life

Target in procurement to install air conditioners with ACOP > 3.5 and R32 lower impact refrigerant

Strong passive design leading to a 7 star NatHERS average rating for apartments

Potable water savings, BASIX 40, achieved through efficient water fixture, appliance selection and rainwater storage

Environmental management plan to be established for construction and seeking key materials with certified Environmental Product Disclosures

Demolition and construction waste key material target of 90% and recommendation to add additional e-waste stream in operation

CELINE - 37 Archer Street – Mixed Use Development Ecologically Sustainable Development Report



CONTENTS	Page
1. Executive summary and introduction	2
2. Project information	3
3. Project response to SEARs	5
4. State and Local strategies and policies	8
5. Energy and carbon efficiency	9
6. Water efficient design	15
7. Responsible materials and waste management	16
8. Climate change resilience	17
9. Human wellbeing and indoor environmental quality	18
10. Consultant declaration	19
11. Key abbreviations/glossary	20
Net Zero Statement	21

1. Executive summary and introduction

Executive summary and purpose of report

This ESD Report has been prepared by Efficient Living to accompany a detailed State Significant Development Application (SSDA) for the development of a mixed use residential tower with infill affordable housing at 37 Archer Street, Chatswood NSW 2067. The site consists of attached townhouses within a large rectangular lot. The legal description of the site is outlined in the table below.

Property Address	Title Description
37 Archer Street, Chatswood NSW 2067	SP 38065
Project Site Area	2,201m ²

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the project (SSD-73277714)

This report concludes that the proposed development is suitable and warrants approval subject to the implementation and future investigation of the ESD measures outlined in this report.

Section 3 of the report provides a summary of responses to relevant Ecologically Sustainable Development (ESD) SEARs. This includes:

- SEAR 1 considering relevant ESD related regulations and controls predominantly in relation to the Sustainable Buildings SEPP).
- SEAR 9 that requires a response to key ESD factors including a response to EP&A Regulation ESD principles; meeting or exceeding industry ESD standards; minimising green house gas emissions, energy, water and material resources

Additional reports/documents required under the Sustainable Buildings SEPP are also submitted with the proposal including:

- A 'Net Zero Statement' for the commercial office space development proposed classified as large commercial development under the SEPP (attached at the end of this report)
- A 'NABERS agreement to rate' for the commercial office space development proposed classified as large commercial development under the SEPP
- A NABERS embodied emissions materials form required for non-residential development under the SEPP

Structure of this report

The report has been structured into key ESD categories as indicated in the SEARs Cl 9, and as required in the general sustainability categories as set out in the Sustainable Buildings SEPP. Each category details the ESD measures included in the proposal and an assessment of the performance of this measure against regulatory requirements and industry benchmarks where applicable. The categories include:

- Energy and carbon efficiency
- Water efficient design
- Responsible materials and waste management
- Reducing urban heating
- Human wellbeing and indoor environmental quality

This report should be considered in conjunction with the BASIX and NatHERS certification documentation provided with the SSDA also be Efficient Living.

Methodology to identify ESD measures and outcomes

Efficient Living uses a combination of industry benchmarks, reference projects and comparative project data, together with industry recognised modelling tools, to assess the strength of ESD measures proposed.

It should be noted that a wide cross section of ESD factors are considered with both qualitative and quantitative measures.

Ultimately the proposed ESD measure is assessed against the performance and detail required under key planning policy requirements at a State level, and as relevant Local level.

Where relevant comment and reference to published Australian standards and sustainability rating schemes (such as GBCA Green Star) is made. Efficient Living also relies on its experience across multiple NSW proposals to provide opinion on whether the proposed ESD measure meets 'industry benchmarks' which can be subjective.

The ESD report also recommends further detail and specification outcomes as the project moves into detailed design and tender processes that accompany construction phases. ESD outcomes can not be finally determined until the detailed level of design and final construction package of works is agreed.

2. Project information

Property details—the site

The site is located at 37 Archer Street, Chatswood within the Willoughby Local Government Area (LGA). The site is legally described as SP 38065 and has an area of 2,201m². The existing development includes two buildings (multi-unit housing) of up to three storeys in height which accommodate a total of 14 dwellings. The existing development includes an inground swimming pool fronting Archer Street and single level of basement parking which is accessed from Bertram Street.

Pedestrian entries are available from Bertram and Archer Street. Vegetation within the site includes planter boxes through the central circulation spaces and established trees around the site's perimeter. Street trees, comprising native species, along the site's western frontage form part of an attractive and distinctive avenue of trees.

The site is situated on the southern edge of the Chatswood CBD. The immediately surrounding area has been zoned for more intensive development and is intended to support mixed use development

including high density residential uses. The existing character of the area is evolving.

The urban context surrounding the site is characterised by a mix of residential, commercial, and retail uses. The surrounding locality is described below:

North: The site is bounded to the north by low scale residential development including townhouses and single dwelling properties. This land is zoned to support high-rise mixed use development including buildings with heights up to RL246.8m. Along Archer Street proposals for mixed use towers have been lodged for properties at 51-55 Archer Street and 57-61 Archer Street.

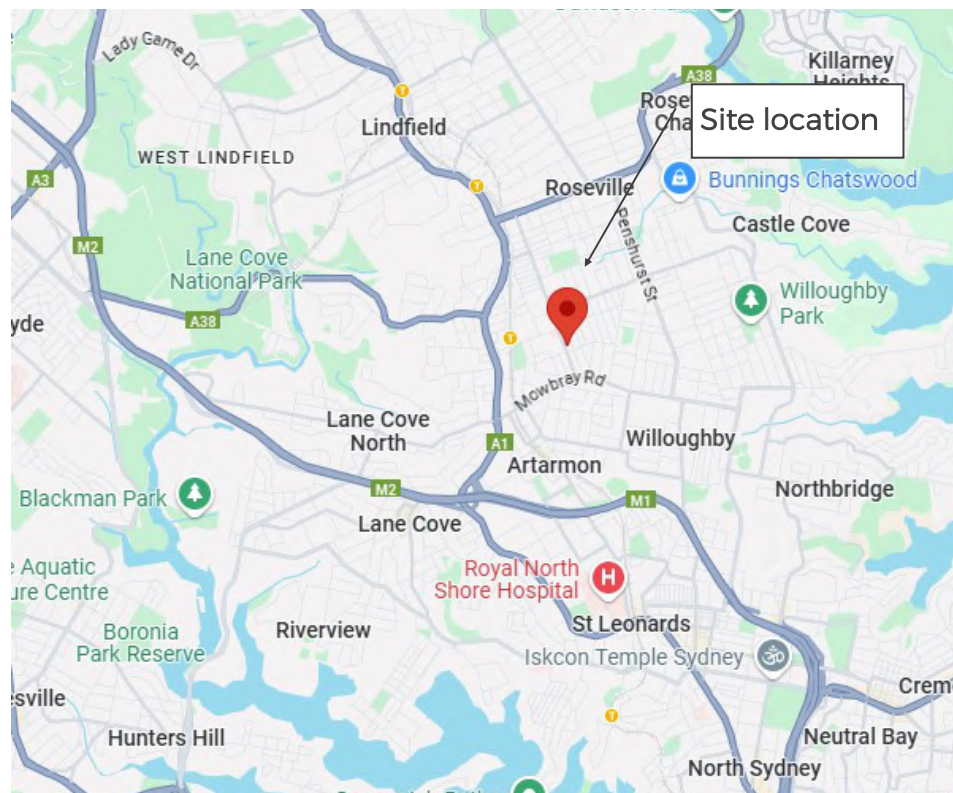
East: The site is bound to the east by Bertram Street which comprises a two-way local road and borders the western edge of the South Chatswood Heritage Conservation Area. A locally listed heritage item at 34 Neridah Street is situated directly opposite.

South: A development application for a 14-storey mixed use development has been lodged for 31-44 Archer Street which is

situated immediately to the south of the site. This area provides a transition to low scale residential uses contained within the South Willoughby Conservation Area located on the southern side of Johnson Street. There is a locally significant heritage item at 27 Archer Street.

West: To the west the site is bound by Archer Street which comprises a four-lane classified road. Existing development on Archer Street comprises medium density residential towers of 7 storeys and higher. The area has been zoned for taller buildings of up to 90m. Further to the west is the Chatswood transport interchange and Pacific Highway, linking to the CBD and wider Greater Sydney region.

The site benefits from excellent access to public and active transport and is within walking distance of the Chatswood Interchange, which provides rail and metro connections to North Sydney, Macquarie Park, and the Sydney CBD. Bus services run along Archer Street and provide connections to Chatswood and Crows Nest.



Regional context of Site (Google Maps)



Local context of Site (Urbis 2024)

2. Project information

Proposed development

The application seeks consent for the demolition of existing structures on the site and the development of a residential apartments (including affordable housing), commercial office space, food and beverage uses and retail tenancies with servicing areas and parking contained within the building's basement. A publicly accessible through site-link is also proposed providing a direct connection between Archer and Bertram Streets and allowing opportunities for outdoor dining and passive recreation.

