EAGERS AUTOMOTIVE LIMITED

SUSTAINABILITY & ENERGY EFFICIENCY REPORT

Bungaree Street, Maitland – Newcastle Heritage

Project Number: 117280
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Document Control

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117280-ESR-r1	29 February 2024	ESD Report	Ruifong Ong	Robert Romanous
117280-ESD-r2	1 March 2024	ESD Report	Ruifong Ong	Robert Romanous
	1 March 2024	Ruifong Ong Senior Sustainability Engineer	Signed:	

Jensen Hughes Australia

Providing building regulations, fire engineering, accessibility, and energy consulting services to NSW for over 25 years

Our story begins in 1997 with the founding of BCA Logic to fulfill the demand of a consultancy company whose expertise expanded across the entire life cycle of a building, from consulting on the initial planning through to construction and occupation.

BCA Logic, SGA Fire and BCA Energy joined Jensen Hughes in 2021, a leading global, multi-disciplinary engineering, consulting and technology firm focused on safety, security and resiliency. We continue to be at the forefront of our industry and work thoroughly to preserve our position by ensuring the successful delivery of projects.

Jensen Hughes was launched in 2014 through the historic merger of Hughes Associates and Rolf Jensen & Associates (RJA), two of the most experienced and respected fire protection engineering companies at the time. Since then, we have gained market leadmership in nuclear risk consulting and established commanding positions in areas like forensic engineering, security risk consulting and emergency management. Over the past 22 years, our integration of more than 30 privately held engineering and consulting firms has dramatically expanded our global footprint, giving us a powerful market presence ten times larger than our nearest competitor in some of our markets and extending our historical lineage back to 1939.

With more than 90 offices and 1500 employees worldwide supporting clients globally across all markets, we utilise our geographic reach to help better serve the needs of our local, regional, and multinational clients. In every market, our teams are deeply entrenched in local communities, which is important to establishing trust and delivering on our promises.

Glossary & Definition

Term	Definition
BASIX	Building Sustainability Index
COP	Coefficient of Performance
DCP	Development Control Plan
DTS	Deemed-to-satisfy
EMP	Environmental Management Plan
ESD	Ecologically Sustainable Development
GHG	Greenhouse Gas
HVAC	Heating, Ventilating and Air-Conditioning
LEP	Local Environment Plan
Lumens	Luminous flux, equal to the amount of light emitted per second from a uniform source of 1 candela
Lux	Light intensity in a specific area (1 lux = 1 Lumen/m^2)
NCC	National Construction Code
PV	Photovoltaic
Rt	Total R-value for the system
R-value (m^2.K/W)	The thermal resistance of a component calculated by dividing its thickness by its thermal conductivity
SA	Solar absorptance
SEPP	State Environmental Planning Policy
SHGC	Solar heat gain coefficient
U-value (W/m^2K)	The thermal transmittance of the composite element allowing for the effect of any airspaces, thermal bridging and associated surface resistances
VLT	Visible Light Transmission
WELS	Water Efficiency Labelling and Standard

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Executive Summary

Jensen Hughes Pty Limited (Jensen Hughes) has been engaged by Eagers Automotive Limited to provide an Energy and Water Efficiency Report that outlines both regulatory and benchmarking design initiatives for the proposed project at Bungaree Street, Maitland – Newcastle Heritage. The project will be assessed under the following compliance provisions:

+ NSW State Environmental Planning Policy (Sustainable Buildings) 2022, Item 3.2
+ National Construction Code 2022 Volume One – Building Code of Australia Class 2 to 9 buildings

Beyond the compliance requirements, the project team is committed to its occupants, visitors, community and the environment with a sustainably conscious development through design to operation. The focus of additional Ecologically Sustainable Design measures to further reduce energy & water resource consumption and improve environmental quality through the following:

+ Passive design strategy
+ Low emission materials
+ Energy efficiency
+ Water efficiency

1.0 Basis of Assessment

1.1 LOCATION AND DESCIPTION

The building development, the subject of this report, is located at Bungaree Street, Mailtand and is the Newcastle Heritage. The project consists of car showrooms and workshop.

