

# SECTION J ENERGY EFFICIENCY REPORT

**PROJECT NAME:**

Whale Beach  
Neighbourhood Centre

**ADDRESS:**

231 Whale Beach Road,  
Whale Beach, NSW 2107

**CLIENT:**

Leslie Cassar

## DOCUMENT CONTROL

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**ISSUE:** FINAL

**REVISION:** 5

**DATE:** 26/07/2024

## DTS ENERGY EFFICIENCY DECLARATION

Pursuant to NCC A2.2 (vi) this report relies on supplied documentation for assessment with regards to adopting measures contributing to deemed-to-satisfy of designed and built deliverables. This report documents the energy efficiency assessment undertaken on the proposed building work described herein to confirm compliance with the Section J – Energy Efficiency Provisions of the National Construction Code Volume One – Class 2 to Class 9 Buildings. It is our opinion that this project can be constructed to satisfy the requirements of the National Construction Code.



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# 1 - Introduction

The term Proposed Development in this report refers to Whale Beach Neighbourhood Centre located at 231 Whale Beach Road Whale Beach NSW 2107.

This report presents the findings from the design assessment of the Proposed Development against the Deemed-to-Satisfy (DTS) requirements of Section J of the Building Code of Australia 2022 –Volume 1, Energy efficiency.


The purpose of this report is to provide an assessment of the design plans and documentation for the Proposed Development and to satisfy the requirements of Local Government Area of the development for issuance of Construction Certificate for construction operations in the development site.

The scope of this report is limited to the design documentation referenced in Section 2 of this report and only covers Section J of BCA 2022 – V1 provisions.

## 2 - Referenced Documents

The following documents and design plans have been referenced in compilation of this report:

1. National Construction Code Series, Volume 1, Building Code of Australia 2022 – Class 2 to Class 9 Buildings.
2. Architectural Plans listed below provided by “Richard Cole” and received by Certified Energy at 18/07//2024.
  - CC02 – Site Plan, Revision QQ - Dated 17/07/2024.
  - CC05 – Basement Floor Plan, Revision QQ - Dated 17/07/2024.
  - CC06 – Ground Floor Plan, Revision QQ - Dated 17/07/2024.
  - CC07 – Level 1 Plan, Revision QQ - Dated 17/07/2024.
  - CC08 – Level 2 Plan, Revision QQ - Dated 17/07/2024.
  - CC09 – Level 3 Plan, Revision QQ - Dated 17/07/2024.
  - CC10 – Level 4 Plan, Revision QQ - Dated 17/07/2024.
  - CC11 – Roof Plan, Revision QQ - Dated 17/07/2024.
  - CC12 – Elevations, Revision QQ - Dated 17/07/2024.
  - CC13 – Elevations, Revision QQ - Dated 17/07/2024.
  - CC14 – Sections, Revision QQ - Dated 17/07/2024.
  - CC15 – Sections, Revision QQ - Dated 17/07/2024.
  - CC16 – Sections, Revision QQ - Dated 17/07/2024.
  - CC20 – Basement RCP, Revision QQ - Dated 17/07/2024.
  - CC21 – GF RCP, Revision QQ - Dated 17/07/2024.
  - CC22 – L1 and L2 RCP, Revision QQ - Dated 17/07/2024.
  - CC23 – L3 and L4 RCP, Revision QQ - Dated 17/07/2024.

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- CC30 – Door & Window Schedule- Basement, Ground & Retail, Revision QQ - Dated 17/07/2024.
  - CC46 – GF Retail Plan, Ground & Retail, Revision QQ - Dated 17/07/2024.
  - CC47 – Level 3 Retail Plan, Ground & Retail, Revision QQ - Dated 17/07/2024.
  - CC56 – GF Retail RCP Plan, Ground & Retail, Revision QQ - Dated 17/07/2024.
  - CC57 – Level 3 RCP Plan, Ground & Retail, Revision QQ - Dated 17/07/2024.
3. Email correspondence and response to information request received from the architects of the Proposed Development.

# 3 - Proposed Development

The Proposed Development in this report is construction of a six-storey school building named “Whale Beach Neighbourhood Centre” located at 231 Whale Beach Road Whale Beach NSW 2107.

The development is a class 2 and 6 building in BCA Climate Zone 5 according to BCA Climate Map for NSW.

The following construction elements are being proposed in the building design according to architectural plans and design documents referenced in this report:

**Roof and Ceiling:** Plasterboard internal lining and concrete roof.

**External Walls:** Cavity Brick and concrete block wall with rigid insulation, AFS Logicwall and off-form concrete walls.

**Internal Walls:** Cavity Brick wall with rigid insulation, off-form concrete walls, AFS Logicwall and concrete block walls.

**Floors:** Suspended concrete slab.

**Windows:** Standard Aluminium framed windows.

**Skylights:** No skylights.

**Air Conditioning System:** No design plans provided.

**Lighting System:** No design plans provided.

# 4 - Scope of Report (Building Envelope)

“**Envelope**”, for the purposes of Section J, means the parts of the buildings fabric that separate a conditioned space or habitable room from-

- » the exterior of the building; or
- » a non-conditioned space including-
  - (i) the floor of a rooftop plant room, lift-machine room or the like; and
  - (ii) the floor above a carpark or warehouse; and
  - (iii) the common wall with a carpark, warehouse or the like.