Specifically, the SSDA seeks development consent for:

- Demolition of existing buildings, structures and trees.
- Excavation of the site to a basement depth of RL RL71.85mm.
- Construction of a mixed-use building to 28 storeys (RL184.25m) comprising residential and commercial uses.
- The development of 125 apartments (including 28 affordable housing units) with residential amenities and services, commercial office space, food and beverage tenancies and retail uses.

Description

The proposal is for a 28-storey building with 6-levels of basement below. The development contains the following uses:

- Residential apartments: A total of 125 apartments (including 28 affordable housing units) comprising 29 x 1 bed apartments, 55 x 2 bed apartments, 30 x 3 bed apartments and 11 x 4 bed apartments with recreational facilities at Level 8.
- Office tenancies: occupying levels 2 and 3.
- Retail tenancies: double storey retail units fronting Bertram Street.
- Food and beverage tenancies: ground level.
- Basement parking: 154 car spaces, 9 motorbike spaces, 28 bicycle spaces and end of trip facilities.
- Servicing and plant equipment.
- Publicly accessible landscaped through site link.
- The gross floor area (GFA) for the proposed development is described below:
 - Total GFA: 14,230sqm
 - Residential GFA: 12,318sqm
 - Non-residential GFA: 1,912sqm

Affordable housing will be provided in the form of a monetary contribution and floorspace within the proposed development.

The purpose of the project is to provide a high-quality mixed-use development in an accessible location within the Chatswood CBD, providing new market and affordable housing opportunities complemented by commercial and retail uses within this well serviced location.



3. Project responses to SEARs

SEARs REQUIREMENTS	Project response (and reference to relevant report section)
<p>1. Statutory Context</p> <ul style="list-style-type: none"> Address all relevant legislation, environmental planning instruments (EPIs) (including drafts), plans, policies, guidelines and planning circulars. Identify compliance with applicable development standards and provide a detailed justification for any non-compliances. 	<p>The report primarily considers the EP&A Act ESD considerations on CI9 of the in-fill affordable housing SEARS. In addition the report also considers ESD principles or objectives from the following State strategies and policies:</p> <ul style="list-style-type: none"> Greater Sydney Region Plan Northern District Plan Sustainable Buildings SEPP and Housing SEPP (ADGs) NSW Government Net Zero Plan <p>The report also includes consideration of compliance with National Construction Code (NCC) Section J Energy Efficiency requirements as is mandatory for components of this project type. These considerations are made in Section 4 of the report.</p>
<p>9. Ecologically Sustainable Development (ESD)</p> <ul style="list-style-type: none"> Identify how ESD principles (as defined in section 193 of the EP&A Regulation) are be incorporated in the design and ongoing operation of the development <ul style="list-style-type: none"> The precautionary principle Inter-generational equity Conservation of biological diversity and ecological integrity Improved valuation, pricing and incentive mechanisms 	<p>The precautionary principle</p> <ul style="list-style-type: none"> The project demonstrates a commitment to minimising environmental impact, implementing climate change resilience measures, implementing resource conservation measures and implementing human health and wellbeing measures. In combination these initiatives deliver the concept behind a precautionary approach to approving development based on potential future or uncertain impacts. <p>Inter-generational equity</p> <ul style="list-style-type: none"> The project delivers development that both minimises and provides resilience for future human activity through environmental change but also seeks to provide a mix of housing outcomes, through apartment sizes and market price points but also through adaptable and Affordable Housing provision, deemed necessary for the future generations living in Sydney. <p>Conservation of biological diversity and ecological integrity</p> <ul style="list-style-type: none"> The renewal strategy for the site seeks to maximise the use of local endemic species in landscape and minimise environmental impacts (such as carbon emissions, stormwater volume and quality controls) such that the post development outcome has no greater diversity or ecological impact than the current situation of low rise dwellings and apartments with high proportions of concrete hardscape. <p>Improved valuation, pricing and incentive mechanisms</p> <ul style="list-style-type: none"> The sustainability and environmental measures for the project are being incorporated in the early design and cost plan for the project to ensure the most economic pathways are identified through design and construction. Further, the specification of materials and equipment will strongly consider the most efficient operations and maintenance outcomes which are anticipated to also match the most efficient environmental outcomes for the apartment complex operation (for example use of PV arrays to minimise the long term financial and environmental cost of electricity).

3. Project responses to SEARs

SEARs REQUIREMENTS	Project response (and reference to relevant report section)
<p>9. Ecologically Sustainable Development (ESD)</p> <ul style="list-style-type: none"> • Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards. • 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. 	<p>The environmental performance initiatives and outcomes for the project (Sections 4-8 of this report set out these categories) have been determined based on meeting or exceeding industry benchmarks. These benchmarks include consideration of industry rating schemes, such as the capacity to meet Green Star Buildings and EnviroDevelopment rating standards.</p> <p>The proposed ESD initiatives incorporate measures to significantly reduce GHG emissions and consumption of energy, conserve water and minimise resource consumption and embodied energy in materials.</p> <p>The primary performance benchmarks include:</p> <p>Minimising carbon emissions and energy (Section 4) - meeting or exceeding requirements</p> <ul style="list-style-type: none"> • Scope 1 and 2 CO2 emissions for the building (residential and non-residential operation) c.51% savings against norm; options included to reduce significant Scope 3 CO2 emissions • Sustainable Building SEPP 2022 BASIX energy score of 63% and average NatHERS thermal performance rating of minimum 7 stars, minimum individual apartment score of 6 stars • Inclusion of a 15kW PV array to the roof area (final location subject to detailed design) • Future compliance with Section J NCC energy efficiency requirements • All electric services to commercial office spaces and future NABERS Energy rating of 5.5 stars • Target to reduce upfront carbon emissions in materials by 20% • Provision for 100% EV parking spaces (NCC 2022) allows transition away from ICE vehicles saving on average over 273 tCO2pa <p>Water conservation (Section 5) - meeting or exceeding requirements</p> <ul style="list-style-type: none"> • Reduce potable water demand to meet the Sustainable Building SEPP BASIX requirements through water efficient appliances and fixtures, and rainwater storage and reuse –achieves BASIX score of 40% • Commercial office spaces will achieve a NABERS Water 3 star rating <p>Responsible materials and waste management (Section 6)</p> <ul style="list-style-type: none"> • Target to recycle or reuse at least 90% of construction waste; implement waste streaming to support operational phase recycling outcomes • Procurement strategy to target key materials with Environmental Product Disclosures and low environmental impact

3. Project responses to SEARs

SEARs REQUIREMENTS	Project response (and reference to relevant report section)
<p>9. Ecologically Sustainable Development (ESD)</p> <ul style="list-style-type: none"> • Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards. • 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. 	<p>Climate change resilience (Section 7)</p> <ul style="list-style-type: none"> • Building systems and site drainage detailed design reviewed to consider increased extreme rainfall events, storm events and heat wave events for operational performance in extremes • Heat island mitigation steps including high reflection horizontal hard surfaces, planned canopy and green cover and attention to preventing building reflection to the ground level <p>Human health and wellbeing (Section 8)</p> <ul style="list-style-type: none"> • Procurement strategy to target low VOC and low/no formaldehyde products to improve air quality • Acoustic and lighting (and daylighting) outcomes and products tailored for healthy and comfortable living environments • High levels of daylight access to residential dwellings

4. State and Local strategies and policies

Key State ESD related strategies and policies

Sustainable Buildings SEPP

For residential development the proposal meets the requirements of the BASIX conditions for thermal performance, energy/carbon reductions and potable water reductions.

For the majority of the non-residential development, such as retail floor space, the proposal includes measures considering the general sustainability requirements including waste management, energy efficiency and management, improved passive design, generation and storage of renewable energy and reduced potable water consumption. A NABERS Embodied Emissions Material Form will also be provided with the proposal.

In addition the commercial office space component of the development (c. 1455 sqm) will qualify as 'large commercial development' under the SEPP and as such the following are provided with the proposal:

- A Net Zero Statement quantifying how the commercial office development can operate as net zero emissions
- A NABERS agreement to achieve future ratings of 5.5 stars for energy and 3 stars for water

Housing SEPP—NSW Apartment Design Guide

The objectives, design criteria and design guidance will need to be considered especially in relation to design criteria including:

- Sunlight to habitable rooms (70% of apartments to receive 2 hours, <15% receive no sunlight)
- Natural cross ventilation to at least 60% of apartments
- Apartment and room sizes, window requirements, room depths for habitable rooms, balcony provision and size

Greater Sydney Region Plan

Various objectives of this plan require targeted ESD outcomes including Objective 27 Biodiversity is protected, urban bushland and remnant vegetation is enhanced; 30 Increased tree canopy; 33 Low carbon city; 34 Energy and water flows are captured, used and

reused; 35 More waste is recycled; 36 People and places adapt to climate change; 37 Exposure to natural and urban hazards is reduced; 38 Heatwaves are managed.

North District Plan

Consistent with the Greater Sydney Region Plan targeted ESD outcomes are required for N19, tree canopy and green landscape improvement, N21, reduced carbon emissions and efficient use of energy, water and waste, N22, adaptation and resilience to climate change.



