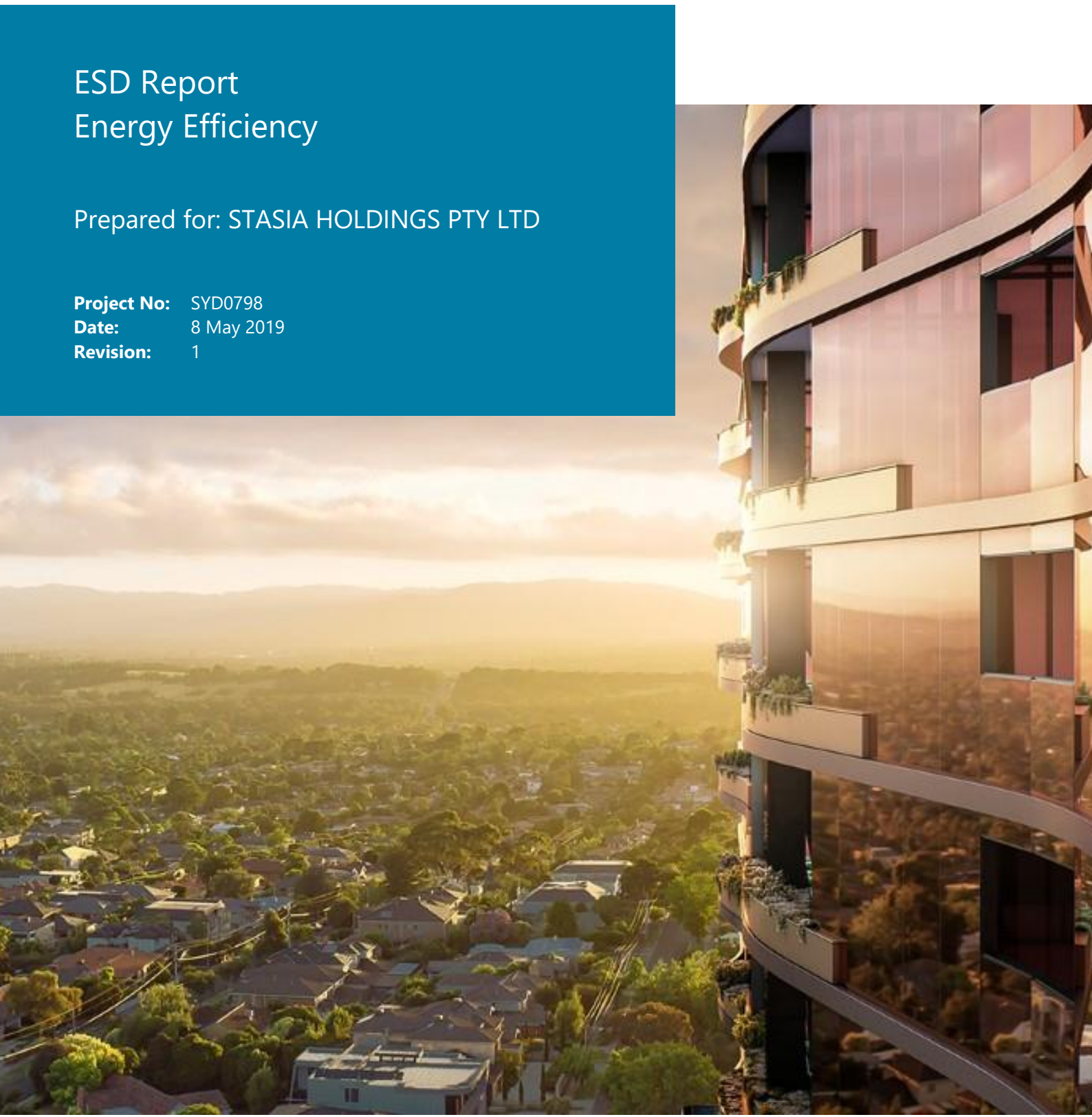


72-84 Foveaux St, Surry Hills

ESD Report Energy Efficiency

Prepared for: STASIA HOLDINGS PTY LTD

Project No: SYD0798
Date: 8 May 2019
Revision: 1



Project: 72-84 Foveaux St, Surry Hills

Location: 72-84 Foveaux St
Surry Hills, NSW 2010

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Project No: SYD0798

Revision: 1

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Contents

Executive Summary	4
1. Introduction	5
1.1 Project Background	5
1.2 Report Scope and Limitations	5
1.4 Site Context	6
2. NCC Section J Compliance	7
2.1 General	7
2.2 Building Envelope.....	7
2.3 J1.2 – Thermal Construction.....	7
2.4 J1.3 – Roof and Ceiling Construction	7
2.5 J1.4 – Roof Lights.....	8
2.6 J1.5 – Walls.....	8
2.7 J1.5 – Floors	8
2.8 Part J2 – Glazing.....	9
3. ESD Initiatives	10
3.1 Adaptive Reuse.....	10
3.2 Passive Cooling & Indoor Air Quality.....	10
3.3 Daylight & Shading	10
3.4 Energy Efficient Lighting.....	10
3.5 Metering.....	11
3.6 Renewables and Electric Power	11
3.7 NABERS Energy Target (Base Build)	11
3.8 Water Efficiency.....	11
4. Conclusions and Recommendations	12
Part J3 - Building Sealing.....	14
Part J5 – Air Conditioning and Ventilation Systems	15
Part J6 – Artificial Lighting	17
Part J7 – Hot Water Supply.....	19
Part J8 – Access for Maintenance.....	19

Appendices

Appendix A Part J3 to J8 Requirements	13
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Figures

Figure 1	Site Location Plan (source: Six Maps)	6
Figure 2	ABCB Climate Zone.....	6

Tables

Table 1	Proposed Roof & Ceiling Insulation	7
Table 2	Proposed Roof Lights	8
Table 3	Proposed Wall Insulation	8
Table 4	Proposed Floor Insulation.....	8
Table 5	Part J3 Compliance Requirements.....	14
Table 6	Part J5 Compliance Requirements.....	15
Table 7	Part J6 Compliance Requirements.....	17
Table 8	Part J7 Compliance Requirements.....	19
Table 9	Part J8 Compliance Requirements.....	19

Executive Summary

STASIA HOLDINGS PTY LTD has engaged ADP Consulting to provide an ESD Report for the proposed re-development of the commercial building located at the 72-84 Foveaux St, Surry Hills NSW 2010.