The building has been classified as shown in Table 1, and the location of the project is set within the following climate zones as shown in Table 2.

Table 1: Building Classifications

Class	Level	Description
6	Ground	Car showroom and workshop

Table 2: Climate Zones

Location	Climate Zone & Description
Maitland	Climate Zone 5 - Warm temperature

1.2 DESIGN DOCUMENTATION

This report has been prepared based on the following Design Plans and Specifications:

- Centric Architects, 21/02/2024 DA Submission

1.3 REPORT SCOPE

The purpose of this report is to assess the proposed design against the environmentally sustainable design strategy, energy, and water efficiency components in line with the SEPP. This report addresses:

- Sustainability drivers stipulated from relevant regulatory and project requirements.
- Project's design responses corresponding to the sustainability drivers.

1.4 LIMITATIONS

This report aims to provide high level ESD design guidance to the project in accordance with the SEPP. It is intended that the options nominated in this report are subject to discuss, assess and workshop into the detailed design of the development. Section J compliance must refer to separate, designated assessment reports. Sections B, C, D, E, F, G, H and I of the NCC;

2.0 ESD Framework Requirements & Strategy

The following regulatory frameworks are incorporated to form part of the overarching ESD strategy for the development:

2.1 NSW STATE ENVIRONMENTAL PLANNING POLICY (SUSTAINABLE BUILDINGS) 2022

2.1.1 Item 3.2 Development consent for non-residential development

1. In deciding whether to grant development consent to non-residential development, the consent authority must consider whether the development is designed to enable the following—
    a. the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials,
    b. a reduction in peak demand for electricity, including through the use of energy efficient technology,
    c. a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,
    d. the generation and storage of renewable energy,
    e. the metering and monitoring of energy consumption,
    f. the minimisation of the consumption of potable water.
2. Development consent must not be granted to non-residential development unless the consent authority is satisfied the embodied emissions attributable to the development have been quantified.

To achieve the objectives of the SEPP, the sustainability and energy efficiency report is to be prepared for the development application, which will address how the principles have been incorporated into the design.

2.2 NCC2022 VOLUME ONE SECTION J PROVISIONS

The primary objective of Section J provisions is designed to reduce greenhouse gas emissions through improved performance of building fabric elements and operational services systems in the following categories. Deemed-to-Satisfy (DTS) compliance is mandated for project's minimum provision, but it is recommended to exceed the baseline requirement where reasonable, refer to project specific Section J compliance requirement in addressing the following provisions:

+ J4 Building Fabric
+ J5 Building Sealing
+ J6 Air-conditioning & ventilation systems
+ J7 Artificial lighting & power
+ J8 Heated water supply
+ J9 Facilities for energy monitoring and on-site distributed energy resources

2.3 ESD FRAMEWORK

Based on ESD frameworks in 2.1 and 2.2, our interpretation of the requirements is to ensure the project's energy and water resource reduction targets are achieved through means of *avoid*, *reduce,* and *offset* design hierarchy action; where the foremost effective strategy is to minimise resource demand through building element design, followed by improving the efficiency of building systems and finally replace non-renewable sources with alternative substitutes. The combined design principles shall reduce the consumptions for energy and water resources, which will minimise the overall building's environmental impact and cost over its lifetime.

- ***Offset*** – Provide alternative energy sources. i.e., ENERGY - onsite generation, renewable systems, waste heat reclaim or green power purchases; WATER - rainwater harvesting for landscape, toilet and laundry uses.
- ***Reduce*** – Minimise resource demand with improved efficiency requirement to building operational systems, i.e., ENERGY - mechanical and electrical equipment star rating; WATER - high star rating taps, shower head and toilets.
- ***Avoid*** – Eliminate consumptions through passive design and user behaviour. i.e., ENERGY - building orientation, solar access, natural cooling, glazing/fabric requirement and improve occupant awareness to building feature uses; WATER - use native, drought tolerant species for landscape, avoid the water-base cooling tower and utilise waterless urinal for common amenities.