Directions for sustainability



A city in its landscape

Planning Priority N15
Protecting and improving the health and enjoyment of Sydney Harbour and the District's waterways

Planning Priority N16
Protecting and enhancing bushland and biodiversity

Planning Priority N17
Protecting and enhancing scenic and cultural landscapes

Planning Priority N18
Better managing rural areas

Planning Priority N19
Increasing urban tree canopy cover and delivering Green Grid connections

Planning Priority N20
Delivering high quality open space



An efficient city

Planning Priority N21
Reducing carbon emissions and managing energy, water and waste efficiently



A resilient city

Planning Priority N22
Adapting to the impacts of urban and natural hazards and climate change.

NSW Government Net Zero Plan

The NSW Government targets (NSW Climate Change Policy Framework—Net Zero Plan) for 70% reduced emissions by 2035 and net zero by 2050 should also shape the ESD initiatives for the proposal.

National Construction Code (NCC) Section J Energy Efficiency

Section-J of the National Construction Code 2022 focuses on "energy efficiency of buildings". Section J is a minimum performance target for standard buildings and specifies minimum performance targets known as deemed-to-satisfy (DTS) requirements, for building fabric and services.

The report considers Section J measures that will be required for compliance with the detailed design and construction certificate for the proposal.

Willoughby Council LEP and DCP

Objectives, controls and guidelines of the Willoughby Council LEP and DCP objectives for building sustainability are considered where relevant but it is noted that the SSDA SEARS process largely replaces this process.

- DCP objectives to achieve a high level of performance equating to a GBCA Green Star 4 star rating
- WLEP cl 6.3 requirement to consider and mitigate Urban Heating

Net Zero Plan

The Net Zero Plan Stage 1: 2020-2030 is the foundation for NSW's action on climate change and goal to reach net zero emissions by 2050.



5. Energy efficiency and low carbon emissions

Passive design Initiatives to reduce energy use

With thoughtful planning, a well-designed building can be passively heated, cooled, and ventilated for most of the year in temperate NSW climates. This approach minimizes reliance on mechanical heating, ventilation, and air-conditioning (HVAC) systems, which are only needed when outside temperatures are too extreme to be controlled passively.

Proposed outcome meeting compliance and meeting or exceeding industry standards

- A NatHERS average rating of at least 7 stars (minimum 6 stars per apartment) meeting upgraded BASIX thermal performance requirements that commenced in 2023
- Cross ventilation for apartments at a minimum meet ADG requirements of 62% over the first 9 storeys and 82% overall
- Solar access for apartments at a minimum meet ADG requirements of 70%
- Building shell outcomes for commercial floor space to meet Section J DTS or future JV3 performance provisions

Strong NatHERS ratings for apartments

Strong passive design will translate into strong measured thermal performance outcomes in NatHERS modelling. The project will achieve at least a minimum average NatHERS 7 stars for apartments (minimum 6 stars) in line with the upgraded requirements of the Sustainable Buildings SEPP 2022..

Compliance with NCC 2022

The project will comply with the latest NCC 2022 Section J inclusions for building fabric and energy requirements. This will include the

commercial/retail spaces and any common residential spaces that may be conditioned.

Cross Ventilation

The floor plate of the building has been designed to maximise the number of dwellings achieving natural cross ventilation.

62% of apartments will comply with natural cross ventilation requirements over the first 9 storeys in accordance with Housing SEPP Apartment Design Guide and will achieve 82% for the overall building.

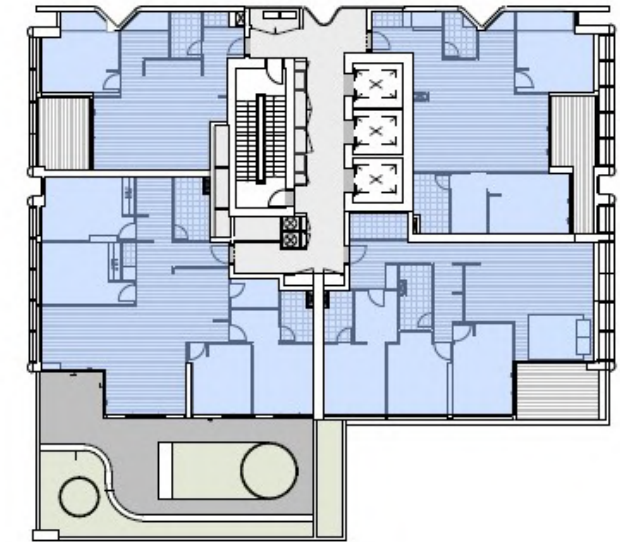
Opportunities to naturally ventilate the commercial/retail areas will be investigated as the design progresses. As the commercial/retail premises are at ground level, acoustics will need to be considered for any naturally ventilated strategy of these floors.

Solar Access

The floor plate of the building has been designed to maximise solar access. Solar access provides daylight which means electric lights can be left off during the day but also provide passive heating during the winter months, meaning that the heating system has less work to do, and less energy is consumed heating the spaces.

70% of apartments will comply with solar access requirements in accordance with SEPP 65 Apartment Design Guide. The upper levels of the proposal deliver strong outcomes with most apartments at level 12 and above achieving 100% solar access.

Strong daylight outcomes are expected for the commercial/retail tenancies given the large floor to ceiling windows proposed.



Level 12 - 100% cross ventilation outcomes—ADGs



Level 12 - 100% solar access outcomes—ADGs

5. Energy efficiency and low carbon emissions

Service and appliance initiatives to reduce energy use and carbon emissions

Proposed outcome meeting or exceeding industry standards

- BASIX Energy outcome of 63% meeting increased Sustainable Building SEPP/BASIX Energy standards introduced in 2023
- Net Zero Statement and NABERS Agreement to Rate for the commercial office floor space component of the project
- A/C efficiency target of > 3.5 ACOP in procurement phase
- NCC provision for battery charging and for future EV charging to 100% of residential car spots, and E bike charging
- Commercial floor space to meet NCC 2022 Section J energy efficiency requirements

Predominantly electric services— future transition to all electric provisioned in infrastructure planning

The building will be serviced with electricity with the exception of some gas cooking services to residential cooktops and food and beverage retail premises.

Transition to all electric services, anticipated at the end of the useful life of the gas services (or as required), will be made possible by:

- Initial provision of a hard wired circuit to each apartment cooktop allowing a replacement of the hybrid electricity/gas appliances with 100% electric appliances
- Provision of a hard wired circuit to each food and beverage premise cooktop area to allow future conversion to electric cooktops
- Provision for additional substation capacity that will support all electric services in the future without the need for an upgrade

Consideration has also been given to the total electrical demand requirement, including for future high uptake of EVs, and how this will be managed with active load management systems and catered for through substation sizing.

Domestic Hot Water System

Domestic hot water systems can be responsible for 10-15% of total apartment building CO2 emissions.

A centralised electric heat pump system is planned for the building with high level of insulation for the hot water ring main throughout the building.

The coefficient of performance for this system should be greater than 3 compared to a traditional gas boiler system with coefficient of performance less than 1.

Air conditioning services

With strong passive design, reflected in a 7 star average NatHERS rating, space conditioning is responsible for about 5-8% of total apartment building CO2 emissions.

Air conditioners will be single phase with ACOPs targeted at 3.5 or greater towards the higher end of efficiency (exceeding BASIX compliance at 3.0-3.5 COP for cooling). Units will be located in a room on each apartment level with open access to outdoor air and ventilation.

Appliances

Appliances and related other electrical demand average approximately 35% of total CO2 emissions in a modern apartment building.

The following star ratings are recommended for key domestic appliances subject to final clarification of BASIX requirements.

- Dishwashers - 4 star minimum
- Clothes Dryers - 8 star condenser/heat pump minimum

Lighting

Lighting can use up to 10% of an apartment building's electricity consumption, therefore efficient luminaires and lighting control systems are critical in order to optimise the building's energy efficiency. The following measures will be implemented:

- LED lighting to be specified throughout with a target of 10%

reduction on NCC compliant lighting power.

- Common area lighting to have motion and daylight sensors with further zoned lighting controls for car park areas.

Lifts

Lift use can be responsible for over 10% of total apartment building CO2 emissions.

The lifts will incorporate PMS motor and regenerative drive technology and will target a Class A energy efficiency rating under ISO 25745.

Car park ventilation

Common area ventilation can be responsible for over 10% of apartment building CO2 emissions.

Car park mechanical ventilation will be CO monitored/controlled and utilise energy efficient variable speed fans.

Other ventilation, such as to switch rooms, plant rooms and communal bathrooms, will be either interlocked to light switching or controlled through a building management system.

Pool management

An electric heat pump system will be utilised for heating the communal pool using approximately 30% of the power required for a gas based heating system.

5. Energy efficiency and low carbon emissions

Electric transport services

Electric transport

Electric vehicles are anticipated to experience high adoption over the coming decades. When serviced with renewable electricity this mode of transport provides an effective net zero in operation outcome for travel.

Provision for electric cars is the major item to consider followed by power access and storage for the fast growing use of e-bikes and e-scooters.

Electric car provisions

Final detailed electrical system design will cater for a high uptake of electric cars and bikes.

Consistent with NCC 2022, dedicated distribution boards to support EV charging on each basement level will be provisioned together with an active load management system that allows future connection of all parking spots within an achievable total electrical demand level for the project.