The ESD Report has identified the measures for addressing Council's DA requirements in accordance with the following framework:

- > NSW Government - Local Environmental Plan (LEP) 2012;
- > City of Sydney - Development Control Plan (DCP) 2012;
- > City of Sydney – Sustainable Sydney 2030 Community Strategic Plan (2014);
- > Section J provisions of the NCC 2016/2019 Building (BCA) Code of Australia

In order to demonstrate compliance with the above, the following works are intended to be carried out following DA approval and for construction certificate purposes:

- > Adopt an alternative verification method (such as JV3) to demonstrate that the building can comply with Section J of the NCC. The provisions of Section J NCC 2016 or 2019 (whichever is agreed to with the building certifier) must be complied with during the building code transition period. The intent of proposed architectural design will likely be met through a performance-based approach, such as:
 - identification of a uniform glazing specification in line with the architectural intent of the facades;
 - trading of various fabric and glazing elements as required to meet the proposed design intent of the building;
- > A NABERS Predicted Energy Rating Report including detailed energy modelling to demonstrate that the building is capable of supporting minimum Base Building NABERS Energy Commitment Agreement of 5.5 stars;
- > An additional NABERS Energy assessment to identify the requirements for the project to have the capability for supporting a 6 Star NABERS Energy Base Build rating;

1. Introduction

1.1 Project Background

STASIA HOLDINGS PTY LTD has engaged ADP Consulting to provide an ESD Report for the proposed re-development of the commercial building located at the 72-84 Foveaux St, Surry Hills NSW 2010.

It is taken into consideration that only the structure and slabs of the existing building are to be retained while the rest of the building be demolished.

