



SECTION J – ENERGY EFFICIENCY

NCC 2022, Volume 1

NCC Compliance Assessment of:

11 Montague Street, Goulburn

(NCC Class 4/9b)

Lot 22 DP 758468

Climate Zone 7

Queanbeyan-Palerang Regional

V1.0

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1. Compliance Summary

Below is a summary of actions required to comply with the Deemed-To-Satisfy (DTS) provisions of Part J2 of NCC 2022 for the proposed development at 11 Montague Street, Goulburn

NSW J4D3	Class 9b and Class 4: All reflective and bulk insulation must be installed in accordance NSW J4D3 Thermal Construction.
NSW J5D5	Class 9b and Class 4: Entrance doors must have a self-closing door and seal to restrict air infiltration in accordance with J5D5.
NSW J5D6	Class 9b and Class 4: Exhaust fans serving a conditioned space or habitable room must be fitted with a sealing device such as a self-closing damper
NSW J5D7	Class 9b and Class 4: Construction of ceilings, walls and floors must be constructed to minimise air leakage in accordance with NSW J5D7.
NSW J5D8	Class 9b and Class 4: [If applicable] Evaporative cooler must be fitted with a self-closing damper or the like when forming part of a heated space.
Class 4 only (NCC 2019)	
BASIX	Refer to Attachment F: • 40% of new or altered light fixtures must be fit with fluorescent, compact fluorescent, or LED lamps • New or altered fixtures to be minimum 3 star water rating or flow rates showerheads and taps $\leq 9\text{L}$ per minute; toilets $\leq 4\text{L}$ per flush • New or altered ceilings/roofs¹ add minimum ceiling insulation R1.75 with foil back blanket (100mm) to roof with colour medium (solar absorptance 0.475 – 0.7) • New glazing – Minimum U-value 5.34; SHGC 0.67 • New skylights – Minimum U-value 2.9; SHGC 0.456
NSW Part J(A)3	Class 4: The air conditioning supplier must certify that the installation complies with Part J5 Air-conditioning and ventilation of NCC 2019 at Attachment E.
NSW Part J(A)4	Class 4: The heated water supply must be designed and installed in accordance with J7.2 of NCC 2019.
Class 9 only (NCC 2022)	
NSW J4D6	• Class 9b: Refer to Attachment A and Attachment B which shows glazing for this development achieves U2.0 with Maximum U-value 4.8; SHGC 0.3 – 0.7 (and walls SA 0.5) as calculated in accordance with NSW J4D6 using Method 2 (Multiple aspects) • Light weight (FRL 90/90/90) new external walls to have minimum R1 insulation added.
Part J6	Class 9b: The air conditioning supplier must certify that the installation complies with Part J6 Air-conditioning and ventilation of NCC 2022 at Attachment D.
NSW J7D3(2)	The lighting supplier must certify that artificial lighting complies with NSW J7D3(2) of NCC 2022 at Attachment C
NSW J7D4(4)	The lighting supplier must certify that artificial lighting and power control complies with NSW J7D3 and Specification 40 at Attachment C.
NSW J7D7	Boiling water and chilled water storage units must be fit with a time switch with manual override capability and efficiency measures as applicable and in accordance with NSW J7D7.

¹ not applicable to floor above 9b building; or areas of new wall/ceiling/roof <2m²; or where insulation already exists

<u>NSW J9D5</u>	The development must have features that facilitate the future installation of on-site renewable energy generation and storage as per J1P4, including at least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels with exception to limitations described under J9D5.
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2. Introduction

This report identifies and details the Deemed-to-Satisfy (DTS) provisions relevant to Section J of the NCC 2022 for the design of the proposed alteration at 11 Montague Street, Goulburn. The development is assessed under climate zone 7.

Documentation used in the development of this report are summarised in Table 1 below:

Table 1: Documentation used in Section J Report	
Description	Dwg No
Title	A-01
Existing Site Plan	A-03
Existing Ground Floor Plan	A-04
Existing First Floor Plan	A-05
Existing Elevations	A-06
Existing Elevations	A-07
Existing Roof Plan	A-08
Demolition Ground Floor Plan	A-09
Demolition First Floor Plan	A-10
Demolition Elevations	A-11
Demolition Elevations	A-12
Demolition Roof Plan	A-13
Proposed Ground Floor Plan	A-14
Proposed First Floor Plan	A-15
Proposed Elevations	A-16
Proposed Elevations	A-17
Proposed Roof Plan	A-18
Proposed Carport Plan	A-19
Window and Door Schedules	A-20

Part J2 Energy Efficiency

NSW J2D1(1)

Where a DTS Solution is proposed (with respect to the Class 9b component of the building), Performance Requirements J1P1 and J1P4 is satisfied by complying with:

- a) [NSW J2D2](#); and
- b) NSW [J3D2 to J3D15](#); and
- c) NSW [J4D2](#) to J4D7; and
- d) NSW J5D2 to J5D8; and
- e) NSW J6D2 to J6D13; and
- f) NSW J7D2 to J7D9; and
- g) J8D2 to J8D4; and
- h) J9D2 to J9D5.