Consideration of a charger provision and tariff system/model, so that individual apartments are provided with an accurate electricity bill for their usage, is also recommended. This service is most often provided by specialist EV charging entities.

Any shared car service parking spots and service provider procurement should also plan for shared EVs to further provide zero net carbon outcomes for car based transport.

E-bike and e-scooter provisions

Provision of standard GPOs with access from bike storage racks and other storage areas (potentially for e-scooters) will be provided to facilitate charging of these mobility devices.

The future of Electric Vehicle batteries integrated with building electricity demand

Batteries in EVs theoretically store enough energy to run a moderate home for 4-5 days or apartment for 5-7 days. Technology is under development to allow the energy in EV batteries to be accessed by homes, and potentially apartment buildings, to help reduce peak demand and otherwise supplement demand throughout the day as required.

The software controlling the management of the car battery, through a 'two way' charging connection, would allow for a proportion of the battery power (say 50%) to be utilised for building energy management. The owner of the EV would be compensated for this service.

When fully developed this energy management system may be able to greatly reduce the buildings peak demand and therefore help reduce the required substation size requirements for 'all electric' buildings.

In the future this could mean that EVs support transition of buildings with fossil fuel inputs, (such as the proposed building for cooking services) and limited substation upgrade capacity, to become all electric buildings.



Example of EV charging provision image from <https://evse.com.au/blog/apartmentevcharger/>



Modern buildings are providing charging options for e-bikes and e-scooters

5. Energy efficiency and low carbon emissions

Renewable energy sources and energy management

Proposed outcome meeting compliance and meeting or exceeding industry standards

- A PV array of 15kW capacity is required to achieve the BASIX 63 Energy score
- Potential for embedded network operator to provide renewable electricity for base building and EV charging
- Provision for future battery system integration

Incorporation of solar/PV arrays

A small PV/solar array of 15kW is required to meet BASIX Energy requirements. Final location of the panels (c. 36 panels will be required) will be determined in detailed design focussed on roof area to the lift overrun, over the roof top plant area and potentially as shade structures to the roof top terrace areas.

Opportunity to purchase renewable electricity for base building services

The developer of the proposal will request that the potential embedded network operator for the building provide an option to purchase 100% renewable electricity through a longer term power purchase agreement.

If the cost of this agreement is comparative with standard grid sourced electricity (which is most often the case) then renewable electricity will be locked in for all common electrical services.

This opportunity would be extended to the provision of power to EVs if arranged through the embedded network operator, or separately through an independent EV charging organisation.

Building energy management

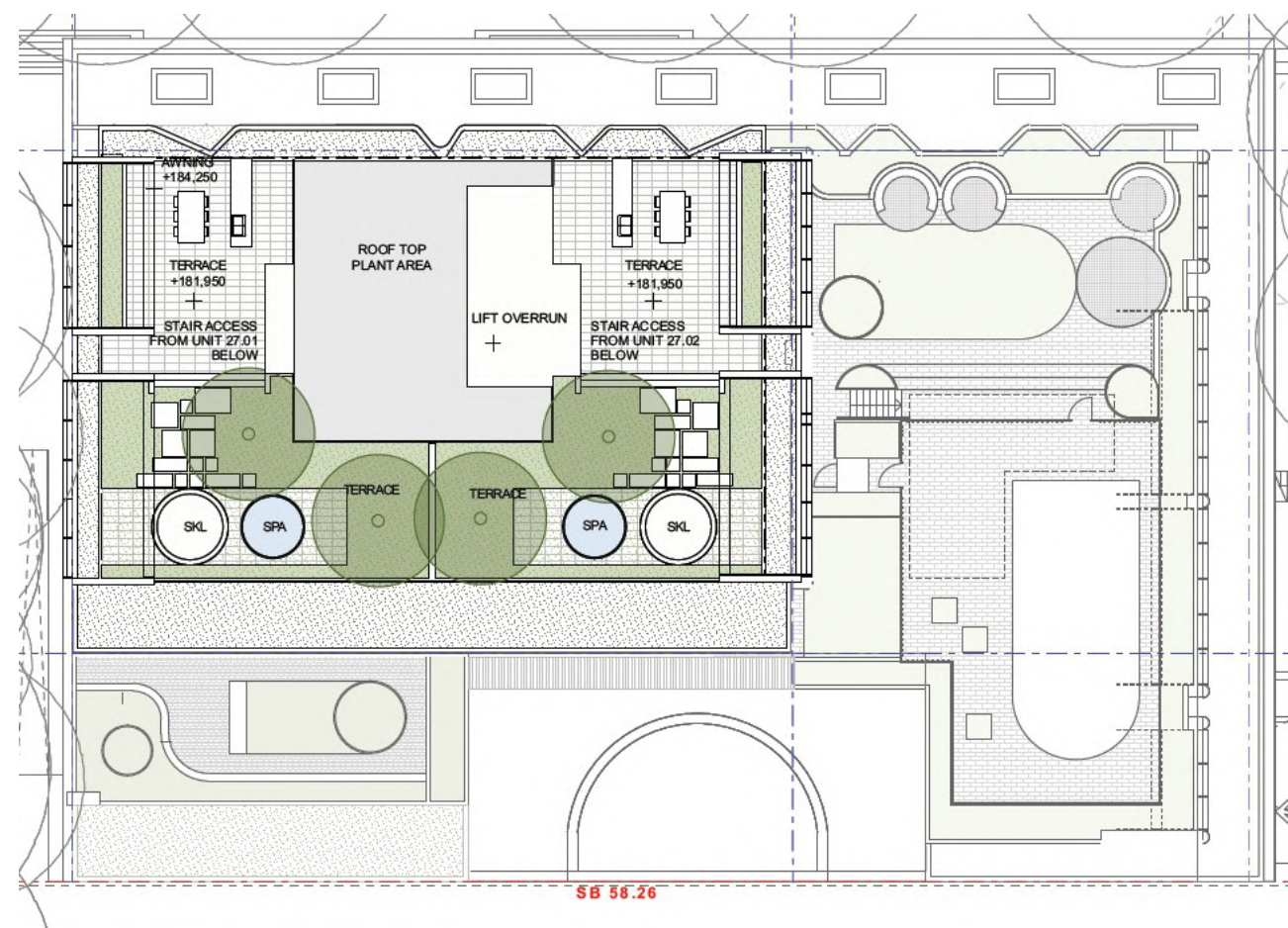
Building systems will be set up with sufficient sub meters to allow detailed monitoring of consumption patterns and equipment performance.

Investigation of a centralised battery system

An area will be identified in the basement in close proximity to the main switchboard to allow potential installation of multiple batteries in the future—as now required in NCC 2022.

The future building operator/embedded network operator will ultimately determine if a shared building/community battery is worthwhile given the specific demand profile and tariff schedule through peak and off peak periods that determine battery feasibility (without PV array supply).

Ultimately the potential to utilise 'two way' EV batteries linked to the building system (discussed on the preceding page) will determine if a stationary battery system is also warranted.



The open upper roof areas of the proposal have been dedicated mainly to private and communal activity spaces—space will be identified in detailed design for a 15kW capacity (36 panel) PV array

5. Energy efficiency and low carbon emissions

Summary of carbon emission reduction measures

Boundary and Scope of carbon emissions considered

- The most relevant boundary for considering CO₂ reduction measures are the activities carried out in building operations—predominantly residential activities with a small amount of commercial activities.
- Major Scope 1 CO₂ emissions are avoided due to the electric services to key mechanical equipment such as hot water, space heating and pool heating—we note some Scope 1 emissions will be created through part gas cooking in residential cooktops and gas cooking to food and beverage premises
- Scope 2 CO₂ emissions, the major source of emissions, come from electricity sourced to power key building systems and appliances
- Significant Scope 3 CO₂ emissions, embodied carbon in key buildings materials and carbon emissions related to cars stored in the building for transport are also considered.

Operational carbon emissions—energy use

Passive design

- NatHERS average rating of at least 7 stars using new BASIX 2022 benchmark
- Non-residential premises will comply with NCC Section J 2022 requirements

Energy efficient systems and appliances

- Electric heat pump, centralised hot water
- Air conditioning with target ACOP > 3.5 in procurement (BASIX compliance 3.0-3.5 COP)
- Appliances rated generally in top quartile of efficiency ratings

Provide for EVs to replace fossil fuel vehicles

As a minimum the developer will meet NCC 2022 requirements to include future provision for 100% of residential car spots, and 10% of commercial car spots, to be EV charger capable in the future (Type 2 charger @ min 7kW).

Annual CO₂ emissions amount to on average 2.22 tCO₂pa per car (for a car driven 15,000 kmpa) so the potential for saved emissions by providing for low or no emission EVs is substantial.