The ESD report is intended to form part of the overarching ESD strategy in line with the following planning controls:

- NSW Government - Local Environmental Plan (LEP) 2012;
- City of Sydney - Development Control Plan (DCP) 2012;
- City of Sydney – Sustainable Sydney 2030 Community Strategic Plan (2014)

1.2 Report Scope and Limitations

The scope of this report includes a high-level assessment of the energy efficiency requirements for the project to comply the Council's DA framework, including:

- > the Section J NCC 2016/2019 Building (BCA) Code of Australia for non-residential zones of the project;
- > other energy efficiency measures adopted for the site, including (but not limited to) renewables and passive design principles

This report has been prepared for DA purposes only and the energy efficiency measures will need to be fully developed during the detailed design stage.

Confirmation of Section J compliance for the 'as built' construction of the building is not included within this scope of works.

1.4 Site Context

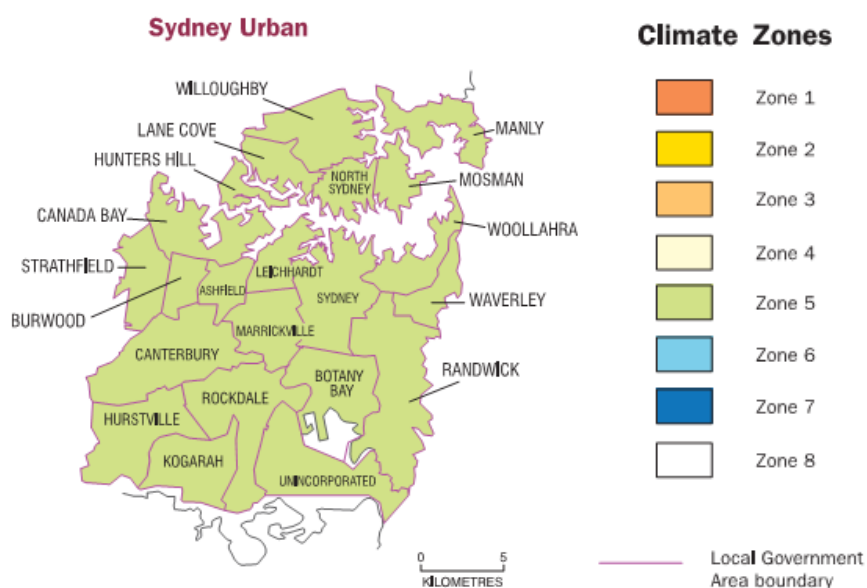
The site location is shown in Figure 1 below within the Sydney urban, NSW.

Figure 1 Site Location Plan (source: Six Maps)



The building is located within Zone 5 as per the Australian Building Codes Board (ABCB) Climate Zone Map (refer to Figure 2) and has been classified as NCC Building Class 5 (Commercial).

Figure 2 ABCB Climate Zone



2. NCC Section J Compliance

2.1 General

The provisions of the NCC2016 or NCC 2019 (as agreed with the building certifier) must be complied with during the building code transition period. For the purposes of this report, we have included the Section J – Part J1 (Building Fabric) and Part J2 (Glazing) Deemed-To-Satisfy (DTS) provisions of the NCC 2016 for reference only. The remaining Section J – Parts J3 to J8 will also require compliance (where relevant) and are summarised in Appendix A.

However, it should be noted that an alternative verification pathway, such as JV3, will likely be adopted during the detailed design stage through to final design phase, where building fabric (insulation and glazing) values will be specified. Hence, the values specified here may not necessarily be adopted for construction purposes.

2.2 Building Envelope

For the purposes of Section J, the building envelope is defined by the NCC as "...the parts of a building's fabric that separate a conditioned space or habitable room from the exterior of the building or a non-conditioned space...". This also includes spaces which are indirectly conditioned either via exhaust/relief of conditioned air or via pressurization.

2.3 J1.2 – Thermal Construction

Insulation must comply with AS/NZS 4859.1 and be installed in accordance with the requirements of Section J1.2 of the BCA.

2.4 J1.3 – Roof and Ceiling Construction

Ceiling insulation will need to be applied directly to the soffit of the indicated areas or where there is no ceiling, beneath the roof sheeting.