NSW J2D2

For a Class 9b building, Performance Requirements NSW J1P1 are satisfied by complying with

- a) for building fabric, Part J4; and
- b) for building sealing, Part J5; and
- c) for air conditioning and ventilation, Part J6; and
- d) for artificial lighting and power, Part J7; and
- d) for heating water supply, Part J7; and
- e) for facilities for monitoring, J9D3.

For a Class 9 building, Performance Requirement J1P4 is satisfied by complying with J9D4 and J9D5.

Part J3 Class 2 /Class 4 part of building

For a Class 2 building or a Class 4 part of a building, where a relevant development consent or an application for a complying development certificate requires compliance with a BASIX Alterations and Additions Certificate, NSW Section J of NCC 2019, Volume One Amendment 1 applies.

Refer to [Attachment F](#) for BASIX Alteration and Addition Certificate with the summary of requirements below:

- 40% of new or altered light fixtures must be fit with fluorescent, compact fluorescent, or LED lamps
- New or altered fixtures to be minimum 3 star water rating or flow rates showerheads and taps $\leq 9\text{L}$ per minute; toilets $\leq 4\text{L}$ per flush
- New or altered ceilings/roofs² add minimum ceiling insulation R1.75 with foil back blanket (100mm) to roof with colour medium (solar absorptance 0.475 – 0.7)
- New glazing – minimum u-value 5.34; SHGC 0.67
- New skylights – Minimum U-value 2.9; SHGC 0.456

The following NCC 2019 Amendment 1 Volume One Performance Requirements must be

² not applicable to floor above 9b building; or areas of new wall/ceiling/roof $< 2\text{m}^2$; or where insulation already exists

complied with in addition to the BASIX commitments:

- NSW J(A)P1 Building fabric
- NSW J(A)P2 Building sealing
- NSW J(A)P3 Services

NSW Part J(A)1 Building fabric

J0.4 thermal breaks for metal framed roof – metal frame not assumed for this development

J0.5 Thermal breaks for metal framed wall – metal frame not assumed for this development

J1.2 thermal construction – general – as per NSW J4D3

J1.6(b) a (c) floor edge insulation – not applicable to this development

NSW Part J(A)2 Building sealing

J3.2 Chimneys and flues – not applicable to this development

J3.3 Roof lights

- a) A roof light must be sealed, or capable of being sealed when service (i) a conditioned space; or a habitable room in climate zone 7.
- b) A roof light required by (a) to be sealed, or capable of being sealed, must be constructed with (i) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or ii) a weatherproof seal; or iii) a shutter system readily operated either manually, mechanically or electronically by the occupant.

J3.4(a) to (d) windows and doors as per NCC 2022 NSW J5D5

J3.5 Exhaust fans as per NCC 2022 NSW J5D6

J3.6 Construction of ceilings, walls and floors as per NCC 2022 NSW J5D7

J3.7 Evaporative coolers as per NCC J5D8

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

The provisions for the efficiency and control of air-conditioning, space heating and ventilation equipment, the efficiency, sealing and insulation requirements for ductwork systems containing fans, and for the efficiency and insulation of pipework and pump systems are set out in [Attachment E](#) – Extract of NCC 2019 Part J5 Air-conditioning and ventilation.

NSW Part J(A)4 Heated water supply

J7.2 Heated water supply - A heated water supply system for food preparation and sanitary purposes must be designed and installed in accordance with Part B2 of NCC 2019 Volume Three – Plumbing Code of Australia.

NSW Part J(A)5 Facilities

J8.3 Facilities for energy monitoring – Not applicable to this development with floor area of Class 4 not more than 500m².

Part J4 Building Fabric

NSW J4D2

The building elements forming the envelop assessed in this report is limited to the extent of the new proposed extension and/or alterations to building elements forming the envelop of

the existing building shown in Figure 1(a) Ground; (b) First Floor; and (c) Roof and Figure 2(a) proposed Class 9b Ground; Figure 2(b) proposed Class 4 First Floor and Figure 3(c) proposed Roof. Unaltered parts of the existing building elements forming the envelop are excluded from this report and assumed to comply with relevant requirements in force at the time of construction in accordance with Section 19(c) of the *Environmental Planning and Assessment (Development Certification and Fire Safety) Regulation 2021*.