- NCC 2022—100% of car spaces will be provisioned for Type 2 EV charging capability with additional provisions for e bike charging

Operational carbon emissions—energy source

On-site renewable electricity

BASIX compliance does not require a PV array and limited roof space is available for this purpose

Offsite renewable electricity

- Developer will request an option for the building operator/ embedded network operator to purchase electricity from a verified renewable electricity source for at least the first 5 years (including to service EV chargers)

Operational carbon emissions—energy management

- Energy metering in place to allow monitoring and optimisation of core systems
- Provision for future battery storage to manage peak demand and also consideration of how future EV battery integration may occur

Reduced upfront embodied carbon emissions

The project will target savings of at least 20% in the key materials responsible for Scope 3 embodied CO₂ emissions in apartment buildings.

Work by the GBCA (GBCA Think Step ANZ Embodied Carbon and Embodied Energy in Australia's Buildings 2021) can be used to identify the key building materials responsible, on average, for embodied carbon emissions:

- Steel 46%
- Concrete 44%

Concrete embodied emissions will be reduced by targeting certified low carbon concrete mixes. For example from suppliers Holcim, Boral and Hymix. A combination of recycled materials, reduced concrete and other additives allow concrete across strength grades with reduced carbon emissions of 40-60%.

It is recommended that steel is selected from suppliers with evidenced carbon emissions reduction targets in production and with Net Zero 2050 corporate targets (in alignment with the NSW Government goal).

It is proposed that the tender phase for building contractors include a requirement for submissions to provide material options that would achieve this outcome and clarify differences in relation to increased cost and/or increased uncertainty of supply. Based on this analysis the project proponent will be able to make an informed decision on the feasibility to implement a reduced embodied emission strategy.

5. Energy efficiency and low carbon emissions

Estimates of operational carbon emissions

Residential component (BASIX outputs)	Proposal case (TnCO2 pa)	Base case (TnCO2pa)
Common area services	93	
Heating and cooling and ventilation	33	
Hot water	61	
Cooking	36	
Lights	13	
Appliances and other	118	
Residential total	354	922
Renewable electricity onsite (15kW)	-14	
Residential CO2 reduction p.a.	-63%	
Non residential component		
Office/retail/restaurant - Section J compliant	226	226
Building operating CO2 total p.a.	566	1148
	-51%	
Potential Scope 3 CO2 emission savings		
Potential embodied CO2 savings with adoption of low carbon concrete mixes	2849	3455
Potential CO2 savings with future 100% EV uptake (123 residential car spots)	0	273

Notes:

- Residential assumptions utilize preliminary BASIX engine outcomes observed by Efficient Living under BASIX 2022—final outcomes will vary according to final building specifications
- Commercial emissions use average sqm electricity usage from 2022 Commercial Building Baseline Study, DISER
- Carbon intensity from grid assumed at 0.65kgCO₂/kWh
- Carbon emission savings in lower embodied carbon concrete utilize 'GBCA Think Step ANZ Embodied Carbon and Embodied Energy in Australia's Buildings' to estimate a per apartment materials average and carbon intensity
- Carbon emission savings for EV uptake assume avoided CO₂ emissions from typical ICE vehicle (2.2 tonnes CO₂ pa—NTC 2022, CO₂ Emissions Intensity for New Australian Vehicles 2021)
- Final CO₂ emissions outcomes will vary from averages depending on final design, systems and materials selections for the buildings

6. Water efficient design

Integrated water management plan

Water resources will be managed to deliver three clear objectives for the redeveloped site as an integrated water management plan.

- Reduce the demand for potable water through water efficient fixtures and an alternative water supply
- Reduce negative stormwater volume impacts within and leaving the site (please refer to the project Stormwater Management Plan (SMP))
- Reduce negative stormwater quality impacts within and adjacent to the site (please refer to the SMP)

Proposed outcome meeting compliance and meeting or exceeding industry standards

- A BASIX compliance outcome of 40% has been achieved
- Industry benchmark levels of water efficiency are demonstrated in appliance WELs rating targets

Water efficient fixtures and fittings

Water efficiency in the project will be underpinned by efficient fixtures and fittings.

The following WELS water ratings will be achieved in the top quartile of efficiency:

- Shower roses—flow rates of 6-7.5L/min 3 star
- Toilets 4 star
- Taps 5 star
- Urinals 8 star (with consideration of waterless urinals)
- Dishwashers 4 star

Timed tap flow mechanisms will also be incorporated in student amenities to prevent wasted water from taps not turned off or not turned off completely.

Alternative water

A rainwater tank of at least 2,000L, accessing at least 65 sqm of catchment, is required to meet BASIX requirements. We note the project design has provisioned for a rainwater tank up to 15,000L to help service landscaped areas and car washing bays.

Water sensitive urban design

Water efficient plant selection

The detailed landscape design for the Site will include a balanced use of native and low water demand/ drought tolerant plant species.

Water efficient irrigation methods

Any soft landscape areas in need of regular irrigation will be equipped primarily with under surface drip irrigation to avoid evaporation losses and ensure moisture is directed at root areas.

Any higher need areas will also utilise irrigation control sensors so that irrigation does not occur in times of existing sufficient moisture levels.



WELS shower label certifying 6.5 L flow rate—consistent with this proposal

7. Responsible materials, construction and waste management

Lower impact materials and 'circular' waste management

Together with supporting lower upfront carbon emissions, the project will investigate the inclusion of responsible materials and include space for splitting and recycling of waste 'resources' during project construction and ongoing operation.

Proposed outcome meeting compliance and meeting or exceeding industry standards

- Greater than 80% of construction and demolition waste (mass) to be recycled with a target of 90%
- Environmental Product Disclosures (EPDs) sought for key materials
- EMS preferred, and EMP required for head building contractor (ISO 14001)

Supporting responsible materials in the building structure and envelope

The detailed design and tender phases for the project will target procurement of products that follow good practice in respect to measuring environmental impacts and reducing these impacts. Products with a certified EPD will be sought where available.

The GBCA defined Good Practice products with a Responsible Product Value >10, as detailed at <https://new.gbca.org.au/green-star/rating-system/responsible-products-framework/#responsible-structure>, is a valuable resource to use in this process.

Building tender responses will be required to provide material options aligned to recognised responsible materials ratings schemes as set out by the GBCA. If commercially competitive (by cost and supply risk) then these improved materials should be specified.

Key building processes to be considered in detailed design would include:

- Design allowing sub structure and super structure to utilise certified concrete, steel and other major components
- Façade design also considered to support use of responsible glazing, panel and shade structures etc

Responsible building finishes

The tender requirements for internal finish fitouts will also require options for key materials that have achieved certification for environmental responsibility (paints, carpet flooring etc).

Examples of certification include from GECA and GreenTag for a wide cross section of finishing materials and the FSC for timber.

Responsible construction

The tender requirements for building contractors will prefer that the head contractor has an environmental management system consistent with AS/NZS ISO 14001 and will develop and Environmental Management Plan for the project to be advised to all sub contractors.

Construction waste recycling

Please refer to the Elephant's Foot WMP for the project. It is recommended that construction waste management targets a combined recycling outcome of 90% by mass (minimum 80%) consistent with better practice for current major Sydney located projects. This would need to be accomplished through additional recycling potential for timber and plasterboard waste.

Designing in Waste Sorting and Storage Facilities

The project will provide adequately sized waste storage areas in the basement with separation of major waste streams according to Willoughby Council services.

A separate waste streaming area for e-waste should also be considered for occasional removal as required.

A Waste Management Plan will be developed for the project guiding the final sizing and location of facilities and providing a guide to future building operators.



8. Climate change resilience

Future proofing

Proposed outcome meeting compliance and meeting or exceeding industry standards

- Detailed design of building drainage and systems to be reviewed for performance in extreme weather events (rainfall, storm, heat)
- Over 75% of horizontal surfaces to minimise urban heating effects
- Heat reflection from building to street level mitigated through façade design elements and lower level green scape

Climate Change Resilience

Relevant climate change impacts over the next 50 years include higher average temperatures and lower average rainfalls (mainly in winter) together with greater extreme events particularly in relation to rainfall, storms and heat waves, Impacts can be direct, for example rainfall ingress to the building, or indirect, for example expected higher maximum temperatures, longer and hotter heat events, increased rainfall intensity leading to increased flooding during rainfall events.