## Conditioned Space Note:

 Legend: Building Envelope and scope of this report

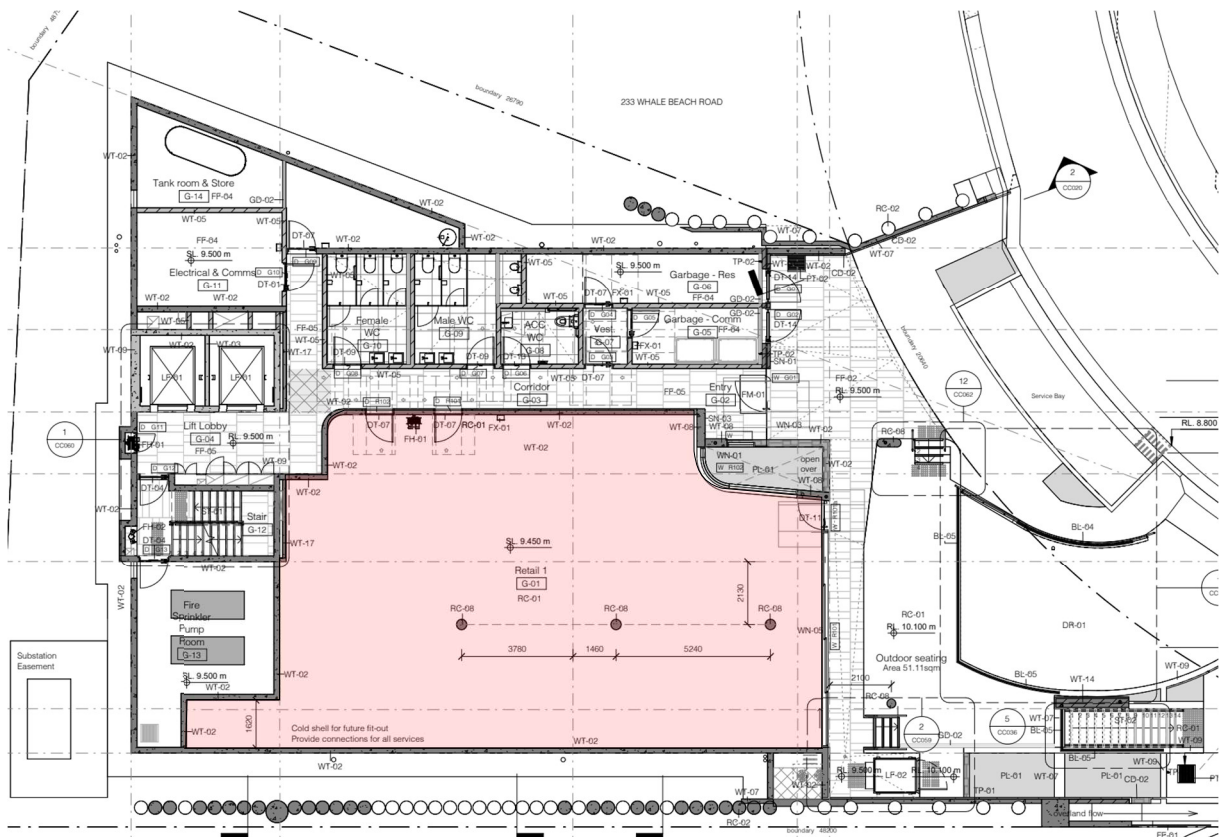


Figure 1 – Building Envelope – Ground Floor



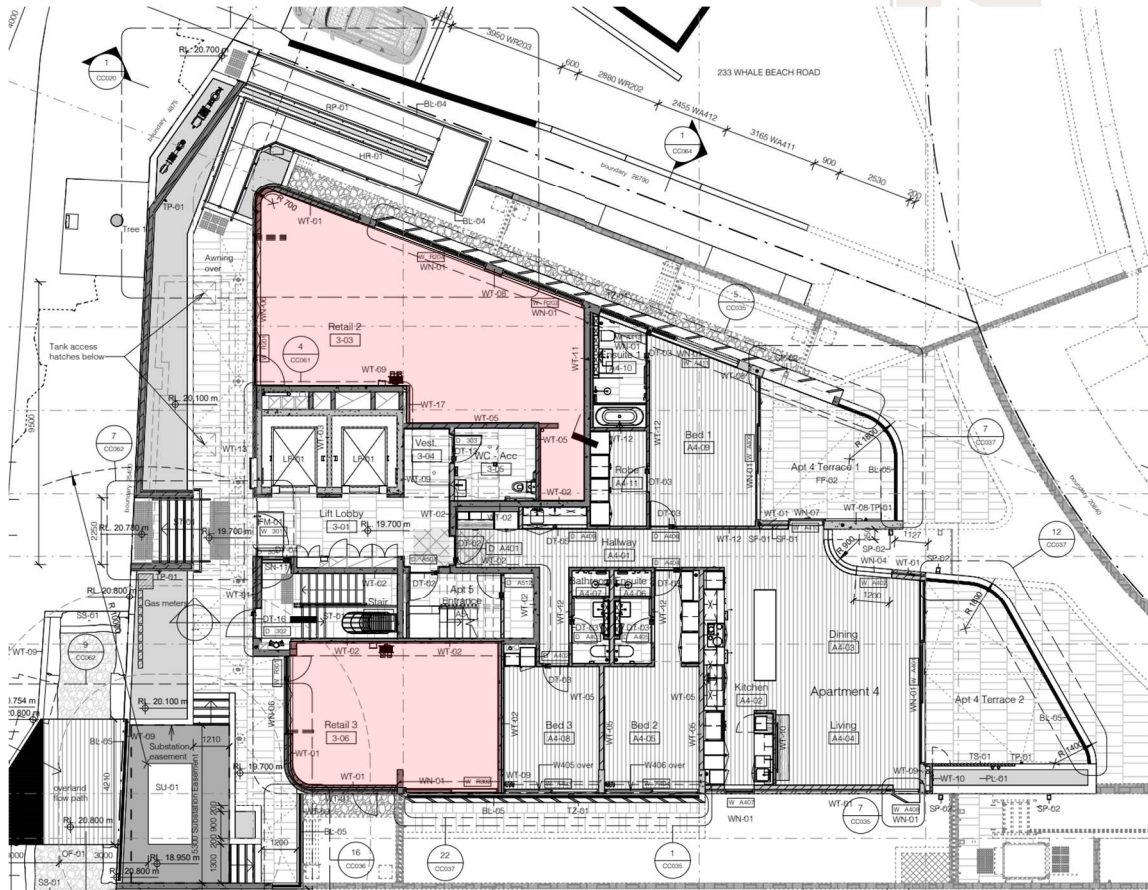


Figure 2 – Building Envelope – Level 3

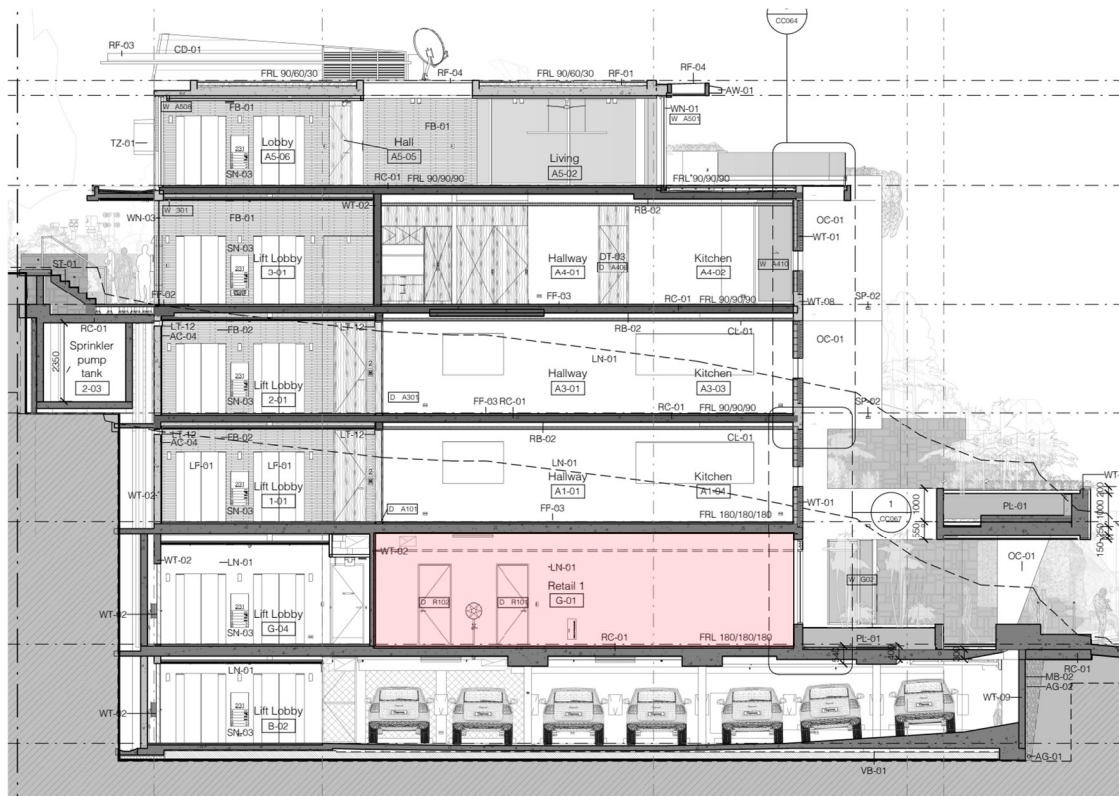


Figure 3 – Building Envelope – Section 1

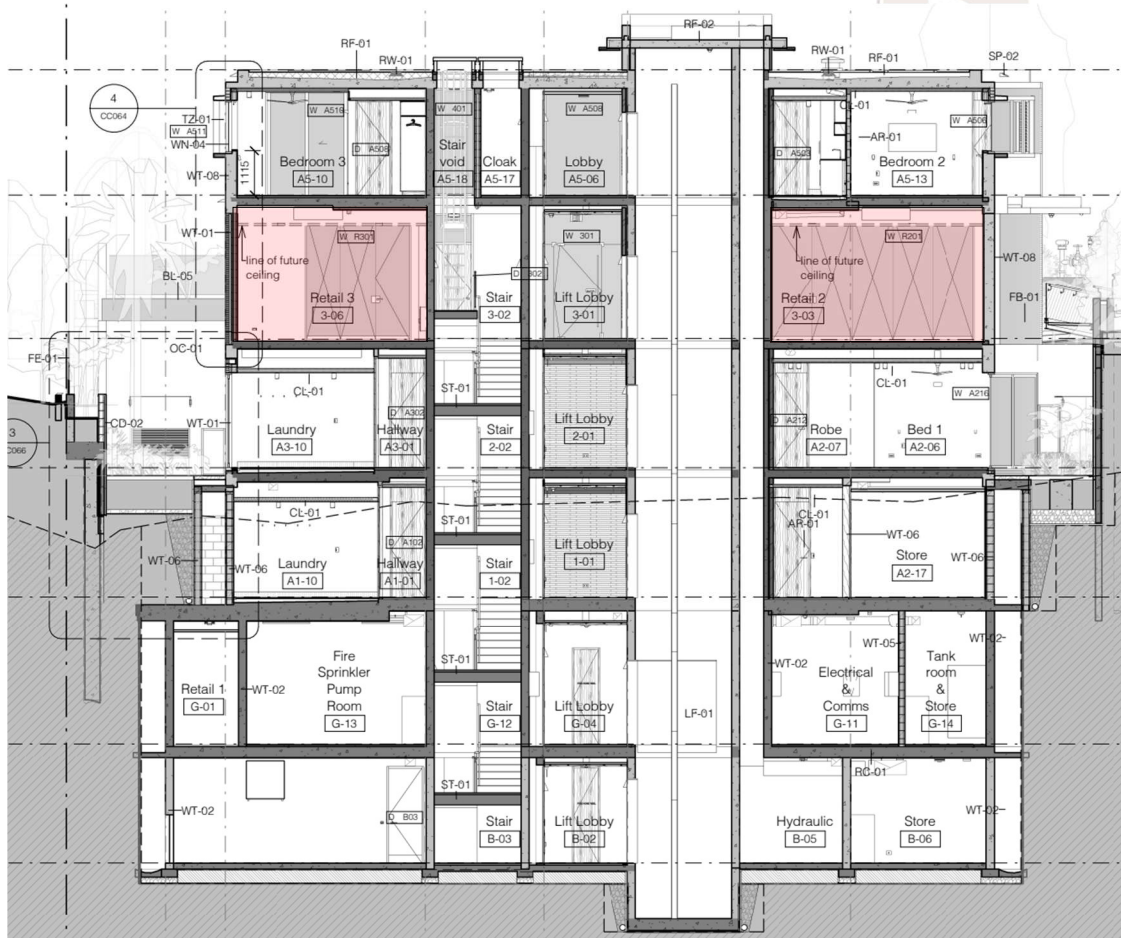
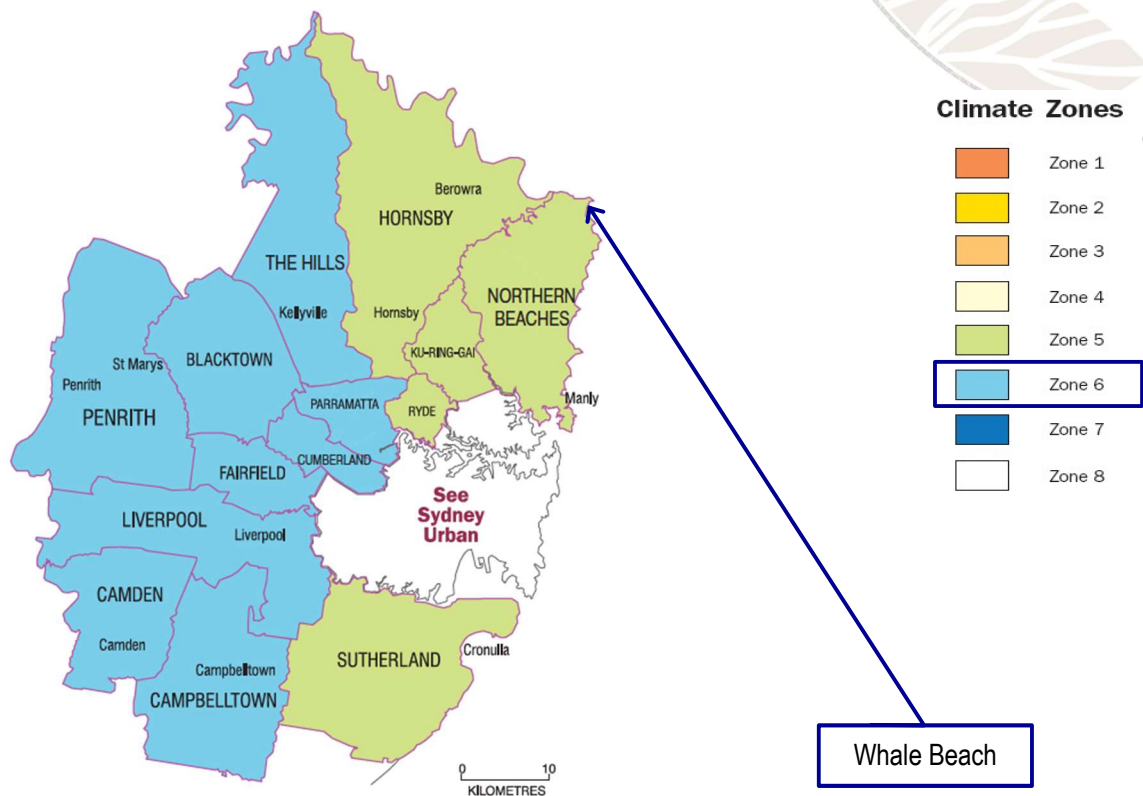