3.0 Energy Efficiency Report

3.1 INTRODUCTION

The energy efficiency report provides an analysis derived from the energy simulations that has been conducted in the J1V3 assessment, specifically with quantifying the greenhouse gas emissions attributable to the development of the project.

3.2 LIMITATIONS OF THE ENERGY SIMULATION

The energy simulations results represent a theoretical limit of the base building energy use for the project. While reasonable, and in places conservative, assumptions have been made to obtain the results. The estimate is based on simplifications that do not and cannot fully represent all the intricacies of performance once built. No guarantee or warranty of performance in practice can be based on simulation results alone.

3.3 MODEL INPUT & ASSUMPTIONS

Table 3: Input data summary

Input Data Summary	
Building Space Type	Retail showroom
Energy Simulation Software	IES VE 2022
Weather Data	Sydney Airport
Operation Profile	Monday – Saturday: 8:00am – 5:30pm
	Sunday: 9:00am – 5:00pm
HVAC Heating & Cooling COP	3.4
Infiltration rate	0.7 ach

Table 4: Building fabric construction details used in the energy simulation model

Building Fabric Summary		
Type	**Element**	**Details**
External Roof & Ceiling	Metal Roof	Rt 4.07
External Walls	Steel Stud Wall	Rt 1.55
Floor (Showroom)	Slab-on-Ground Concrete	Rt 2.06
Floor (Workshop)	Slab-on-Ground Concrete	Rt 1.46
Glazing (Showroom)	Single Glazed, Low-e, Clear	U5.80, SHGC 0.80
Glazing (Workshop)	Single Glazed, Clear	U8.00, SHGC 0.77

Table 5: Internal gains for the different room types used in the energy simulation model

Space Type	Lighting Power Density	Appliances/ Machinery	Occupancy
Retail	14 W/m^2	5 W/m^2	5 m^2/person

3.4 RESULTS & ANALYSIS

Table 6: Monthly breakdown of energy consumption

Month	Lighting	Equipment	Heating	Cooling	System Auxiliary	Heat Rejection	Total Energy (MWh)
January	3.16	0.55	0.00	0.85	0.95	0.36	5.88
February	2.85	0.50	0.00	0.93	0.86	0.39	5.53
March	3.16	0.55	0.00	0.65	0.95	0.27	5.58
April	3.05	0.54	0.07	0.22	0.92	0.09	4.90
May	3.16	0.55	0.27	0.05	0.95	0.02	5.01
June	3.05	0.54	0.66	0.00	0.92	0.00	5.17
July	3.16	0.55	0.80	0.00	0.95	0.00	5.46
August	3.16	0.55	0.64	0.00	0.95	0.00	5.31
September	3.05	0.54	0.25	0.06	0.92	0.02	4.85
October	3.16	0.55	0.13	0.26	0.95	0.11	5.15
November	3.05	0.54	0.05	0.48	0.92	0.20	5.24
December	3.16	0.55	0.01	0.65	0.95	0.27	5.60
TOTAL	**37.16**	**6.53**	**2.89**	**4.15**	**11.18**	**1.74**	**63.66**