The following design measures will be implemented in detailed design to improve climate change resilience:

- Equipment and building drainage design to accommodate increased storm, hail and rainfall events
- Landscape design and plant selection to survive an increased number of heat wave days
- HVAC design thresholds to function properly with higher average temperatures and a higher number of heat wave days

Heat Resilience

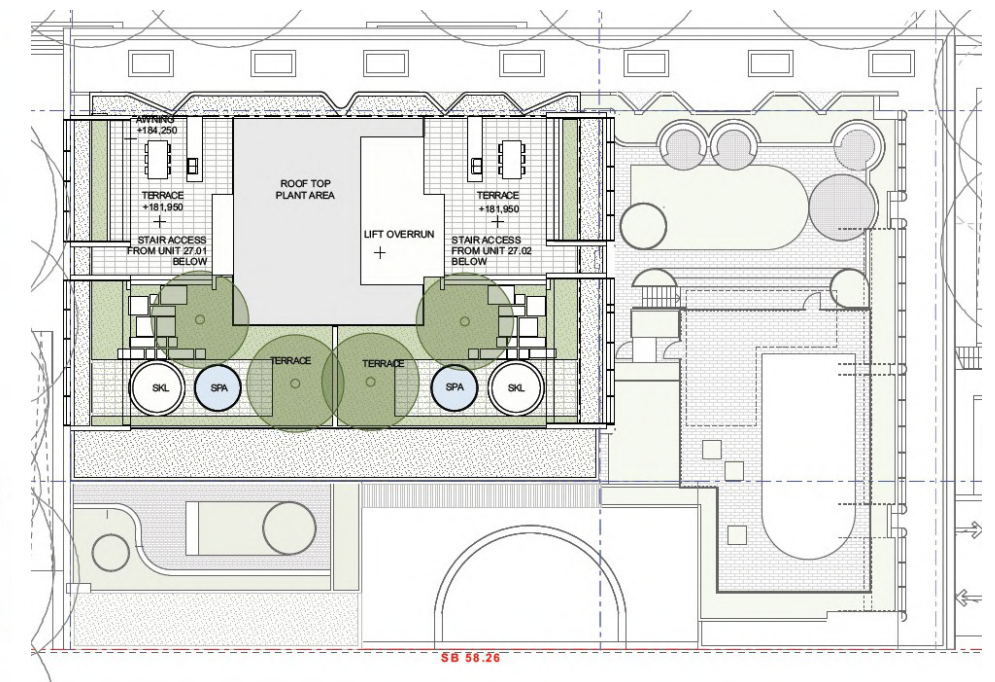
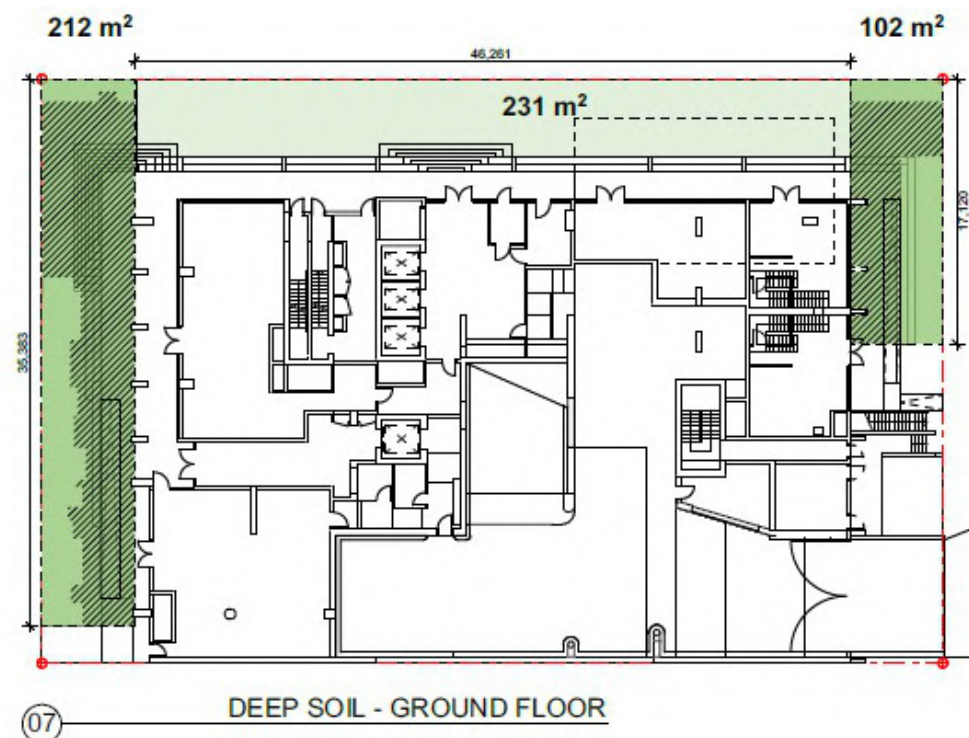
Over 75% of total site horizontal surfaces (excluding the area of proposed PV arrays) have been targeted for low urban heating outcomes (in line with Green Star rating requirements) including:

- Green soft landscape outcomes at street level and podium levels (levels 1, 2, 8, 12 and roof), including tree canopy where possible fronting the street, providing shade to hard surfaces

- Final colours for the roof, podium hard surfaces and ground level hardscape surfaces will be specified to achieve low solar absorptance/high solar reflectivity.
 - Roof initial SRI target of minimum 80, or >64 over 3 years
 - Unshaded hardscapes initial SRI of target minimum 39

Highly reflective glazed facades can have a large influence on the ground level microclimate by pushing solar radiation down to this level.

- The landscape plan incorporates layers of green space at ground and podium (levels 2) that will help absorption of solar radiation reflected downward from the façade.
- While some downward reflection barriers, from glazing, have been included across each level the ground level tree canopy will be essential to stopping solar radiation hitting the footpath and asphalt street surfaces



Landscape plans for ground level and upper levels that include the majority of horizontal surfaces exposed to solar radiation—a combination of green landscape surface and paving, roof surfaces with mid/high solar reflection colours will help mitigate urban heating

9. Human wellbeing and indoor environmental quality

Human wellbeing initiatives

Proposed outcomes meeting or exceeding industry standards

- All NCC and Australian Standards for air quality, light and acoustic comfort will be met
- Cross ventilation outcomes for 62% of apartments over the first 9 storeys and 82% overall.
- Internal materials and fixings will be selected based on certification of low toxicity as measured by VOC off gassing and formaldehyde content
- Universal design has been incorporated in a proportion of apartments to insure inclusive outcomes for people with disabilities; internal and external communal spaces are multi use and designed to foster social interaction

Air quality

Natural cross ventilation outcomes, as considered by the Apartment Design Guidelines criteria, have been met at 62% of apartments over the first 9 storeys and 82% overall.

For the retail, food and beverage and commercial/office premises, future design for outdoor air flow will target 50% higher levels than the baseline AS 1668.2:2012 requirement.

Acoustic Comfort

An acoustic study has been carried out to establish requirements for satisfactory acoustic outcomes for building occupants according to the activity they are undertaking.

For residential apartments the strategy and design and inclusions will ensure that:

- Maximum acceptable internal noise levels are achieved in bedroom and living room areas
- Acoustic separation insulation levels between apartments will be targeted to meet or exceed NCC minimum requirements

Lighting Comfort

To further enhance the health and wellbeing of residents the project has considered daylighting outcomes through design and will consider lighting fixture selection that exceeds basic compliance.

- Daylighting outcomes are enhanced by the ADG guidelines for window sizing and room depths.
- LED lighting colour outputs should be accurate, and reflect natural colour outcomes, as measured by a CRI greater than 85 (luminaires should quantify the CRI level)
- LED temperature should target lower levels (2700k-3000k) in bedrooms with brighter (4500K-6500K) in living and kitchen areas with dimming function

Low exposure to toxins

Procurement of paints, adhesives, sealants, carpets and other large surface area materials for internal finishes will target products with a recognised certification of Total Volatile Organic Compounds measured in the lower quartile. The tender issued for this stage of

work will include clear guidelines on the requirements for products and materials to be used.

Any engineered wood products selected for the building will also have to be confirmed as having low or no formaldehyde content generally recognised as below 1mg/L.

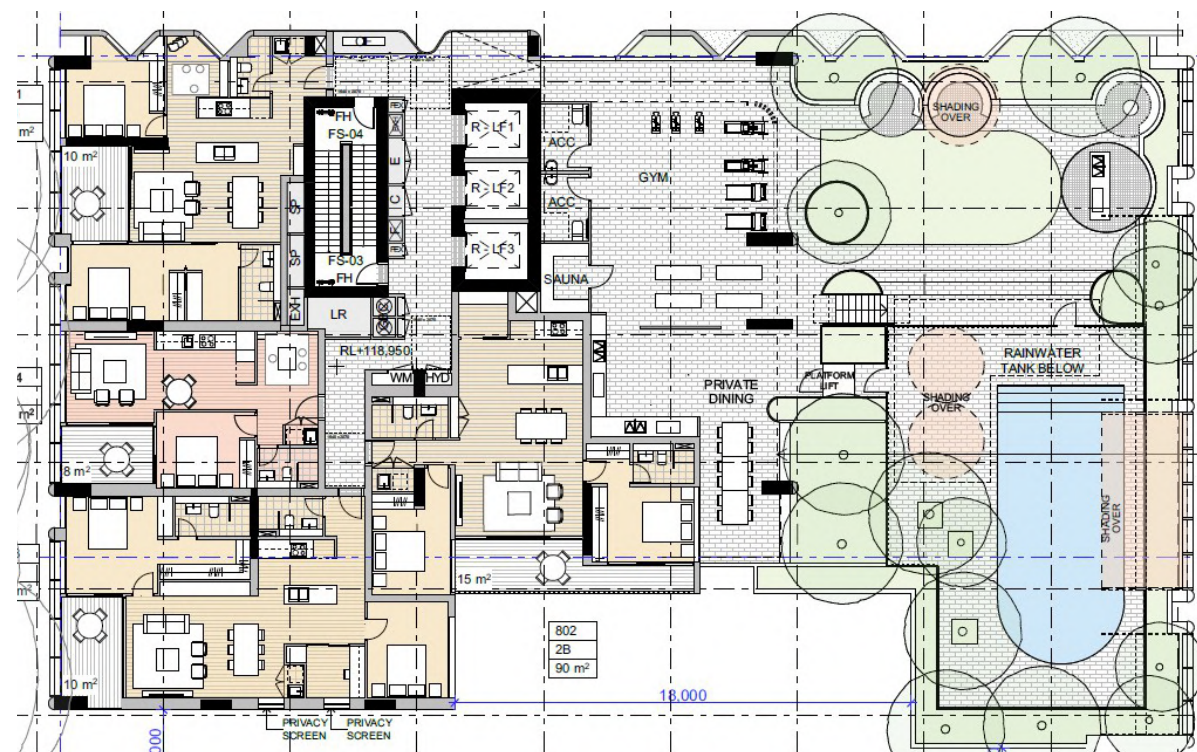
Communal Facilities and Spaces

The design provides outdoor spaces for residents that are inclusive, safe, flexible and enjoyable. Communal open space of total 565 sqm (approximately 25% of site area) has been located on level 8.