Figure 4 – Building Envelope – Section 2



# 5 - Project Classification and Climate Zone

## BUILDING CLASS 2 & 6



CLIMATE	COLOUR	SUBURB
ZONE 5	GREEN	WHALE BEACH

### Climate Characteristics of Zone 5

#### Warm Temperate:

- Moderate diurnal (day-night) temperature range near coast to high diurnal range inland.
- Four distinct seasons: summer and winter can exceed human comfort range, spring and autumn are ideal for human comfort.
- Mild winters with low humidity.
- Hot to very hot summers with low to moderate humidity.
- Widely variable solar access and cooling breeze directions and patterns.

### Key design objectives

Minimising heating and cooling energy use should be a primary design objective

# 6 - NCC Section J Compliance Provisions

This section analyses the current elements of the of Proposed Development design against provisions of Section J of the Building Code of Australia 2022 –Volume 1, Energy Efficiency. In case of a non-complying element, advisory notes are provided to bring the building in compliance with Section J requirements.

A summary note of these provisions is provided in **Section 7-Conclusions** of this report that can be incorporated into specification blocks of architectural plans and, as a result, be deployed during construction. It is however the responsibility of the entity responsible for the submission of the design plans and documents to the council to ascertain each and every element of this report is clearly referenced and reflected on the submitted plans and documents.

## 6.1 – Part J1 Energy Efficiency Performance Requirements

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	Renewable energy and electric vehicle charging	The proposed building must have features that facilitate the future installation of on-site renewable energy generation and storage and electric vehicle charging equipment.	J1P4

## 6.2 – Part J4 Building Fabric

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
<b>J4D4 Roof and ceiling construction</b>			
1	External Concrete roof and plasterboard ceiling of the Proposed Development	Install minimum R3.16 m <sup>2</sup> .K/W insulation OR Provide a roof and ceiling system with total performance of R3.7 m <sup>2</sup> .K/W	Part J4D4(1) and Material Properties from Specification - J1.2
2	Internal Concrete Slab and plasterboard ceiling of the Proposed Development	Install minimum R3.00 m <sup>2</sup> .K/W insulation OR Provide a roof and ceiling system with total performance of R3.7 m <sup>2</sup> .K/W	Part J4D4(1) and Material Properties from Specification - J1.2
3		The solar absorptance of the upper surface of the roof should not exceed 0.45	Part J4D4(2)
<b>J4D6 Walls and Glazing</b>			
4	External Cavity Brick and blockwork walls of the Proposed Development [WT-01]	Proposed R0.6 12.5mm Firemax A10 Plus, additional R0.27 insulation and Thermal break tape over metal studs achieves minimum compliance OR Provide a wall-glazing construction system that not exceed the U-value of U2.0 W/ m <sup>2</sup> .K	Part J4D6a, Façade Calculator and Material Properties from Specification - J1.2

5	External Off-form concrete walls of the Proposed Development [WT-08]	Install minimum R0.84 m <sup>2</sup> .K/W insulation and Thermal break tape over metal studs OR Provide a wall-glazing construction system that not exceed the U-value of U2.0 W/ m <sup>2</sup> .K	Part J4D6a, Façade Calculator and Material Properties from Specification - J1.2
6	Internal 200mm AFS Logicwall walls adjacent to unconditioned spaces [WT-02, WT-11]	Install minimum R0.76 m <sup>2</sup> .K/W insulation and Thermal break tape over metal studs achieves minimum compliance OR provide an internal wall system with total performance of R1.4 m <sup>2</sup> .K/W.	Part J4D6a, Façade Calculator and Material Properties from Specification - J1.2
6	Internal 200mm AFS Logicwall + concrete block walls adjacent to unconditioned spaces [WT-02 + WT-12]	Install minimum R0.74 m <sup>2</sup> .K/W insulation and Thermal break tape over metal studs achieves minimum compliance OR provide an internal wall system with total performance of R1.4 m <sup>2</sup> .K/W.	Part J4D6a, Façade Calculator and Material Properties from Specification - J1.2
8	Internal Concrete Block walls adjacent to unconditioned spaces [WT-05, WT-12]	Install minimum R0.86 m <sup>2</sup> .K/W insulation Thermal break tape over metal studs OR provide an internal wall system with total performance of R1.4 m <sup>2</sup> .K/W.	Part J4D6a, Façade Calculator and Material Properties from Specification - J1.2
9	Internal Off form concrete walls adjacent to unconditioned spaces [WT-08, WT-09]	Install minimum R0.84 m <sup>2</sup> .K/W insulation Thermal break tape over metal studs OR provide an internal wall system with total performance of R1.4 m <sup>2</sup> .K/W.	Part J4D6a, Façade Calculator and Material Properties from Specification - J1.2
10	All display glazing	Install windows with Total System U-value no more than 5.8 W/m <sup>2</sup> .K and SHGC no more than check J4D6(7)	Part J4D6(2)(7)
11	All new elevation windows	Install windows with Total System U-value no more than 5.8 W/m <sup>2</sup> .K and SHGC no more than 0.66	Part J4D6(6) and Façade Calculator
<b>J4D7 Floors</b>			
12	Suspended concrete slab of conditioned areas above enclosed spaces	Install minimum R1.30* m <sup>2</sup> .K/W insulation or provide a suspended slab system with total performance of R2.0 m <sup>2</sup> .K/W.	Part J4D7(1) and Table J4D7 considering the material properties from specification - J1.2 & J1.6 Figure 2(c)
*Proposed CL-01 (R1.5) and CL-02 (R1.75) insulated ceiling allows suspended floor of Retail 2 and 3 to achieve compliance.			

## 6.2.1 – Building Fabric Breakdown

	External Concrete Roof and Plasterboard Ceiling	R value [m <sup>2</sup> K/W]
1	Outdoor air film (7m/s)	0.03
2	Solid Concrete (200mm)	0.14
3	Roof airspace	0.15
4	Bulk insulation	-
5	Plasterboard gypsum (10mm, 880kg/m <sup>3</sup> )	0.06
6	Indoor air film	0.16
	<b>Default System R value</b>	<b>R0.54</b>
	Total system R value required	R3.70
	<b>Additional insulation required for compliance</b>	<b>R3.16</b>

	Internal Concrete Slab and Plasterboard Ceiling	R value [m <sup>2</sup> K/W]
1	Indoor air film	0.16
2	Solid Concrete (250mm)	0.17
3	Roof airspace	0.15
4	Bulk insulation	-
5	Plasterboard gypsum (10mm, 880kg/m <sup>3</sup> )	0.06
6	Indoor air film	0.16
	<b>Default System R value</b>	<b>R0.70</b>
	Total system R value required	R3.70
	<b>Additional insulation required for compliance</b>	<b>R3.00</b>

	External Cavity Brick and blockwork Walls [WT-01]	R value [m <sup>2</sup> K/W]
1	Outdoor air film (7m/s)	0.03
2	Clay Brick (90mm, 1950kg/m <sup>3</sup> )	0.12
3	Airspace (non-reflective, unventilated)	0.16
4	12.5mm Firemax A10	0.60
5	Solid Concrete (140mm minimum)	0.10
6	Indoor air film	0.12
	<b>Default System R value</b>	<b>R1.13</b>
	Total system R value required (with factored thermal bridging)	R1.40
	<b>Additional insulation required for compliance (with factored thermal bridging) *</b>	<b>R0.27 + Thermal break tapes over metal studs</b>

	External Off-Form Concrete Walls [WT-08]	R value [m²K/W]
1	Outdoor air film (7m/s)	0.03
2	Solid Concrete (280mm minimum)	0.19
3	Airspace (non-reflective, unventilated)	0.16
4	Bulk Insulation	-
5	Plasterboard gypsum (10mm, 880kg/m³)	0.06
6	Indoor air film	0.12
	<b>Default System R value</b>	<b>R0.56</b>
	Total system R value required (with factored thermal bridging)	R1.40
	<b>Additional insulation required for compliance</b> (with factored thermal bridging) *	<b>R0.84 + Thermal break tapes over metal studs</b>