The envelope of the space is from the finished floor level to the soffit meaning that any areas of external wall above the suspended ceiling will require insulation as per the requirements in **J1.5** of this report.

Table 1 Proposed Roof & Ceiling Insulation

Building Element	BCA/NCC Required <u>Total</u> R-Value	Comment
External Roof	R3.7 (Downwards)	The figures for the proposed roof & ceiling insulation have been selected with the understanding that the upper surface of the roof colour will

Building Element	BCA/NCC Required <u>Total</u> R-Value	Comment
		not exceed a solar absorbance of >0.45.

2.5 J1.4 – Roof Lights

Table 2 Proposed Roof Lights

Building Element	BCA/NCC Required <u>Total</u> R-Value	Comment
Roof Lights	U-Value = 2.9 SHGC = 0.29	Roof lights which do not meet the clause (a) of J1.4, but clause (b). This will be assessed through an alternative verification method following DA.

2.6 J1.5 – Walls

Table 3 Proposed Wall Insulation

Building Element	BCA/NCC Required <u>Total</u> R-Value	Comment
Walls	External: R2.8 (<220 kg/m ² wall density)	Refer to insulation markup for locations. It should be noted that walls to be infilled will also require this insulation.
	Internal: R1.8	Refer to insulation mark-up for locations.

2.7 J1.5 – Floors

Table 4 Proposed Floor Insulation

Building Element	BCA/NCC Required <u>Total</u> R-Value	Comment
Floors	Exposed suspended floor R2.0 (Downwards)	Refer to insulation mark-up for locations. Exposed suspended floor other than clause (a), (b) or (c) of Table J1.6.
	Enclosed suspended floor R1.0 (Downwards)	Refer to insulation mark-up for locations. It has been assumed as a suspended floor without an in-slab or in-screed heating or cooling system and applied with the unconditioned space (i) enclosed; and (ii) where

mechanically ventilated by not more
than 1.5 air change per hour.

2.8 Part J2 – Glazing

The DTS glazing values were calculated from the NCC Volume One Glazing Calculator (2014) - refer to Appendix D.

Note: The DTS glazing values presented in this report are intended to be optimised through a performance-based approach in the next phase of the project and should not be adopted as the final glazing specifications for the proposed building. A Section J-Compliant uniform glazing specification will be identified to meet the architectural design intent for the building and for constructability purposes.

3. ESD Initiatives

The following energy/water efficiency initiatives have been identified for this development and will be considered throughout the design development process. Several initiatives for consideration under a pathway to a net-zero energy building have also been contemplated. The opportunities are presented and explained how they relate to best practice guidelines and standards.

3.1 Adaptive Reuse

Adaptive reuse attempts to utilise and integrate existing building materials into the new development, aiming to reduce, reuse and recycle waste. By limiting the amount of new material used in construction, the embodied energy associated with new materials is minimised, while the amount of energy consumed during the demolition and construction phases are also reduced. Implementing adaptive use into the construction can greatly reduce the energy consumption associated with new construction.

3.2 Passive Cooling & Indoor Air Quality

Natural ventilation is an important consideration during the design phase of a project, as when incorporated correctly, can drastically reduce the amount of energy required to maintain temperature within a space while at the same time helping to improve the indoor air quality. Natural cross ventilation can be achieved by having windows on more than one aspect with direct exposure to prevailing winds, or windows open to notably different pressure regions. Limiting the number of fixed windows and considering the commercial floor plate and depth can also have a significant effect on natural ventilation.

3.3 Daylight & Shading

Daylighting initiatives aim to balance both the benefits and impacts of natural light and solar gains. This includes considering indoor environmental quality, glare discomfort, energy savings (reduction in artificial lighting) and energy costs (associated with increased cooling). Access to natural daylight should be taken advantage of where possible, but at the same time, appropriate shading devices and glazing selections will be considered to minimise the negative daylighting impacts on the space. Incorporating solar shade structures can dramatically reduce the radiant temperature of a space, improving thermal comfort levels and reducing the energy required to cool the space. It can also increase the usability of the space in periods of significant heat. Where shading structures are not feasible, such as atrium roofs, this can be resolved through high performance glazing systems to reduce solar gains.