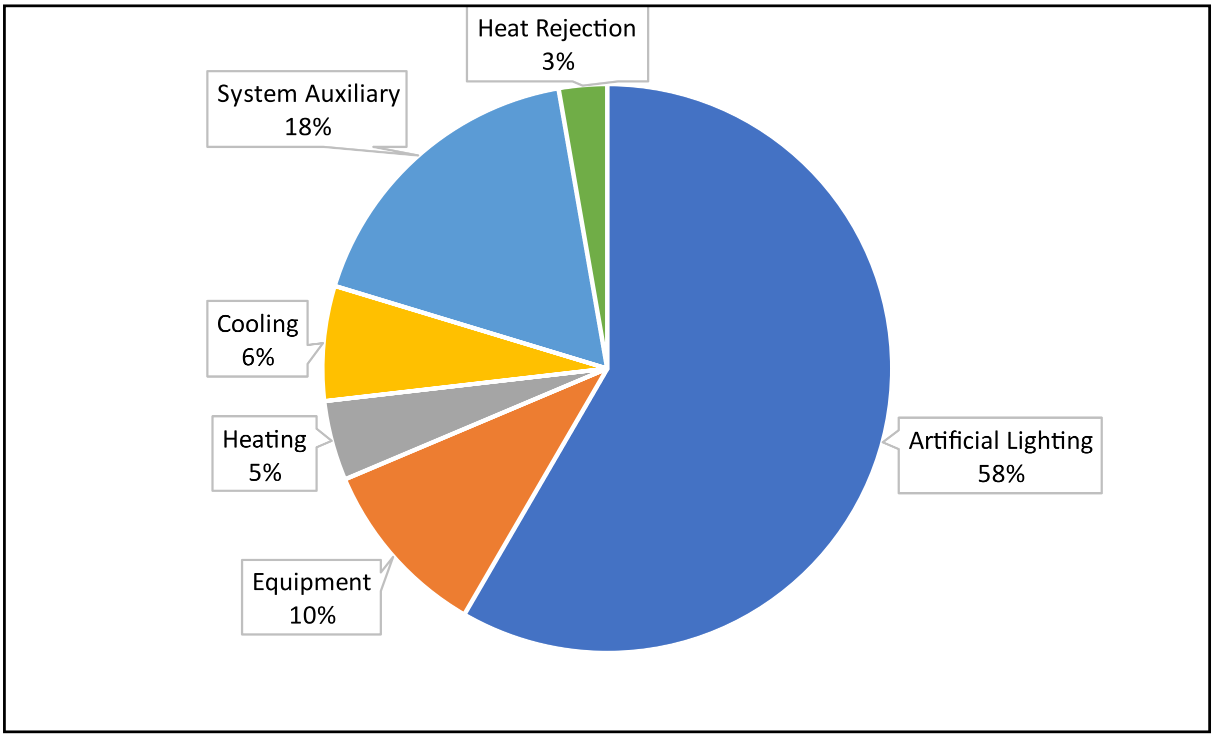


Figure 1: Itemised annual energy consumption in the building

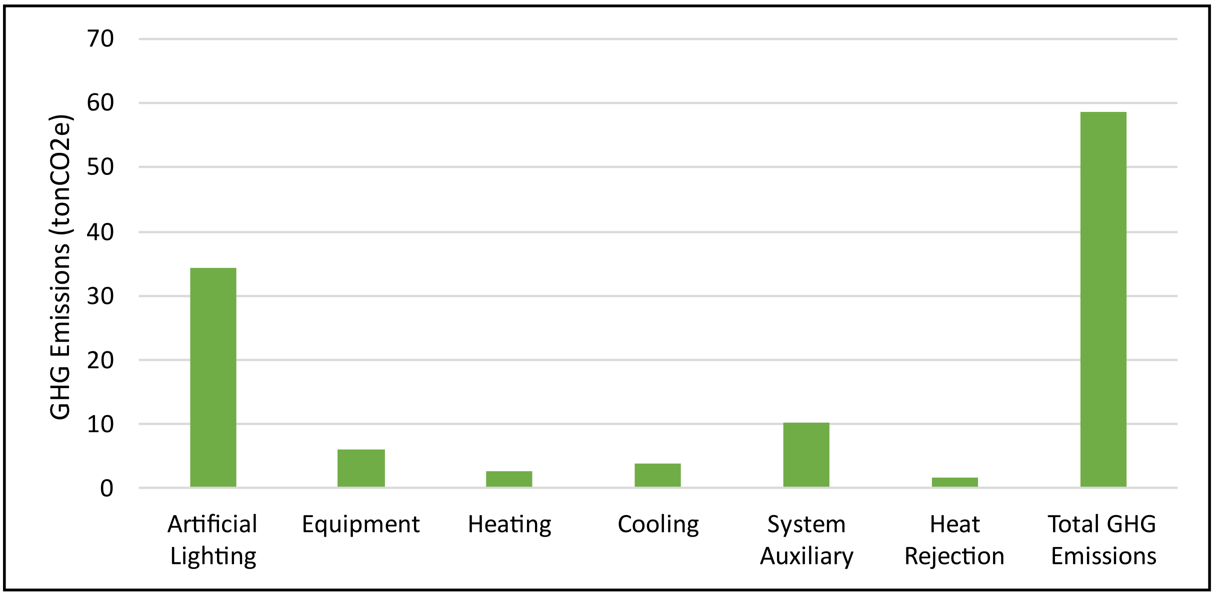


Figure 2: Itemised greenhouse gas emissions of the building

Table 7: Summary of results for annual energy consumption and greenhouse gas emissions

Annual Energy Consumption and Results	
Total Energy Consumption	63.66 MWh/yr
Total Greenhouse Gas Emissions	54.09 ton CO_2e/yr

The breakdown of energy consumption and greenhouse gas emissions of the project is summarised in Table 6, Figure 1, Figure 2 and Table 7. The total energy consumption is 63.66 MWh/year which translates to a total greenhouse gas emission of 54.09 ton CO_2e/yr.

4.0 Sustainable Design Strategies

With the intent to satisfy the sustainability objectives from the SEPP and minimise the environmental impact of the project, the following preliminary ESD strategies are proposed to govern the design, construction, and operational phases of the project. The proposed design strategies below intend to address recommendations made within the DA stage where relevant.

4.1 SUSTAINABLE CONSTRUCTION

Sustainable construction aims to address the consumption of resources within a building construction context, by encouraging the selection of lower-impact materials. This section will also aim to achieve absolute reductions in the amount of waste generated or the recycling of as much of the waste generated as possible, which will help lower the embodied carbon of the building. The following items are addressed in this section:

+ The minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials

Feature	Design Strategy	Objective/ Impact