	Internal 200mm AFS Logicwall Walls [WT-02, WT-11]	R value [m²K/W]
1	Indoor air film	0.12
2	200mm AFS Logicwall	0.18
3	Airspace (non-reflective, unventilated)	0.16
4	Bulk insulation	-
5	Plasterboard gypsum (10mm, 880kg/m³)	0.06
6	Indoor air film	0.12
	<b>Default System R value</b>	<b>R0.64</b>
	Total system R value required (with factored thermal bridging)	R1.40
	<b>Additional insulation required for compliance</b> (with factored thermal bridging) *	<b>R0.76 + Thermal break tapes over metal studs</b>

	Internal 200mm AFS Logicwall and concrete block Walls [WT-02 + WT-12]	R value [m²K/W]
1	Indoor air film	0.12
2	200mm AFS Logicwall	0.18
3	Airspace (non-reflective, unventilated)	0.16
4	Bulk insulation	-
5	Concrete Block (90mm minimum, 1100/2200 kg/m³)	0.08
6	Indoor air film	0.12
	<b>Default System R value</b>	<b>R0.66</b>
	Total system R value required (with factored thermal bridging)	R1.40
	<b>Additional insulation required for compliance</b> (with factored thermal bridging) *	<b>R0.74 + Thermal break tapes over metal studs</b>



	Internal Concrete Block Walls [WT-05, WT-12]	R value [m <sup>2</sup> K/W]
1	Indoor air film	0.12
2	Concrete Block (90mm minimum, 1100/2200 kg/m <sup>3</sup> )	0.08
3	Airspace (non-reflective, unventilated)	0.16
4	Bulk Insulation	-
5	Plasterboard gypsum (10mm, 880kg/m <sup>3</sup> )	0.06
6	Indoor air film	0.12
	<b>Default System R value</b>	<b>R0.54</b>
	Total system R value required (with factored thermal bridging)	R1.40
	<b>Additional insulation required for compliance</b> (with factored thermal bridging) *	<b>R0.86 + Thermal break tapes over metal studs</b>

	Internal Off-Form Concrete Walls [WT-08, WT-09]	R value [m <sup>2</sup> K/W]
1	Indoor air film	0.12
2	Solid Concrete (150mm minimum)	0.10
3	Airspace (non-reflective, unventilated)	0.16
4	Bulk Insulation	-
5	Plasterboard gypsum (10mm, 880kg/m <sup>3</sup> )	0.06
6	Indoor air film	0.12
	<b>Default System R value</b>	<b>R0.56</b>
	Total system R value required (with factored thermal bridging)	R1.40
	<b>Additional insulation required for compliance</b> (with factored thermal bridging) *	<b>R0.84 + Thermal break tapes over metal studs</b>

	Suspended Concrete Slab	R value [m <sup>2</sup> K/W]
1	Indoor air film	0.16
2	Concrete floor slab (250mm)	0.17
3	Airspace under floor	0.15
4	Bulk insulation	-
5	Plasterboard gypsum (10mm, 880kg/m <sup>3</sup> )	0.06
6	Indoor air film	0.16
	<b>Default System R value</b>	<b>R0.70</b>
	Total system R value required	R2.00
	<b>Additional insulation required for compliance</b>	<b>R1.30</b>

## 6.3 – Part J5 Building Sealing

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	Roof lights	<p>Roof light in a conditioned space or habitable room in climate zone 4 to 8; must be sealed or capable of being sealed, and must be constructed with either;</p> <ul style="list-style-type: none"> <li>➤ An imperforate ceiling diffuser or the like installed at the ceiling or internal lining level, or</li> <li>➤ A weatherproof seal, or</li> <li>➤ A shutter system readily operated either manually, mechanically or electronically by the occupant.</li> </ul>	Part J5D4
2	Each edge of a door, all openable windows, or the like forming part of the envelope of a conditioned space	<p>Provide air seals on all edges or provide doors and windows complying with AS2047 for the Proposed Development except for fire doors, smoke doors, roller shutter doors roller shutter grille or other security door or device installed only for out-of-hours security</p> <p>The bottom seals to doors are to be a draft protection device and all other edges to be of foam or rubber compression strip, fibrous, or similar material.</p>	Part J5D5(1)(2)(3)
3	Entry doors to the building which leads to conditioned spaces greater than 50m <sup>2</sup>	Provide self-closing mechanism, revolving door or similar system other than where a café, restaurant, open front shop or the like has a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and at all other entrances to the café, restaurant, open front shop or the like, self-closing doors	Part J5D5(4)
4	Exhaust fans of the conditioned areas of the Proposed Development if any	Must be equipped with a self-closing damper or similar	Part J5D6
5	Roofs, ceilings, walls, floors, windows frame, door frame and roof light frame of the conditioned areas of the Proposed Development	Must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions OR be sealed by caulking, skirting, architraves, cornices or similar elements unless required for smoke hazard management	Part J5D7
6	Evaporative coolers	All evaporative coolers serving heated space or, habitable room/public area in climate zones 4 to 8, must be fitted with a self-closing damper or the like	Part J5D8

## 6.4 – Part J6 Air-Conditioning and Ventilation Systems

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	No design plans provided	The proposed air-conditioning system must be as per provisions listed in Part J6 and separate compliance certificate to be obtained for compliance with Part J6	N/A

## 6.5 – Part J7 Artificial Lighting and Power

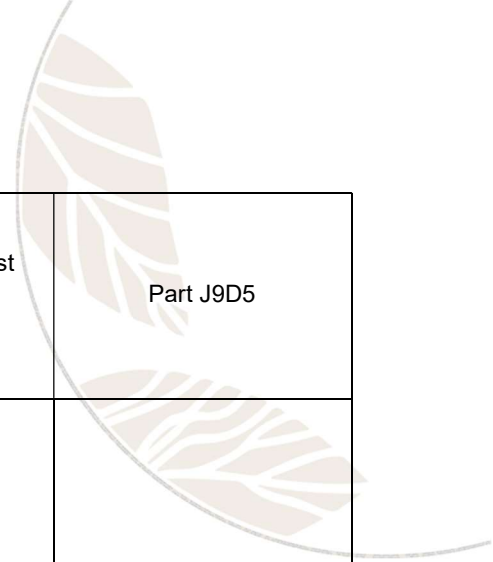
	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	Lighting electrical power of the Proposed Development	Maximum design power allowed is 8,376 Watts	Part J7D3(2)
2	Artificial light switch or other lighting control devices of Proposed Development	Artificial lighting of a room or space must be individually operated by a switch or other control device. An artificial lighting switch must be located in a visible position. Light switch or control device must control lighting of no more than 250 m <sup>2</sup> of area.	Part J7D4(3)(b)(ii)
3	Windows display lighting if installed	Must be controlled separately from other display lighting.	Part J7D5(2)
4	External lighting of the Proposed Development if installed	Must be controlled by either a daylight sensor or a time switch which is capable of being pre-programmed for different times of the day on variable days.	Part J7D6(1)a
5	If the total perimeter lighting load of the Proposed Development exceeds 100 Watts	Use LED luminaires for 90% of the total lighting load or control with a motion detector device in accordance with Specification 40 except when providing emergency lighting in accordance with Part E4	Part J7D6(1)b
6	Façade lighting or signage lighting of the Proposed Development if installed	Must be provided with a separate time switch in accordance with Specification 40.	Part J7D6(1)(b)(iii)
7	Lifts	Lifts must be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 mins; and achieve the idle and standby energy performance level in Table J7D8a and achieve the energy efficiency class in Table J7D8b	Part J7D8

## 6.6 – Part J8 Heated Water Supply and Swimming Pool and Spa Pool Plant

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	Hot water supply of the Proposed Development	Must be designed and installed in accordance with Part B2 of NCC Volume Three- Plumbing Code of Australia	Part J8D2

## 6.7 – Part J9 Energy Monitoring and On-site Distributed Energy Resources

	Building Element	Energy Efficiency Provisions	Corresponding BCA Part
1	For the Proposed Development with a floor area of more than 500 m <sup>2</sup>	Provide facilities to record gas and electricity consumption	Part J9D3(1)
	Carparks of a Class 2 and 6 buildings	Each storey of the carpark must be provided with electrical distribution boards dedicated to electric vehicle charging in accordance with Table J9D4. These must also be labelled to indicate use for electric vehicle charging.	Part J9D4(1)
	Electric distribution boards serving electric vehicles	Must be fitted with a charging control system that can manage and schedule charging of vehicles in response to total building demand.  For Class 2 buildings: Each circuit should support an electric vehicle charger able to deliver 12 kWh minimum from 11:00pm to 7:00am daily.  For Class 5 to 9 buildings: Each circuit should support an electric vehicle charger able to deliver 12 kWh minimum from 9:00am to 5:00pm daily.  Must be sized to support future installation of 7 kW (32 A) type 2 electric vehicle charger in all car parking spaces (class 2)  10% of car parking spaces (class 6)	Part J9D4(2)



	Solar and battery facilities	At least 20% of the building roof area must be left clear for the installation of solar photovoltaic panels.	Part J9D5
	Solar and battery facilities	<p>The above condition is not applicable if:</p> <ul style="list-style-type: none"> <li>(i) Solar photovoltaic panels are installed on at least 20% of the roof area; or</li> <li>(ii) There is equivalent generation capacity elsewhere on-site; or</li> <li>(iii) 100% of the roof area is shaded for more than 70% of daylight hours; or</li> <li>(iv) Roof area is less than 55m<sup>2</sup>; or</li> <li>(v) More than 50% of roof area is used as a terrace, carpark, roof garden, roof light or similar</li> </ul>	Part J9D5(2)

The provisions of **J93 (2)** do not apply to a Class 2 where the total area of the common areas is less than 500 m<sup>2</sup> or individual sole-occupancy units with a floor area of less than 2,500 m<sup>2</sup>.