3.4 Energy Efficient Lighting

The lighting design should focus on high efficiency LED lighting to provide adequate lighting levels with minimum energy expenditure. Careful consideration should be made to the design of daylight controls so that artificial lighting can be adjusted easily in response to daylight levels without causing undesirable switching effects or interactions. The use of sensors should be used to ensure back of house and outdoor lighting is automatically switched off when not required, while whole of life considerations such as maintenance costs and access for easy maintenance should also be taken into account.

3.5 Metering

Proper metering strategies can ensure the efficient use of water and electricity by being able to allocate usage accurately, identify inefficiencies and diagnose malfunctions in the systems. It also provides building owners and operators useful data that can be used to reduce energy use and costs and improve the building and equipment operation. The metering requirements as specified in the NABERS Energy and Water for Offices Rules will also be implemented.

3.6 Renewables and Electric Power

Based on an initial review, there is potential to implement a solar PV system on the roof. This would assist in supporting the achievement of the nominated NABERS Energy target by offsetting against the grid electricity demand. While PV will reduce the electrical demand for the building, the use of gas for heating of water is still proposed in order to limit the maximum demand for the site and not invoke the requirement for a substation. It is noted that gas currently provides the ability to achieve a better NABERS Energy Rating.

3.7 NABERS Energy Target (Base Build)

In accordance with the Council's DCP 2012, the building design will be capable of supporting a minimum Base Building National Australian Built Environment Rating Scheme (NABERS) Energy Commitment Agreement of 5.5 stars. This would be demonstrated through detailed energy modelling in accordance with the NABERS Handbook for Estimating NABERS Ratings. This ensures the buildings environmental performance will be set at a high standard, including the implementation of high efficiency HVAC and vertical transportation systems, high efficiency lighting/fittings, high performance building fabric/facades and general overall reduction of GHG emissions through less energy consumption.

Further design parameters will be considered during the Detailed Design Stage to identify additional requirements that would support achievement of a 6 Star NABERS Energy Base Build target.

3.8 Water Efficiency

Rainwater capture and reuse has been considered for toilet flushing in End of Trip facilities or for irrigation purposes should landscaping areas be incorporated. Water efficient fixtures (WELS rated) and fittings have also been considered. These initiatives are intended to reduce potable water demand for the building.

4. Conclusions and Recommendations

The ESD Report has identified the measures for addressing Council's DA requirements in accordance with the following framework:

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In order to demonstrate compliance with the above, the following works are intended to be carried out following DA approval and for construction certificate purposes:

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Appendix A

Part J3 to J8 Requirements

Section J NCC 2016 requirements outlined in this appendix have been provided as a summary for reference only. During the transition period, the Section J provisions of NCC 2016 or 2019 for the project must be adhered to as agreed with the building certifier.

Part J3 - Building Sealing

Table 5 Part J3 Compliance Requirements

Clause	System	Required action(s) for compliance
J3.1	Application Of Part	See details below
J3.2	Chimneys & Flues	None noted
J3.3	Roof Lights	Ensure: Proposed skylights are sealed or capable of being sealed by a weatherproof seal
J3.4	Windows & Doors	Confirm: Evidence that windows comply with AS 2047 else comply with J3.4. Ensure: Entrance doors have a self-closing mechanism installed. Doors to be sealed as per J3.4 (c) Any other doors that form part of the external fabric of the development must also be sealed as per J3.4(c).
J3.5	Exhaust Fans	Ensure (if applicable): Any new exhaust fans, located with-in conditioned areas indicated in the project reference, are fitted with a sealing device such as a self-closing damper or the like
J3.6	Roof, Walls and Floors	Install: Ensure all new construction forming elements are installed in accordance with J3.6(b)
J3.7	Evaporative Cooler	None noted