Indoor Pollutants	+ Internally applied paints, adhesives, sealants and carpets to meet stipulated 'Total VOC Limits' as per Green Star Design As-Built v1.3 requirements. + Engineered wood products to meet stipulated formaldehyde limits as per Green Star Design As-Built v1.3 requirements or where possible not used in the building	Safeguard occupant health through the reduction in internal air pollutant levels
Responsible Construction Practices	+ Environmental impacts are managed during construction by implementing a best practice EMP that covers environmental impacts arising from construction works, as outlined within the NSW Environmental System Guidelines	Ensure responsible construction practices that manages and minimises the environmental impacts, enhance staff health and well-being and improve sustainability knowledge on site
Construction and Demolition Waste	+ Waste contractors and waste processing facilities servicing the project demonstrated compliance with a recognised Construction and Demolition Waste Reporting Criteria, and the total amount of waste sent to landfill is less when compared against a typical building	Reduce construction waste going to landfill by reusing or recycling building materials
Responsible Building Materials	+ Structural and Reinforcing Steel is supplied by a steel fabricator accredited to the Environmental Sustainability Charter of the Australian Steel Institute (ASI) + Timber used is certified by a forest certification scheme	Include building materials that are responsibly sourced or have a sustainable supply chain to reduce carbon footprint of the project

	+ Permanent formwork, pipes, flooring, blinds and cables do not contain PVC and have a recognised product declaration + Reducing the use of Portland cement content with other substitutes + Ensure as much water as possible used within the concrete mix is captured or reclaimed + Using alternative aggregates such as crushed slag aggregate, or incorporating manufactured sand or other alternative materials	