## 7 - Conclusions

Considering the design elements nominated on the Proposed Development provided by Richard Cole the following can be concluded for the Proposed Development to meet the Deemed to Satisfy requirements of Section J of the Building Code of Australia 2022 –Volume 1, Energy Efficiency;

### Part J1 – Energy Efficiency Performance Requirements

- » The proposed building must have features that facilitate the future installation of on-site renewable energy generation and storage and electric vehicle charging equipment.

### Part J4 – Building Fabric:

#### Roof & Ceiling:

- » Install minimum  $R3.16 \text{ m}^2\text{.K/W}$  insulation or provide an external concrete roof and plasterboard ceiling system with total performance of  $R3.7 \text{ m}^2\text{.k/w}$  for the roof of Proposed Development on top of conditioned areas.
- » Install minimum  $R3.00 \text{ m}^2\text{.K/W}$  insulation or provide an internal concrete slab and plasterboard ceiling system with total performance of  $R3.7 \text{ m}^2\text{.k/w}$  for the roof of Proposed Development on top of conditioned areas.
- » All the upper surfaces of the roof should not exceed the solar absorptance of 0.45.

#### Walls:

- » Proposed  $R0.6 \text{ m}^2\text{.K/W}$  12.5mm Firemax A10 Plus, additional  $R0.27$  insulation and thermal break tape over metal studs OR Provide an external cavity brick and blockwork walls system [WT-01] with total performance of  $R1.4 \text{ m}^2\text{.K/W}$
- » Install minimum  $R0.84 \text{ m}^2\text{.K/W}$  insulation and thermal break tape over metal studs OR Provide an external off-form concrete wall system [WT-08] with total performance of  $R1.4 \text{ m}^2\text{.K/W}$
- » Install minimum  $R0.76 \text{ m}^2\text{.K/W}$  insulation and thermal break tape over metal studs OR Provide an internal 200mm AFS Logicwall wall system [WT-02, WT-11] with total performance of  $R1.4 \text{ m}^2\text{.K/W}$
- » Install minimum  $R0.74 \text{ m}^2\text{.K/W}$  insulation and thermal break tape over metal studs OR Provide an internal 200mm AFS Logicwall and concrete block wall system [WT-02 + WT-12] with total performance of  $R1.4 \text{ m}^2\text{.K/W}$
- » Install minimum  $R0.86 \text{ m}^2\text{.K/W}$  insulation and thermal break tape over metal studs OR Provide an internal concrete block concrete wall system [WT-05, WT-12] with total performance of  $R1.4 \text{ m}^2\text{.K/W}$
- » Install minimum  $R0.84 \text{ m}^2\text{.K/W}$  insulation and thermal break tape over metal studs OR Provide an internal off-form concrete wall system [WT-08, WT-09] with total performance of  $R1.4 \text{ m}^2\text{.K/W}$

#### Glazing:

- » Provide the following minimum performance requirements for doors & windows of conditioned areas, adjacent to unconditioned spaces.
  - All New elevation windows; Install windows with Total System U-value no more than  $5.8 \text{ W/m}^2\text{.K}$  and SHGC no more than 0.66

#### Flooring:

- » Install minimum R1.30 m2.K/W insulation OR provide a suspended concrete slab above unconditioned flooring system with total performance of R2.0 m2.K/W.

#### Insulations:

- » Installed insulation must comply with AS/NZS 4859.1 and be installed in such a way to meet the following requirements:
  - The insulation must abut or overlap adjoining insulation other than at supporting members such as studs, noggins, joists, furring channels and the like where the insulation must be against the member.
  - The installed insulation must form a continuous barrier with ceiling, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier while does not affect the safe and effective operation of a service or fitting.
  - The bulk insulation must maintain its position and thickness other than when it is compressed between cladding and supporting members, water pipes, electrical cabling or the like.
  - Reflective insulation must be installed with the necessary airspace to achieve the required R Value and be adequately supported by framing members. Each adjoining sheet of role membrane must be overlapped by not less than 50mm or tapped together. It must be closely fitted against any penetration, door or window opening.

#### **Part J5 – Building Sealing:**

- » Roof lights in a conditioned space or habitable room in climate zone 4 to 8; must be sealed or capable of being sealed, and must be constructed with either; an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level, or a weatherproof seal, or a shutter system readily operated either manually, mechanically or electronically by the occupant.
- » Provide air seals on all edges or provide windows complying with AS 2047 for all external doors and openable windows of the Proposed Development servicing conditioned areas except fire doors, smoke doors, roller shutter doors roller shutter grille or other security door or device installed only for out-of-hours security.
- » Provide self-closing mechanism, revolving door or similar system to conditioned spaces greater than 50m<sup>2</sup> other than where a café, restaurant, open front shop or the like has a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and at all other entrances to the café, restaurant, open front shop or the like, self-closing doors.
- » Exhaust fans of the Proposed Development serving conditioned areas must be equipped with a self-closing damper or similar.
- » Roofs, ceilings, walls, floors, windows frame, door frame and roof light frame of conditioned areas of the Proposed Development must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions OR be sealed by caulking, skirting, architraves, cornices or similar elements unless required for smoke hazard management.
- » Air infiltration seal for bottom edge of external swing doors of the Proposed Development must be a draft protection device and for other edges of an external door or the edges of an openable window or other such openings may be a foam or rubber compression strip, fibrous seal or the like.
- » All evaporative coolers serving heated space or, habitable room/public area in climate

zones 4 to 8, must be fitted with a self-closing damper or the like.

#### **Part J6 – Air Conditioning & Ventilation:**

- » Has not assessed as design details not provided.

#### **Part J7 – Artificial Lighting & Power:**

- » Maximum design lighting power allowed for the Proposed Development is 8,376 Watts.
- » Artificial lighting of a room or space must be individually operated by a switch or other control device. An artificial lighting switch must be located in a visible position. Artificial light switch or other lighting control devices of the Proposed Development must control lighting of no more than 250 m<sup>2</sup> of area.
- » Windows display lighting if installed must be controlled separately from other display lighting.
- » External lighting of the Proposed Development if installed must be controlled by either a daylight sensor or a time switch which is capable of being pre-programmed for different times of the day on variable days.
- » Façade lighting or signage lighting of the Proposed Development if installed must be provided with a separate time switch.
- » All lighting and power control devices of the Proposed Development including timers, time switches, motion detectors and daylight control devices must follow the guidelines and specifications outlined in Appendix D Artificial Lighting and Power Notes of this report.

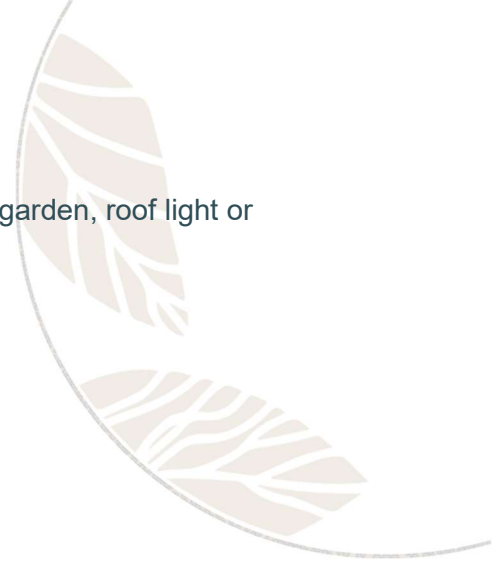
#### **Part J8 – Heater Water Supply & Swimming Pool & Spa Pool Plant:**

- » Hot water supply of the Proposed Development must be designed and installed in accordance with section 8 of AS/NZS 3500.4

#### **Part J9 – Energy Monitoring and On-site Distributed Energy Resources:**

- » For the Proposed Development provide facilities to record gas and electricity consumption.
- » Each storey of carparks in Class 2 and 6 buildings must be provided with electrical distribution boards dedicated to electric vehicle charging in accordance with Table J9D4.
- » These must also be labelled to indicate use for electric vehicle charging.
- » Electric distribution boards serving electric vehicles must be fitted with a charging control system that can manage and schedule charging of vehicles in response to total building demand.
- » For Class 2 buildings: Each circuit should support an electric vehicle charger able to deliver 12 kWh minimum from 11:00pm to 7:00am daily.
- » For Class 5 to 9 buildings: Each circuit should support an electric vehicle charger able to deliver 12 kWh minimum from 9:00am to 5:00pm daily.
- » Must be sized to support future installation of 7 kW (32 A) type 2 electric vehicle charger in all car parking spaces (class 2) | 10% of car parking spaces (class 6)
- » At least 20% of the building roof area must be left clear for the installation of solar photovoltaic panels, except for buildings where-
  - (i) Solar photovoltaic panels are installed on at least 20% of the roof area; or
  - (ii) There is equivalent generation capacity elsewhere on-site; or
  - (iii) 100% of the roof area is shaded for more than 70% of daylight hours; or
  - (iv) Roof area is less than 55m<sup>2</sup>; or

(v) More than 50% of roof area is used as a terrace, carpark, roof garden, roof light or similar



## 8 - Appendix

This section of the report demonstrates the results of employing BCA Calculators for Glazing, Lighting Power, and other referenced calculations and plans in this report.