Part J5 – Air Conditioning and Ventilation Systems

Table 6 Part J5 Compliance Requirements

Clause	System	Required action(s) for compliance
J5.1	Application Of Part	See details below
J5.2	Air-conditioning systems	Ensure: Any air-conditioning system(s) are capable of being deactivated when the building or part of the building served by that system is not occupied. Ensure: Any air-conditioning system(s) that serve more than one air-conditioning zone or area with different heating or cooling needs comply with the requirements listed in comments Ensure: Any motorized outside air and return dampers close when an air-conditioning system is deactivated. Ensure (where applicable): Any items listed below that form part of the air-conditioning system(s) meet the following criteria: Fans comply with Specification J5.2a Pumps comply with J5.2(c) Insulation complies with Specification J5.2b and Specification J5.2c Any heaters comply with Specification J5.2d Energy efficiency ratios comply with Specification J5.2e Install (if required): A time switch in accordance with Specification J6 to any new systems if required by J5.2(g)

Clause	System	Required action(s) for compliance
J5.3	Mechanical ventilation systems	Ensure: That any new air-conditioning system(s) comply with all other areas of J5.2 where applicable. Ensure: Any mechanical ventilation system(s) are capable of being deactivated when the building or part of the building served by that system is not occupied. Ensure: When serving a conditioned space Any system does not exceed the minimum outdoor air quantity required by Part F4, where relevant, by more than 20%; and Have an energy reclaiming system that preconditions outside air; or Have the ability to automatically modulate the mechanical ventilation required by Part F4 in proportion to the number of occupants Ensure: Fans of a mechanical ventilation system(s) listed above comply with Specification J5.2a Install: A time switch in accordance with Specification J6 to any mechanical ventilation system(s) with an air flow rate of more than 1000 L/s.
J5.4	Miscellaneous exhaust systems	Confirm: Whether any miscellaneous exhaust systems are associated with equipment that have a variable demand and have an air flow rate of more than 1000L/s; if so Install: A variable speed fan or the like; and Ensure: That it is capable of stopping the motor when the system is not needed.

Part J6 – Artificial Lighting

Table 7 Part J6 Compliance Requirements

Clause	System	Required action(s) for compliance
J6.1	Application Of Part	See details below
J6.2	Interior Artificial Lighting	Install: Lighting that does not to exceed Illumination Power Load Allowance for each space type specified in the comments as per Table J6.2.a Or Ensure: The aggregate design illumination power load does not exceed the sum of the allowances
J6.3	Interior artificial lighting and power control	Install: Lighting controls or switches within each room, in visible locations. Install: Controls to prevent most of the lighting (95%) being left on 24 hours a day. This can be a time switch or occupancy sensor. Ensure: That lighting controls or switches on do not operate lighting for an area of more than those specified in the comments, where applicable.
J6.4	Interior decorative and display lighting	Ensure (If applicable): All new interior decorative lighting must be controlled by a manual switch and switched separately from occupancy lighting (although all decorative lighting can be on one switch collectively if operating times are the same). Ensure: Any new window display lighting is controlled separately from all other display lighting.
J6.5	Artificial lighting around the perimeter of a building	Install (If applicable): Daylight sensor or time switches to any proposed perimeter lighting.

Clause	System	Required action(s) for compliance
J6.6	Boiling water and chilled water storage units	Ensure: Any façade or signage lighting has a separate time switch in accordance with Specification J6 Install (If applicable): Time switch in accordance with Specification J6.

Part J7 – Hot Water Supply

Table 8 Part J7 Compliance Requirements

Clause	System	Required action(s) for compliance
J7.2	Hot water supply	Ensure: Any new heated water supply system for food preparation must be designed and installed in accordance with Part B2 of NCC Volume Three – Plumbing Code of Australia
J7.3	Swimming Pool Heating & Pumping	N/A to this project
J7.4	Spa Pool Heating & Pumping	N/A to this project

Part J8 – Access for Maintenance

Table 9 Part J8 Compliance Requirements

Clause	System	Required action(s) for compliance
J8.1	Application Of Part	See details below
J8.3	Facilities for energy monitoring	Ensure: Compliance with the provisions of BCA J8.3; as such Install: The appropriate facilities to record the consumption of gas and electricity.

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