4.2 PASSIVE DESIGN STRATEGIES

Passive building design has a direct influence on the thermal comfort and visual quality of the indoor environment. Effective passive design strategy can minimise the energy demands for internal heating, ventilating, air-conditioning, and artificial lighting throughout the year, thus providing savings in operational energy and reductions in greenhouse gas emissions. The following objectives are addressed with the passive design strategies:

+ A reduction in the reliance on artificial lighting and mechanical heating and cooling
+ A reduction in peak demand for electricity

Feature	Design Strategy	Objective / Impact
Daylighting and Visual Comfort	+ High levels of daylight are to be provided for the occupied areas with viewing facades and skylights, whilst managing the glare reduction for the nominated area through a combination of blinds, screens, fixed devices, or other means + The nominated areas are to have a clear line of sight to an external view + Maximise daylight harvesting with optimisation of the building orientation and avoid overshadowing of adjoining properties	Delivery of well-lit spaces that provide high levels of visual comfort to building occupants and reduce lighting energy consumption by maximising the use of natural daylight
Passive Solar Design	+ Use of shading to maximise the sun received during winter months, whilst minimising the penetration of the summer sun	Avoid and reduce the need for additional heating and cooling
Glazing and Shading	+ Glazing U-value and SHGC to comply with Section J requirements based on the wall-glazing façade calculations; + Showroom; Max U-value: 5.80, Max SHGC 0.80 + Workshop; Max U-value: 8.00, Max SHGC: 0.77	Reduce energy required for heating, cooling and lighting needs

Roof, Wall and Floor	+ Roof & Ceiling: Total System R-value to be Rt4.07 (Metal Roof) + External Wall: Total System R-value to be Rt1.55 (Steel Stud Wall) + Floor: Total System R-value to be Rt2.26 (Showroom) or Rt1.46 (Workshop)	Reduce energy required for heating and cooling
Natural ventilation and Indoor Air Quality	+ Use of operable windows and sliding doors to allow natural and cross ventilation + The entry of outdoor pollutants is to be mitigated through building ventilation systems designed according to ASHRAE Standard 62.1 + Mechanical ventilation system is to be designed for ease of maintenance and cleaning	Provide high indoor air quality to occupants

4.3 SERVICES SYSTEM EFFICIENCY (ACTIVE DESIGN)

Services systems account for the main operational energy consumption during the lifetime of the building. Using highly efficient mechanical, lighting, electrical and hydraulic service systems can significantly minimise energy consumption and reduce the local grid supply pressure. The following controls are addressed with the active design strategies:

+ A reduction in the reliance on artificial lighting and mechanical heating and cooling
+ A reduction in peak demand for electricity
+ The generation and storage of renewable energy
+ The metering and monitoring of energy consumption

Feature	Design Strategy	Objective/ Impact
Lighting System	+ Provision of high output LED light fitting to all lighting systems, with design target to meet or improve on DTS maximum power density provision. + Provision of efficient lighting controls to relevant areas: ▪ Motion sensor with manual off/ auto-off ▪ Lighting control zone no larger than 100 m^2, with stage down the lighting load via dimming levels ▪ Daylight sensor controls to perimeter zone ▪ Motion sensor and timer for back of house lighting	Avoid energy wastage when spaces are unoccupied and reduce energy required during operation
HVAC Systems	The HVAC system will be installed for all conditioned areas. Consideration of HVAC system selection should be given to high cooling COP and heat recovery system to improve performance, other considerations may include:	Reduce operational energy required for heating, cooling and ventilation needs