## 8.1 – Appendix A – Façade Calculator



## Project Summary

**Date**  
5/12/23

**Name**  
Vivian Truong

**Company**  
Certified Energy

**Position**  
ESD Consultant

**Building Name / Address**  
231 Whale Beach Road Whale Beach NSW 2107  
0

**Building State**  
NSW

**Climate Zone**  
Climate Zone 5 - Warm temperate

**Building Classification**  
Mixed 2 - 2 common, 5, 6, 7, 8, 9b, 9a non-ward

**Storeys Above Ground**  
5

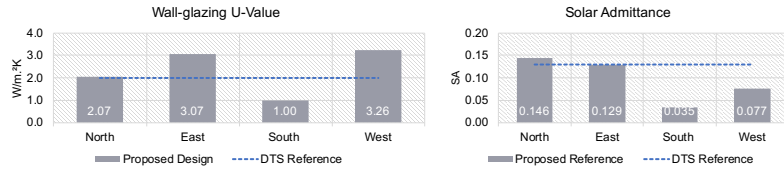
**Tool Version**  
1.2 (June 2020)

The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Aspects).

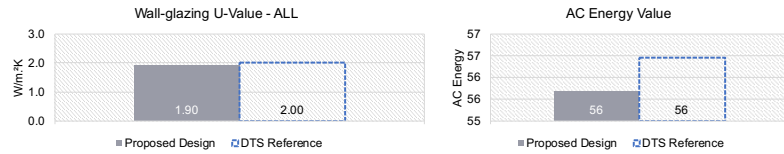
Compliant Solution =    
Non-Compliant Solution =  

	North	East	Method 1 South	West	Method 2 All
Wall-glazing U-Value (W/m².K)	2.07	3.07	1.00	3.26	1.90
Solar Admittance	0.15	0.13	0.04	0.08	
AC Energy Value					56

### Method 1



### Method 2



## Project Details

	North	East	South	West
Glazing Area (m²)	29.6859	25.472625	9.6075	24.58875
Glazing to Façade Ratio	27%	46%	6%	50%
Glazing References	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Glazing System Types	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Glass Types	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Frame Types	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Average Glazing U-Value (W/m².K)	5.80	5.80	5.80	5.80
Average Glazing SHGC	0.66	0.66	0.66	0.44
Shading Systems	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Wall Area (m²)	81.535325	29.59028	158.681065	24.53125
Wall Types	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Methodology	Wall			
Wall Construction	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Wall Thickness	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Average Wall R-value (m².K/W)	1.40	1.40	1.40	1.40
Solar Absorptance	#VALUE!	#VALUE!	#VALUE!	#VALUE!

## 8.2 – Appendix B – Lighting Calculator





# Non-residential Lighting



Calculator

Building name/description	
231 Whale Beach Road Whale Beach NSW 2107	
Number of rows preferred in table below	28 (as currently displayed)

Classification
Class 2

applicable only to areas outside of a sole-occupancy unit (SOU).

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design illumination power load	Space	Illuminance		Adjustment factor 1			Adjustment factor 2			Light colour adjustment factors		SATISFIES PART J7D3	
							Designed lux level	Recommended lux level	Adjustment factor 1	Dimming % area	Illuminance turnaround	Adjustment factor 2	Dimming % area	Illuminance turnaround	Light colour adjustment factor 1	Light colour adjustment factor 2	System illumination power load allowance	Lighting system share of % of aggregate allowance used
1	Lift 01	5.3 m²	9 m	2.6 m	1 W	Lift cars									a) CRI ≥ 90	c) CCT ≥ 4500 K	28 W	4% of 0%
2	Lift 02	5.3 m²	9 m	2.6 m	1 W	Lift cars											28 W	4% of 0%
3	Carpark	387.0 m²	108 m	2.6 m	1 W	Carpark - general											806 W	4% of 0%
4	Basement Store 1	30.2 m²	28 m	2.6 m	1 W	Storage											70 W	4% of 0%
5	Basement Store 2	21.7 m²	20 m	2.6 m	1 W	Storage											52 W	4% of 0%
6	Hydraulic	12.2 m²	15 m	2.6 m	1 W	Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms											80 W	4% of 0%
7	Basement Stair 1	11.1 m²	15 m	2.6 m	1 W	Stairways, including fire-isolated stairways											37 W	4% of 0%
8	Retail 1	197.7 m²	65 m	3.5 m	1 W	Retail space including a museum and gallery whose purpose is the sale of objects											3460 W	4% of 0%
9	Ground Entry/lobby	44.2 m²	61 m	3.0 m	1 W	Entry lobby from outside the building											686 W	4% of 0%
10	Garbage - Comm	8.2 m²	13 m	3.0 m	1 W	Service area, cleaner's room and the like											21 W	4% of 0%
11	Garbage - Res	14.0 m²	19 m	3.0 m	1 W	Service area, cleaner's room and the like											36 W	4% of 0%
12	Vest G-07	3.1 m²	7 m	3.0 m	1 W	Corridors											27 W	4% of 0%
13	ACC WC	4.9 m²	9 m	2.6 m	1 W	Toilet, locker room, staff room, rest room and the like											26 W	4% of 0%
14	Male WC	11.9 m²	15 m	2.6 m	1 W	Toilet, locker room, staff room, rest room and the like											60 W	4% of 0%
15	Femal WC	10.7 m²	13 m	2.6 m	1 W	Toilet, locker room, staff room, rest room and the like											53 W	4% of 0%
16	Electrical & Comms	15.6 m²	16 m	3.3 m	1 W	Control room, switch room, and the like - intermittent monitoring											78 W	4% of 0%
17	Ground Stair 1	11.0 m²	15 m	3.0 m	1 W	Stairways, including fire-isolated stairways											38 W	4% of 0%
18	Fire Sprinkler & Pump Room	23.7 m²	22 m	7.0 m	1 W	Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms											173 W	4% of 0%
19	Level 1 Lift lobby	15.2 m²	18 m	2.8 m	1 W	Corridors											127 W	4% of 0%
20	Level 1 Stair 1	11.2 m²	15 m	3.3 m	1 W	Stairways, including fire-isolated stairways											39 W	4% of 0%
21	Level 2 Lift Lobby	15.2 m²	18 m	2.8 m	1 W	Corridors											127 W	4% of 0%
22	Level 2 Stair 1	11.1 m²	15 m	3.3 m	1 W	Stairways, including fire-isolated stairways											39 W	4% of 0%
23	Level 3 Lift lobby	17.7 m²	23 m	3.1 m	1 W	Corridors											152 W	4% of 0%
24	Level 3 Stair 1	10.9 m²	15 m	3.3 m	1 W	Stairways, including fire-isolated stairways											39 W	4% of 0%
25	Retail 2	61.6 m²	40 m	3.3 m	1 W	Retail space including a museum and gallery whose purpose is the sale of objects											1328 W	4% of 0%
26	Retail 3	32.2 m²	25 m	3.4 m	1 W	Retail space including a museum and gallery whose purpose is the sale of objects											716 W	4% of 0%
27	Level 3 ACC WC	6.8 m²	10 m	2.6 m	1 W	Toilet, locker room, staff room, rest room and the like											34 W	4% of 0%
28	Level 4 Stair Void	4.6 m²	11 m	2.7 m	1 W	Stairways, including fire-isolated stairways											16 W	4% of 0%

Total 28 W

Total 8376 W




ABCB

Non-residential Lighting



National Construction Code



Calculator

Building name/description

231 Whale Beach Road Whale Beach NSW 2107

Classification

Class 2

*applicable only to areas outside of a sole-occupancy unit (SOU).*


Number of rows preferred in table below

28

(as currently displayed)


ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design illumination power load	Space	Illuminance		Adjustment factor 1			Adjustment factor 2			Light colour adjustment factors		SATISFIES PART J7D3	
							Designed lux level	Recommended lux level	Adjustment factor 1	Dimming % area	Illuminance turnaround	Adjustment factor 2	Dimming % area	Illuminance turnaround	Light colour adjustment factor 1	Light colour adjustment factor 2	System illumination power load allowance	Lighting system share of % of aggregate allowance used
							<i>These columns do not represent a requirement of the NCC and are suggestions only.</i>	<div>Adjustment factors</div>			<div>Adjustment factors</div>							

if inputs are valid



**IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THIS LIGHTING CALCULATOR**

By accessing or using this calculator, you agree to the following. While care has been taken in the preparation of this calculator, it may not be complete or up-to-date. You can ensure that you are using a complete and up-to-date version by checking the Australian Building Codes Board website ([abc.gov.au](http://abc.gov.au)). The Australian Building Codes Board, the Commonwealth of Australia and States and Territories of Australia do not accept any liability, including liability for negligence, for any loss (howsoever caused), damage, injury, expense or cost incurred by any person as a result of accessing, using or relying upon this publication, to the maximum extent permitted by law. No representation or warranty is made or given as to the currency, accuracy, reliability, merchantability, fitness for any purpose or completeness of this publication or any information which may appear on any linked websites, or in other linked information sources, and all such representations and warranties are excluded to the extent permitted by law. This calculator is not legal or professional advice. Persons rely upon this calculator entirely at their own risk and must take responsibility for assessing the relevance and accuracy of the information in relation to their particular circumstances.