This space will be embellished to support multiple outdoor experiences for wide interests and will include an outdoor gym, private dining, pool area and relaxation areas.


Inclusive design and spaces

50% of apartments will be 'adaptable' across nine designs. Adaptable housing units are residential dwellings designed to be easily modified to meet the needs of occupants with disabilities or those whose needs may change over time due to age or other factors. 15% of GFA will also be allocated for Affordable Housing apartments.



Level 8 includes a large podium rooftop communal area with mixed recreational facilities for residents

10. Consultant declaration

PROJECT DETAILS	
PROJECT NAME	
Application number	SSD-73277714
Address of subject land	37 Archer Street, Chatswood
Lot / DP	SP 38065
APPLICANT DETAILS	
Applicant name	Hyecorp Property Group
Applicant address	Suite 1/256 Victoria Ave, Chatswood NSW 2067
REPORT DETAILS	
Name of report this declaration relates	Ecologically Sustainable Development (ESD) Report for SSD- 73456206
Report reference no.	2401077
Report date	29 April 2025
Company name (inc. ABN / ACN)	Efficient Living Pty Ltd
Author name	Troy Daly
Author qualifications	Green Star Accredited Professional, Master of Urban and Regional Planning, Bachelor of Economics
Author address	Shop 6, 1/5 Collaroy St, Collaroy NSW 2097
DECLARATION BY CONSULTANT	
Name	Troy Daly
Registration no.	GBCA Contact ID 113992 as GSAP
Organisation registered with	Green Building Council of Australia
Declaration	<p>The undersigned declares that the Ecologically Sustainable Development Report for SSD- 73456206:</p> <ul style="list-style-type: none"> has been prepared in accordance with the following policy, guidelines, or legislative requirements; <ul style="list-style-type: none"> To address SEARS issued for SSD 73456206 and relevant in force NSW State planning legislation including the Sustainable Buildings SEPP; contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the ESD Report relates; does not contain information that is false or misleading subject to the limitation of final project information noted on page 1 of the report and any assumption notes throughout the report; identifies and addresses the relevant Planning Secretary's environmental assessment requirements (SEARs) for the project; identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments to which the ESD Report relates; contains a consolidated summary of the proposed or necessary mitigation measures should be read in conjunction with the separate NatHERS and BASIX certification for the project also by Efficient Living
Signature	
Date	29/04/2025

11. Key abbreviations/glossary

ESD: Ecologically Sustainable Development or often Environmentally Sustainable Development

COP: 'Co-efficient of performance' used to measure conversion of electrical energy into heating or cooling energy

GFA: Gross floor area

ACOP: 'Annualized co-efficient of performance' also used to measure conversion of electrical energy into heating or cooling energy but typically adjusted for local climate conditions

NatHERS: National Home Energy Rating Scheme—note only refers to thermal performance of the home

BASIX: Building Sustainability Index measuring thermal, total energy and water efficiency in the home—part of the Sustainable Buildings SEPP 2022

EV: Electric vehicle

PV/solar array: Solar panels using photo voltaic technology to convert solar radiation into electricity

IEQ: Indoor environmental quality usually referring to air, noise and light quality in the building

DA/SSDA: Development Application/ State Significant Development Application'

SEPP: State Environmental Planning Policy

LEP: Local Environmental Planning Policy

DCP: Development Control Plan

CC: Construction certificate

SEAR: Secretary's Environmental Assessment Requirement issued to support a SSDA

ADG: NSW Apartment Design Guide setting apartment design standards in the NSW Housing SEPP

VOC: 'Volatile organic compound' that is a chemical gas release from typically internal building surfaces and materials

HVAC: Heating, ventilation and air conditioning—also includes cooling processes

Section J: The energy efficiency section requirements of the National Construction Code

GBCA: Green Building Council of Australia—the owner of Green Star ratings for buildings and communities

NABERS: National Australian Built Environment Rating Scheme—providing ratings from actual water and energy consumption in buildings

WELS: Water efficiency labelling and standards scheme

GEMS: Greenhouse and Energy Minimum Standards

MEPS: Minimum Energy Performance Standards (under GEMS)

EPD: Environmental Product Disclosure providing transparent information on environmental impacts

Emission scopes – A mechanism for classifying different sources of carbon/GHG emissions used in carbon accounting. There are three 'scopes'

Scope 1 covers direct emissions from on-site fuel combustion (e.g. diesel, natural gas and LPG).

Scope 2 covers indirect emissions from the consumption of purchased electricity, steam, heating and cooling.

Scope 3 covers indirect emissions from activities not owned or controlled by the reporting organisation, including production of fuels, electricity transmission losses, embodied carbon in construction and maintenance (including materials and products) tenant energy consumption, waste treatment, water treatment and travel to/from the building.

(adopted from Net Zero Technical Note—DPE 2023)



Net Zero Statement

The Net Zero Statement is provided on the next pages



efficient
LIVING



Net Zero Statement - SSD-73277714

Celine - 37 Archer Street Chatswood
Hycorp Pty Ltd

To be built at 37 Archer Street, Chatswood,

Document Control

Issue	File Ref	Description	Author	Date
A	2401077H	Net Zero Statement	TD	29/4/2025



Sustainable Building Consultants

p. 02 9970 6181 e. admin@efficientliving.com.au
www.efficientliving.com.au

Contents

1.	Cover Letter and certification	3
2.	Project Summary	5
3.	On site Fuel Usage.....	5
4.	Energy Efficient Strategies	5
5.	Renewable Energy Generation and Storage	6
6.	Energy Consumption and Emissions Calculator	7
7.	Appendix A – Net Zero Statement Checklist.....	8

1. Cover Letter and certification

Efficient Living has been engaged by Hyecorp Pty Ltd to prepare a Net Zero Statement (NZZ) to support the State Significant Development Application (SSD-73456206).

The NZZ is required for the office floor space component (c. 1,455 sqm GFA) of the proposal as it is considered 'large commercial development' under the Sustainable Buildings SEPP (office development over 1,000 sqm floor space).

This statement outlines the approach for the office floor space activities to be able to operate as 'net zero emissions' in operation.

Contact

Prepared By:

Consultant:	Troy Daly (MURP USYD., GSAP)
Phone:	(02) 9970 6181
Email:	troy@efficientliving.com.au

The design considers passive and active measures to reduce energy use and greenhouse gas emissions, while creating a pathway toward net zero compliance as per EP&A Act Regulation Clause 35C.

The office floor space component of the project has been designed to be serviced by all electric appliances and systems. Scope 1, on-site fossil fuel, related carbon emissions are therefore eliminated, and Scope 2 emissions can be eliminated by contracting supply of renewable electricity.

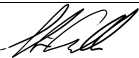
Disclaimer

This report has been prepared in accordance with the agreed scope of work between Efficient Living and Hyecorp Pty Ltd. Efficient Living has acted diligently and employed all reasonable care in the preparation of this report. The information contained within is based upon the documents and information, accepted in good faith as being true and accurate, provided by the client, architects, and consultants. Should amendments occur to the documents referenced in this report, this may require an update.

Mechanical Engineer's Certification

I, as a qualified mechanical engineer, have reviewed the technical content of this Net Zero Statement and confirm its adherence to net zero criteria outlined under the State Environmental Planning Policy (Sustainable Buildings) 2022. This certification validates that the strategies and assumptions detailed in this report are accurate and feasible as per the current design intent of the 37 Archer Street, Chatswood development proposal.

I have reviewed the statement and certified that it meets the technical accuracy and compliance standards required by the NSW Sustainable Buildings SEPP for net zero operations.

Certified by:	
Electrical or Mechanical Engineer:	Steven Cassells
Phone:	0401222862
Email:	steve@neuron.build

2. Project Summary

The proposal is for a 28-storey building with 6-levels of basement below. The development contains the following uses:

- Residential apartments: A total of 125 apartments (including 28 affordable housing units) comprising 29 x 1 bed apartments, 55 x 2 bed apartments, 30 x 3 bed apartments and 11 x 4 bed apartments with recreational facilities at Level 8.
- Office tenancies: occupying levels 2 and 3.
- Retail tenancies: double storey retail units fronting Bertram Street.
- Food and beverage tenancies: ground level.
- Basement parking: 154 car spaces, 9 motorbike spaces, 28 bicycle spaces and end of trip facilities.
- Servicing and plant equipment.
- Publicly accessible landscaped through site link.
- The gross floor area (GFA) for the proposed development is described below:
- Total GFA: 14,230sqm
 - Residential GFA: **12,318sqm**
 - Non-residential GFA: **1,912sqm**

Large Commercial Development under the Sustainable Buildings SEPP

The project includes floor space expected to be allocated to office uses of c 1,455 sqm GFA.