	+ Use indirect evaporative dewpoint cooler on the outside air supply to reduce cooling load + Addition of shut-off dampers to adjust outside air supply in the period of low/ non-occupancy + Motor must be high efficiency defined as per AS1359 + Capable to be fully integrated with the BMS where available + Zone grouping and control for areas with similar demands and cooling loads	
Insulation Needs	Provision of insulation to the service pipes including: + Air-conditioning ductwork and pipework + Heated hot water pipework	Reduce unwanted heat loss and avoid reheat energy demand
Appliances	Provision of electrical appliances at the highest practical efficiency under the federal government's energy rating scheme at the time of the development	Reduce operational energy usage
Hot Water	Provision of solar water heating for hot water. Should this be not feasible for the project, heat pump or condensing boiler type to be used instead	Reduce operational energy usage
Renewable Energy	Future provision of solar photovoltaic panels to offset grid power to be assessed	Reduce operational energy usage
Building Monitoring	Provision of a central monitoring system with designated sub-metering to record, analyse and review energy and water consumption for each specified service, which can be used to optimise ongoing operations and identify leaks: + HVAC + Lighting + Equipment and appliances + Hot water + Ancillary plants	Provide fault detection and optimisation opportunities to avoid waste energy and reduce operational demand.

4.4 WATER EFFICIENCY

The development should adopt the principles of integrated water cycle management, including minimising total water usage, minimising wastewater requiring treatment and disposal, minimising stormwater impacts on the environment and maximising water retention and reuse. The reduction of potable water on-site can be achieved through avoid, reduce and reuse saving strategies as below. The following items are addressed in this section:

+ The minimisation of the consumption of potable water.

Feature	Design Strategy	Objective/ Impact
Fittings and Fixtures	Highest practical efficiency WELS rating fittings and fixtures where practical + 4 star dual flush toilet + 6 star urinal (waterless) + 6 star tap	Reduce potable water consumption
Appliances and Equipment	Highest practical efficiency appliances & equipment, WELS 4 star or higher where practical + Kitchen – dishwasher	Reduce potable water consumption
Rainwater Harvesting Tank	Rainwater harvesting system can be used to collect rainwater from the roofs of the building and reduce potable water demand for the following uses (where practical): + Garden taps and landscape irrigation systems + Fire sprinkler test system (closed loop)	Offset potable water consumption with the use of rainwater
Stormwater Management	A separate Stormwater Management Report is to be issued for the development and incorporate all feasible measures relating to stormwater management, flood risk, water conservation water quality and groundwater protection.	Minimise impacts on the natural water cycle and the environment, and Council's existing drainage network.

5.0 Design Summary

The design approach as referred to in this report has been prepared against the SEPP and provided a high-level overview of the design report's environmentally sustainable design strategies and proposed energy and water efficiency components.

In response to detailed requirements outlined within the energy efficiency and water conservation criteria of the design, the report has included:

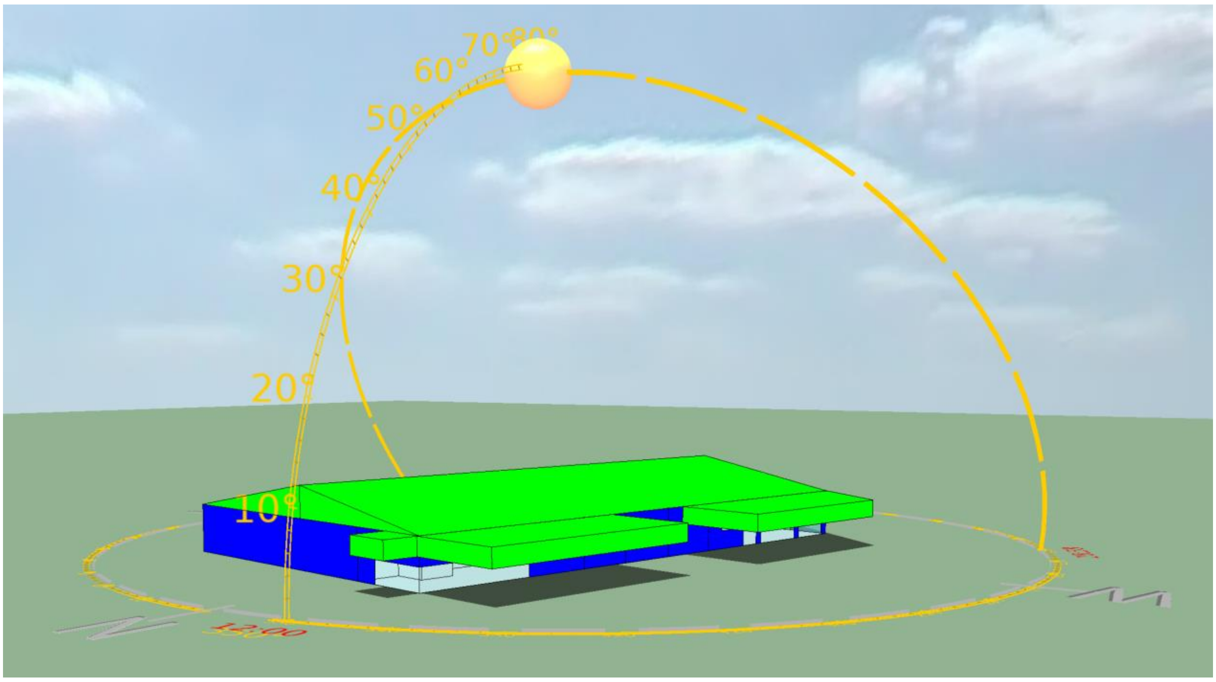
+ Effective passive design elements, highly efficient systems, alternative resource substitutions and sustainable construction practices to address sustainable design requirements set out under the SEPP's objectives and controls.
+ An outline of SEPP requirements, through the ESD framework and project specific proposed strategies, to achieve AVOID, REDUCE and OFFSET approach.

In summary, based on the proposed design strategies and the full commitment to NCC2022 Section J compliance, we believe the project shall satisfy the development consent for non-residential development criteria for Item 3.2 as per the NSW State Environmental Planning Policy (Sustainable Buildings) 2022.

Annexures

Annexure A: Energy Simulation

ENERGY SIMULATION MODEL



ENERGY SIMULATION RESULTS

	Total lights energy (MWh)	Total equip energy (MWh)	Ap Sys boilers energy (MWh)	Ap Sys chillers energy (MWh)	Ap Sys aux + DHW/solar pumps energy (MWh)	Ap Sys heat rej fans/pumps energy (MWh)	Total energy (MWh)
Date	117280-JV3	117280-JV3	117280-JV3	117280-JV3	117280-JV3	117280-JV3	117280-JV3
Jan 01-31	3.1562	0.5548	0.0022	0.8537	0.9498	0.3585	5.8752
Feb 01-28	2.8507	0.5011	0.0012	0.9283	0.8579	0.3899	5.5291
Mar 01-31	3.1562	0.5548	0.0044	0.6465	0.9498	0.2715	5.5832
Apr 01-30	3.0544	0.5369	0.0706	0.2225	0.9192	0.0935	4.8970
May 01-31	3.1562	0.5548	0.2711	0.0517	0.9498	0.0217	5.0053
Jun 01-30	3.0544	0.5369	0.6551	0.0016	0.9192	0.0007	5.1678
Jul 01-31	3.1562	0.5548	0.7977	0.0027	0.9498	0.0011	5.4622
Aug 01-31	3.1562	0.5548	0.6443	0.0021	0.9498	0.0009	5.3081
Sep 01-30	3.0544	0.5369	0.2532	0.0590	0.9192	0.0248	4.8474
Oct 01-31	3.1562	0.5548	0.1292	0.2563	0.9498	0.1076	5.1539
Nov 01-30	3.0544	0.5369	0.0520	0.4754	0.9192	0.1997	5.2374
Dec 01-31	3.1562	0.5548	0.0091	0.6536	0.9498	0.2745	5.5979
Summed total	37.1613	6.5321	2.8901	4.1533	11.1832	1.7444	63.6644