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## 8.3 – Appendix C – Insulation Mark-Up

### LEGEND

- R1.4 EXTERNAL CAVITY BRICK AND BLOCK WORK WALLS [WT-01]
- R1.4 EXTERNAL OFF-FORM CONCRETE WALLS [WT-08]
- R1.4 INTERNAL AFS LOGICWALL WALLS [WT-02, WT-11]
- R1.4 INTERNAL AFS LOGICWALL AND CONCRETE BLOCK WALLS [WT-02 + WT-12]
- R1.4 INTERNAL CONCRETE BLOCK WALLS [WT-05, WT-12]
- R1.4 INTERNAL OFF-FORM CONCRETE WALLS [WT-08, WT-09]
- R3.7 EXTERNAL CONCRETE ROOF AND PLASTEBOARD CEILING
- R3.7 INTERNAL CONCRETE SLAB AND PLASTERBOARD CEILING
- R2.0 SUSPENDED CONCRETE SLAB ABOVE ENCLOSED SPACES

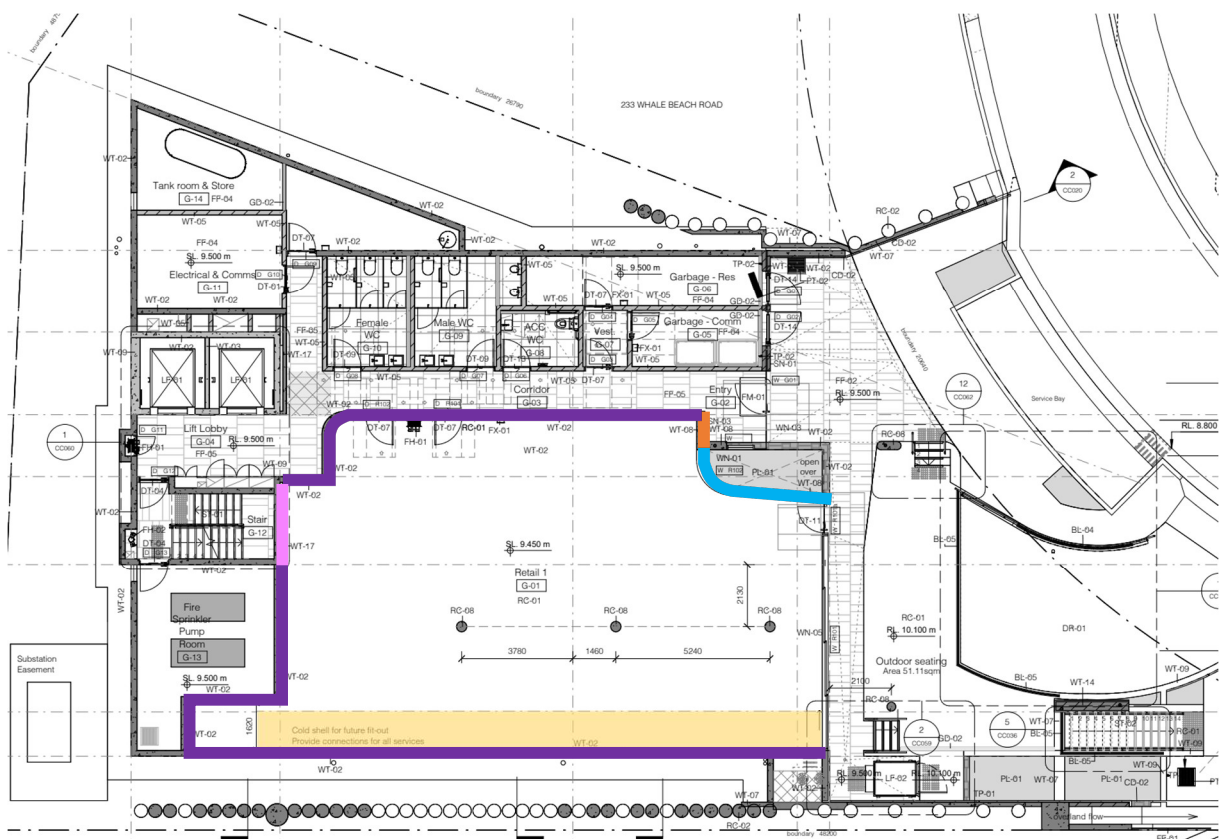


Figure 5 – Insulation mark-up - Ground Floor

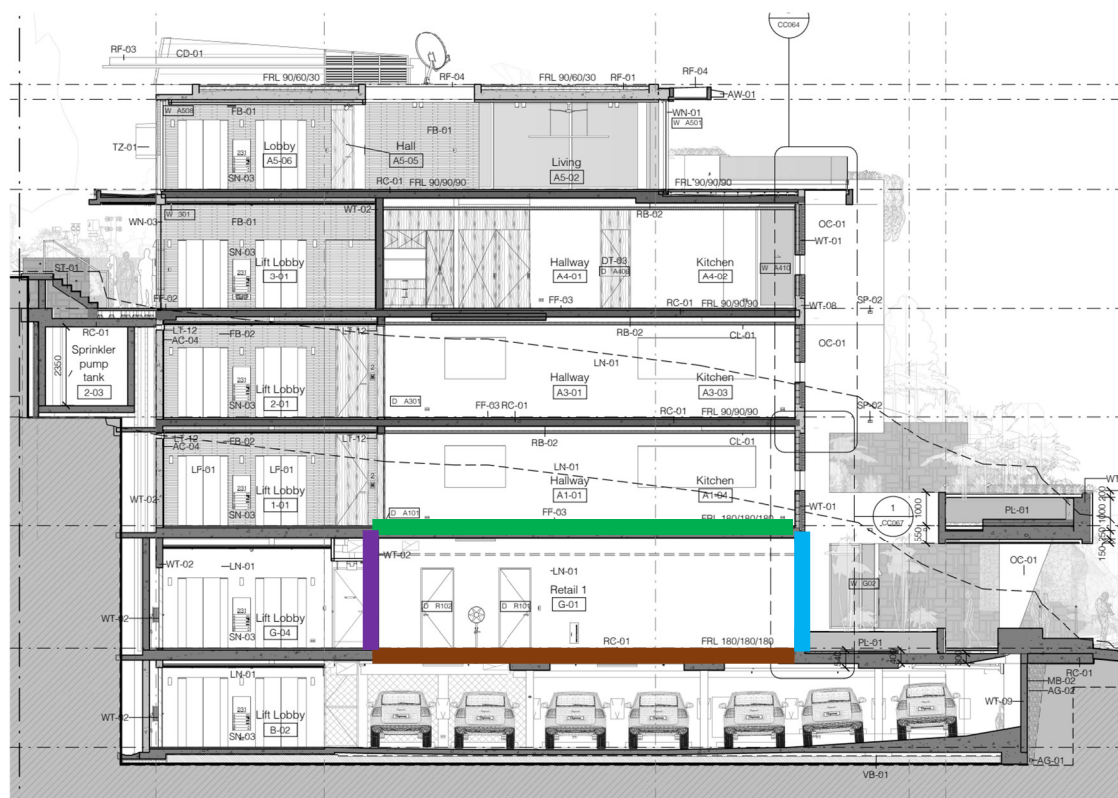
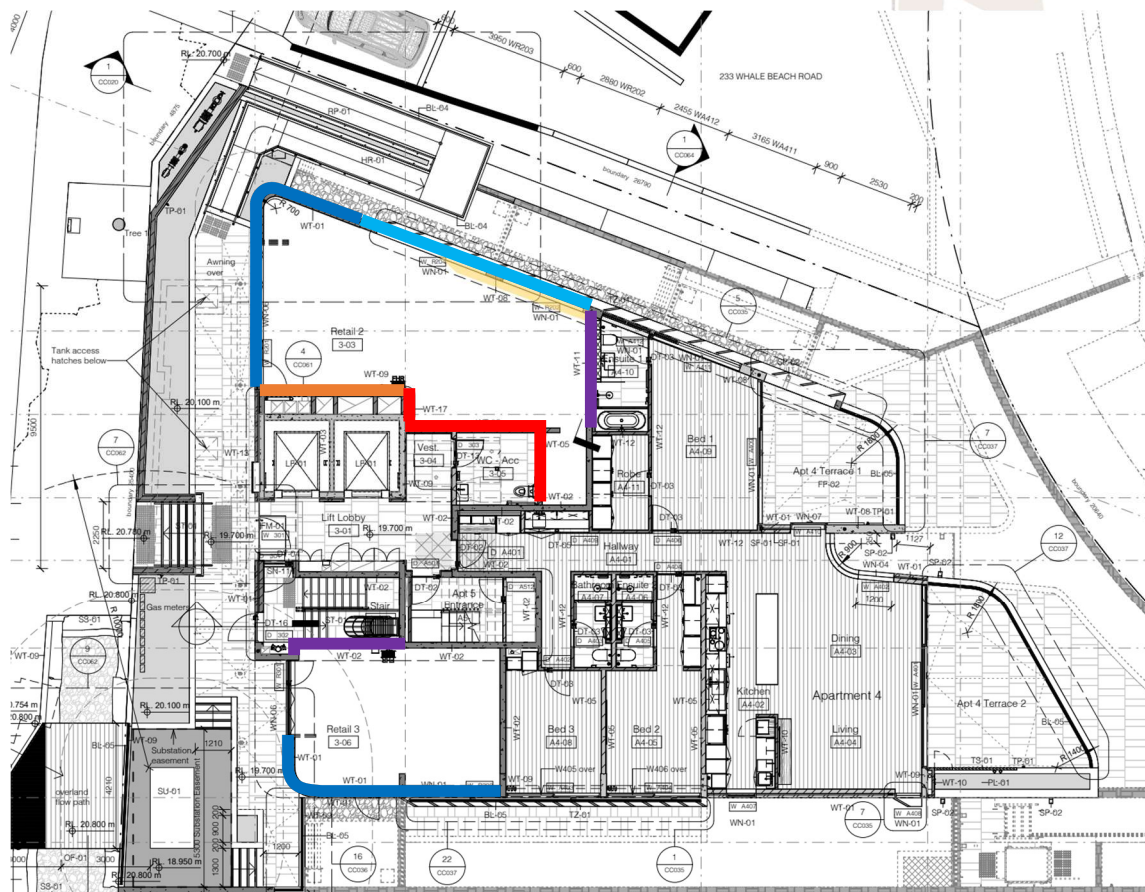
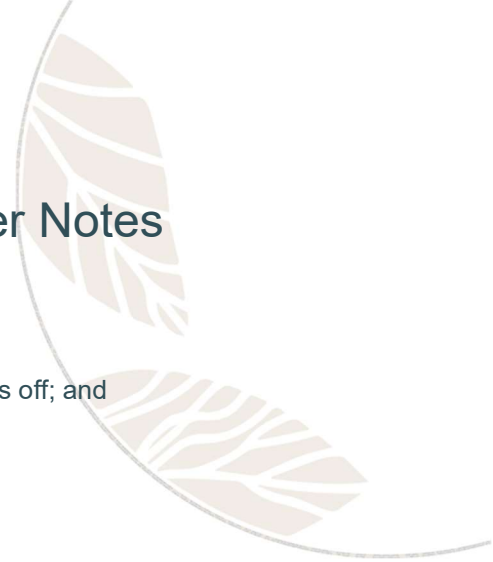