The Sustainable Buildings SEPP requires a Net Zero Statement for a development application for large commercial developments (offices with a net lettable area of at least 1,000 sqm, hotel or motel accommodation with at least 100 rooms and services apartments). The following ESD measures support the ability for the office component of the proposal to operate with net zero carbon emissions in operation by 2035.

3. On site Fuel Usage

The design for the office tenancies has been optimized to operate without use of fossil fuels by proposing a fully electric operation. Key strategies include:

- **All-Electric Operations for office tenancies:** The building has been designed to operate as 'all electric' across all office tenancies, ensuring that each tenant can contribute to a fossil fuel-free environment (with renewable electricity supply) without modifications to core systems. This includes space heating & cooling, hot water, lighting etc.
- **Electric cooking:** Any internal kitchen requirements, related to office tenancies, will be proposed with induction cooktops and electric ovens. Induction cooking offers better energy efficiency and performance than gas while eliminating on-site gas infrastructure.

4. Energy Efficient Strategies

Building Envelope

The building envelope for commercial spaces will be designed to enhance thermal performance and minimize energy loss by complying with the latest NCC 2022 Section J inclusions for building fabric and energy requirements.

- **High-Performance Insulation:** Walls, roofs, and floors will incorporate high-R-value materials to reduce heating and cooling demands.
- **Efficient Glazing and Shading:** High-performance, double-glazed windows with external shading devices will minimize solar gain, especially on western and northern facades.
- **Airtight Construction:** Enhanced sealing around windows, doors, and other envelope penetrations ensures minimal air leakage.

HVAC and System Efficiency

The HVAC system will utilize high-efficiency electric air conditioners with ACOPs targeted at 3.5 or above in the procurement process. System selection will be carried out in detailed design stages. Other potential enhancements to the systems include:

- **Smart Control Systems:** Motion sensors, occupancy-based lighting, and HVAC controls will reduce energy use during low-occupancy periods.
- **High-Efficiency Lighting and Appliances:** LED lighting throughout, efficient layout design, and high-star-rated appliances will be specified to reduce operational energy requirements. At detailed design, a lighting design specification for commercial floorspace will be incorporated seeking to provide LUX outcomes for activities consistent with AS1680 rather than targeting exceedance of these standards (through application of additional efficiency mechanisms).
- **Energy Monitoring & Management:** The commercial tenancies will employ energy monitoring systems with sub-metering in accordance with the latest NABERS requirements to be able to assess and improve the energy rating of the base building and whole building in accordance with the Commercial Building Disclosure.
- **Advanced Energy management and demand response systems:** Implement smart energy management systems that monitor and optimize energy use based on real-time data, weather conditions, and occupancy levels. Demand response strategies can reduce peak energy demand and provide additional grid stability, minimizing dependency on external energy sources that may rely on fossil fuels.

Hot Water Efficiency:

Hot water for kitchens will be provided by the central electric heat pump system, potentially supplemented with localised electric boilers, providing a relatively energy efficient hot water supply outcome. Additionally, hot water pipes will be insulated, and low-flow fixtures installed to reduce overall hot water energy demand.

NABERS Energy 5.5 Star Agreement to Rate:

We note that a NABERS Agreement to Rate for office spaces, of NABERS Energy 5.5 stars, will be submitted with the development application supporting above industry average energy efficiency outcomes.

5. Renewable Energy Generation and Storage

- **On-site Renewables:** The development has restricted roof or podium roof areas able to support solar/PV arrays. The limited areas have been dedicated, as is permissible under NCC 2022, to mechanical services and community and private outdoor areas.
- **Energy Storage Solutions:** Infrastructure provisions will be made under NCC2022 Section J to allow future installation of battery storage.

- **Off-Site Renewable Energy Commitment:** Future building owners/operators will be able to secure renewable electricity power purchase agreements for base building supply. These contracts often offer lower electricity purchase costs and would be required to achieve Net Zero in operation for the office spaces.
- **All-Electric Vehicle (EV) Charging Infrastructure:** Office space car parking provision will benefit from NCC2022 Section J infrastructure requirements to ensure that EV charging spots benefit from a minimum supply of energy during the day and that a minimum percentage of spots (10%) can install a Type 2, 7kW, charger.

6. Energy Consumption and Emissions Calculator

Annual Energy Use Projections:

As the detailed design of office tenancies and final mechanical equipment has not yet been determined a detailed energy use projection is not available.

Using current NABERS reverse calculator assumptions for the proposed office floor space, and an assumed NABERS Energy 5.5 star whole of building rating, the total expected annual energy use is estimated at 187,189 kWh per annum.

Greenhouse Gas Emissions Calculations:

Projected greenhouse gas emissions are calculated based on Scope 1 (direct emissions from fossil fuels), Scope 2 (indirect emissions from purchased electricity), and Scope 3 (other indirect emissions). Using the current NABERS reverse calculator for a 5.5 star rated office space the total operation CO₂ emissions are estimated at 127,288 kgCO₂ per annum.


These carbon emissions are Scope 2 only and could be eliminated, to provide a Net Zero emissions outcome if both building owner and tenants opted for 100% renewable electricity supply. Further, as the grid decarbonizes over the coming decades, this result will reduce accordingly.

	Energy consumption estimate p.a.	Greenhouse Gas Emissions estimate p.a. (Scope 1 and 2)
Scope 1	n/a	
Scope 2	187,189 kWh	127 tonnes CO ₂
Scope 3	n/a	

Note: Refrigerant leakage has not been calculated as data unavailable

Note: Upfront emissions have not been included as Scope 3

7. Appendix A – Net Zero Statement Checklist

<p>Department of Planning and Environment Net Zero Statement Technical Note</p>		
<p>Net Zero Statement Checklist</p>		
<p>Cover Letter</p>		
Project details and overview	<input checked="" type="checkbox"/>	
Confirm if development is fossil fuel-free or requires a transition strategy.	<input checked="" type="checkbox"/>	
Certified and signed by a mechanical or electrical engineer	<input checked="" type="checkbox"/>	
<p>On-Site Fossil Fuel Usage</p>		
<p>If development is fossil fuel-free:</p>		
Provide evidence of fossil fuel-free operations	<input checked="" type="checkbox"/>	
<p>If development is fossil fuel dependent:</p>		
Provide details of each fossil fuel system used and electrification transition strategy.	<input type="checkbox"/>	
<p>Provide evidence the development will operate without fossil fuel by 2035 by confirming it -</p>		
Incorporates infrastructure or space for necessary infrastructure to transition – plant, equipment, ventilation etc	<input type="checkbox"/>	
<p>Energy Efficiency</p>		
<p>Have energy reduction initiatives been described for the following? -</p>		
Passive design features – building orientation, natural ventilation, insulation, glazing performance, air tightness etc.	<input checked="" type="checkbox"/>	
Technical design features – energy efficient HVAC and lighting systems, smart controls and occupancy sensors etc.	<input checked="" type="checkbox"/>	
<p>Renewable Energy Generation and Storage</p>		
Have renewable energy or storage initiatives been described? – solar panels, photovoltaics, wind turbines etc.	<input checked="" type="checkbox"/>	
<p>Estimated Energy Consumption if available</p>		
Estimated fossil fuel consumption per year	<input type="checkbox"/>	
Estimated electricity consumption per year	<input type="checkbox"/>	
Total estimated energy consumption per year kWh/y/m ² of GFA	<input checked="" type="checkbox"/>	
<p>Estimated GHG emissions for energy use if available</p>		
Estimated direct (scope 1) GHG emissions per year	<input type="checkbox"/>	
Estimated indirect (scope 2 and 3) GHG emissions per year	<input type="checkbox"/>	
Total estimated GHG emissions per year	<input checked="" type="checkbox"/>	
<p>Net Zero Statement</p>		<p>4</p>

Abbreviations & Glossary

DHW – Domestic hot water

GFA – Gross floor area

GHG – Greenhouse gas emissions

HHW – Heating hot water

HVAC – Heating, ventilation and air conditioning

PV – Photovoltaic

SB SEPP – State Environmental Planning Policy (Sustainable Buildings) 2022

Emission scopes – A mechanism for classifying different sources of GHG emissions used in carbon accounting. There are three ‘scopes’

- **Scope 1** covers direct emissions from on-site fuel combustion (e.g. diesel, natural gas and LPG).
- **Scope 2** covers indirect emissions from the consumption of purchased electricity, steam, heating and cooling.
- **Scope 3** covers indirect emissions from activities not owned or controlled by the reporting organisation, including production of fuels, electricity transmission losses, embodied carbon in construction and maintenance (including materials and products) tenant energy consumption, waste treatment, water treatment and travel to/from the building.