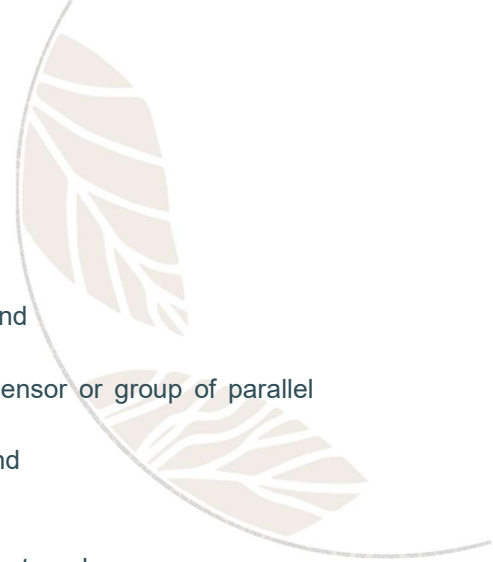


Figure 8 – Insulation mark-up – Section 2

## 8.4 – Appendix D – Artificial Lighting & Power Notes

- 
- 1- A lighting timer must;
    - a. be located within 2 m of every entry door to the space; and
    - b. have an indicator light that is illuminated when the artificial lighting is off; and
    - c. not control more than
      - i. an area of 100 m<sup>2</sup> with a single push button timer; and
      - ii. 95% of the lights in spaces of area more than 25 m<sup>2</sup>; and
    - d. be capable of maintaining the artificial lighting
      - i. for not less than 5 minutes and not more than 15 minutes unless it is reset; and
      - ii. without interruption if the timer is reset.
  - 2- Time switch;
    - a. A time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.
    - b. A time switch for internal lighting must be capable of being overridden by
      - i. a means of turning the lights on, either by
        1. a manual switch or an occupant sensing device that on sensing a person's presence, overrides the time switch for a period of up to 2 hours, after which there is no further presence detected, the time switch must resume control; or
        2. an occupant sensing device that overrides the time switch upon a person's entry and returns control to the time switch upon the person's exiting, such as a security card reader; and
      - ii. a manual "off" switch
    - c. A time switch for external lighting must be capable of
      - i. limiting the period the system is switched on to between 30 minutes before sunset and 30 minutes after sunrise is determined or detected including any pre-programmed period between these times; and
      - ii. being overridden by a manual switch or a security access system for a period of up to 30 minutes, after which the time switch must resume control.
    - d. A time switch for boiling water and chilled water storage units must be capable of being overridden by a manual switch or a security access system that senses a person's presence, overrides for a period of up to 2 hours, after which if there is no further presence detected, the time switch must resume control.
  - 3- Motion detectors;
    - a. In a Class 2, 3 or 9c aged care building other than within a sole-occupancy unit, a motion detector must
      - i. be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means; and
      - ii. be capable of detecting a person before they are 1Â m into the space; and
      - iii. other than within a sole-occupancy unit of a Class 3 building, not control more than
        1. an area of 100 m<sup>2</sup>; and
        2. 95% of the lights in spaces of area more than 25 m<sup>2</sup>; and
      - iv. be capable of maintaining the artificial lighting when activated
        1. for not less than 5 minutes and not more than 15 minutes unless it is reset; and
        2. without interruption if the motion detector is reset by movement.
    - b. In a Class 5, 6, 7, 8, 9a or 9b building, a motion detector must
      - i. be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or



- 
- by a combination of these means; and
  - ii. be capable of detecting
    - 1. a person before they have entered 1 m into the space; and
    - 2. movement of 500 mm within the useable part of the space; and
  - iii. not control more than
    - 1. in other than a carpark an area of 500 m<sup>2</sup> with a single sensor or group of parallel sensors; and
    - 2. 75% of the lights in spaces using high intensity discharge; and
  - iv. be capable of maintaining the artificial lighting when activated
    - 1. for a maximum of 30 minutes unless it is reset; and
    - 2. without interruption if the motion detector is reset by movement; and
  - iv. not be overridden by a manual switch to permanently leave the lights on.
  - c. When outside a building, a motion detector must
    - i. be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means; and
    - ii. be capable of detecting a person within a distance from the light equal to
      - 1. twice the mounting height; or
      - 2. 80% of the ground area covered by the light's beam; and
    - ii. not control more than five lights; and
    - iii. be operated in series with a photoelectric cell or astronomical time switch so that the light will not operate in daylight hours; and
    - iv. be capable of maintaining the artificial lighting when the switch is on for a maximum of 10 minutes unless it is reset; and
    - v. have a manual override switch which is reset after a maximum period of 4 hours.
  - 4- Daylight sensor and dynamic lighting control device;
    - a. A daylight sensor and dynamic control device for artificial lighting must
      - i. for switching on and off
        - 1. be capable of having the switching level set point adjusted between 50 and 1000 Lux; and
        - 2. have a delay of more than 2 minutes; and a differential of more than 100 Lux for a sensor controlling high pressure discharge lighting, and 50 Lux for a sensor controlling other than high pressure discharge lighting; and
        - 3. for dimmed or stepped switching, be capable of reducing the power consumed by the controlled lighting in proportion to the incident daylight on the working plane either
          - 5- continuously down to a power consumption that is less than 50% of full power; or
          - 6- in no less than 4 steps down to a power consumption that is less than 50% of full power.
      - a. Where a daylight sensor and dynamic control device has a manual override switch, the manual override switch must not be able to switch the lights permanently on or bypass the lighting controls.

## 8.5 – Appendix E – NSW Subsection J(A)

This Subsection contains energy efficiency requirements for Class 2 buildings and Class 4 parts of buildings. The provisions of NSW Subsection J1 are therefore designed to complement requirements that arise under BASIX and which are implemented via the development consent.

### 8.5.1 – NSW J1P4

A building must have features that facilitate the future installation of on-site renewable energy generation and storage and electric vehicle charging equipment.

### 8.5.1 – NSW J1P6

A building must have, to the degree necessary, a level of building sealing against air leakage to facilitate the efficient use of energy for artificial heating and cooling appropriate to—

- (a) the function and use of the building; and
- (b) the internal environment; and
- (c) the geographic location of the building.

### 8.5.2 – NSW J1P7

A building's services must have features that, to the degree necessary, facilitate the efficient use of energy appropriate to—

- (a) the function and use of the service; and
- (b) the internal environment; and
- (c) the geographic location of the building; and
- (d) the energy source of the service.

### 8.5.4 – NSW J(A)V1 Building sealing

Compliance with NSW J(A)P2 is verified when a building envelope is sealed in accordance with JV4 of the national provisions.

### 8.5.5 – NSW J(A)V1 Building sealing

Where a Performance Solution is proposed, the relevant Performance Requirements must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

### 8.5.6 – NSW Part J(A)3 Air-conditioning and ventilation systems

Where a Deemed-to-Satisfy Solution is proposed, Performance Requirement NSW J(A)P3 is satisfied by complying with NSW J(A)3.1 and NSW J(A)3.2. NSW J(A)3.2 Compliance with BCA provisions

Class 2 buildings and Class 4 parts of buildings must comply with the following national BCA provisions, as applicable—

- (a) for air-conditioning system control: J5.2; and
- (b) for mechanical ventilation system control: J5.3; and
- (c) for fan systems: J5.4; and
- (d) for ductwork insulation: J5.5; and
- (e) for ductwork sealing: J5.6; and
- (f) for pump systems: J5.7; and
- (g) for pipework insulation: J5.8; and
- (h) for refrigerant chillers: J5.10; and
- (i) for unitary air-conditioning equipment: J5.11; and
- (j) for heat rejection equipment: J5.12.

Note: Compliance is not required with the national BCA provisions of J5.9 as those matters are regulated under BASIX

### 8.5.7 – NSW Part J(A)4 Heated water supply

(a) Where a Deemed-to-Satisfy Solution is proposed, Performance Requirement NSW J(A)P3 is satisfied by complying with NSW J(A)4.1 and NSW J(A)4.2

### 8.5.8 – Facilities for energy monitoring

(a) Where a Deemed-to-Satisfy Solution is proposed, Performance Requirement NSW J(A)P3 is satisfied by complying with NSW J(A)5.1 and NSW J(A)5.3.



# 9 - Disclaimer

## Recommendations:

Based on the information available on the supplied drawings and data, I am of the opinion that there is nothing that should prevent this project from compliance with the requirements of the Building Code of Australia 2022.

This report is based on details available at the time of writing. Selected contractors and other parties contributing to the scope of the works should confirm that their supplied work will be in compliance with the BCA/NCC. It is advisable that this confirmation be requested prior to the commencement of construction. Final certification of BCA/NCC compliance at completion of works should be obtained to aid final certifier's approval.

## Dimensions:

The dimensions used in this report are scaled from the supplied project documents. There may be some minor variation between the scaled dimensions, the dimensions on the window schedule and the actual dimensions on site.

## Checked by:



Jamie Ian Bonnefin

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