Figure 1a: Existing Envelop / Demo Ground Floor

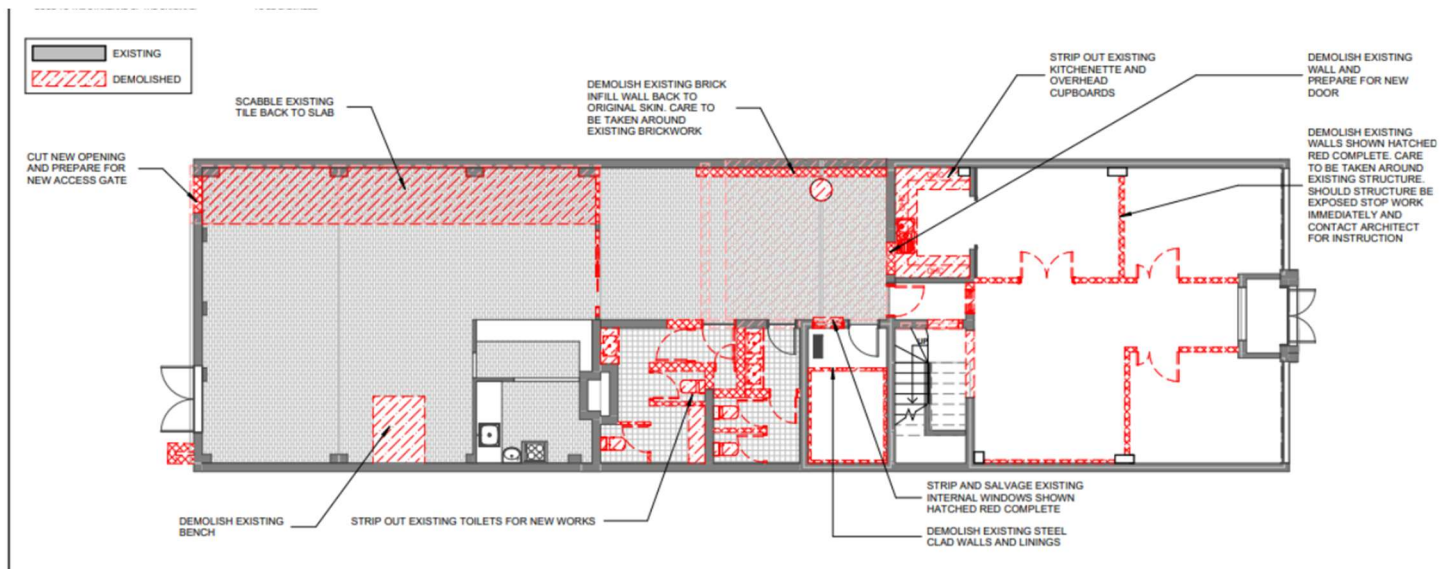


Figure 1b: Existing Envelop / Demo First Floor

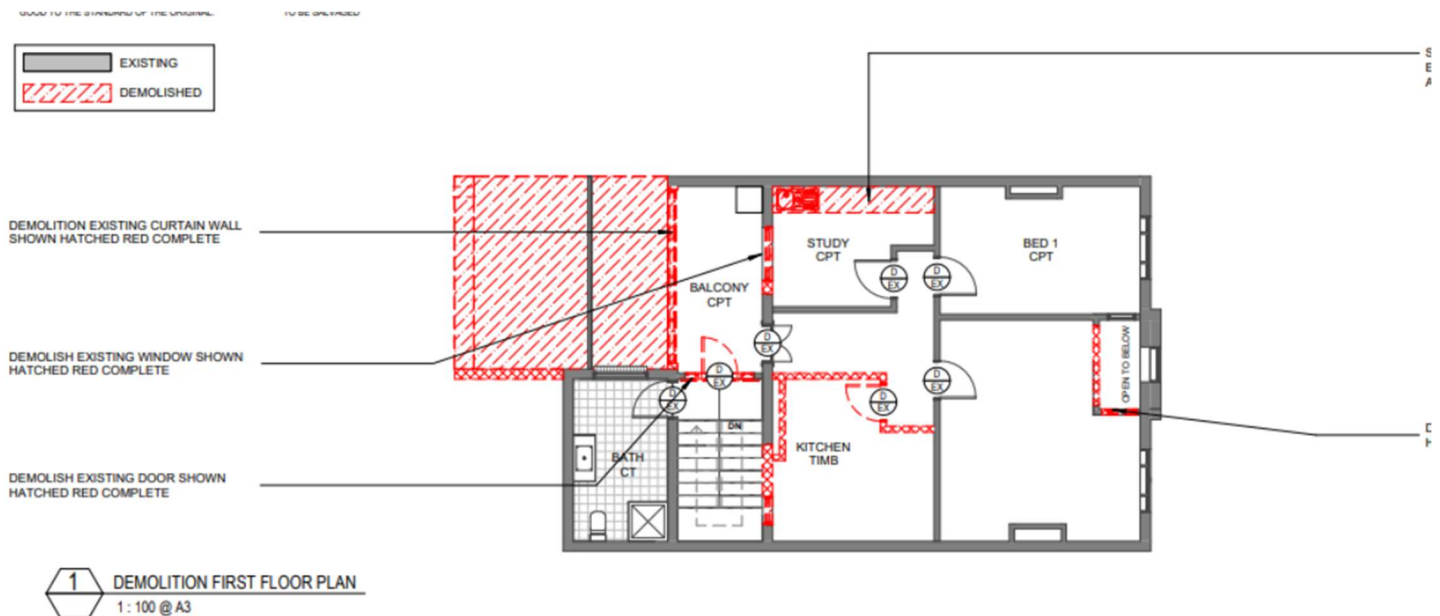


Figure 1c: Demo Roof



Figure 2a: Class 9b – Proposed Gallery and Potting Studio



Figure 2b: Class 4 – Proposed First Floor Plan

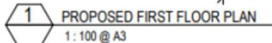
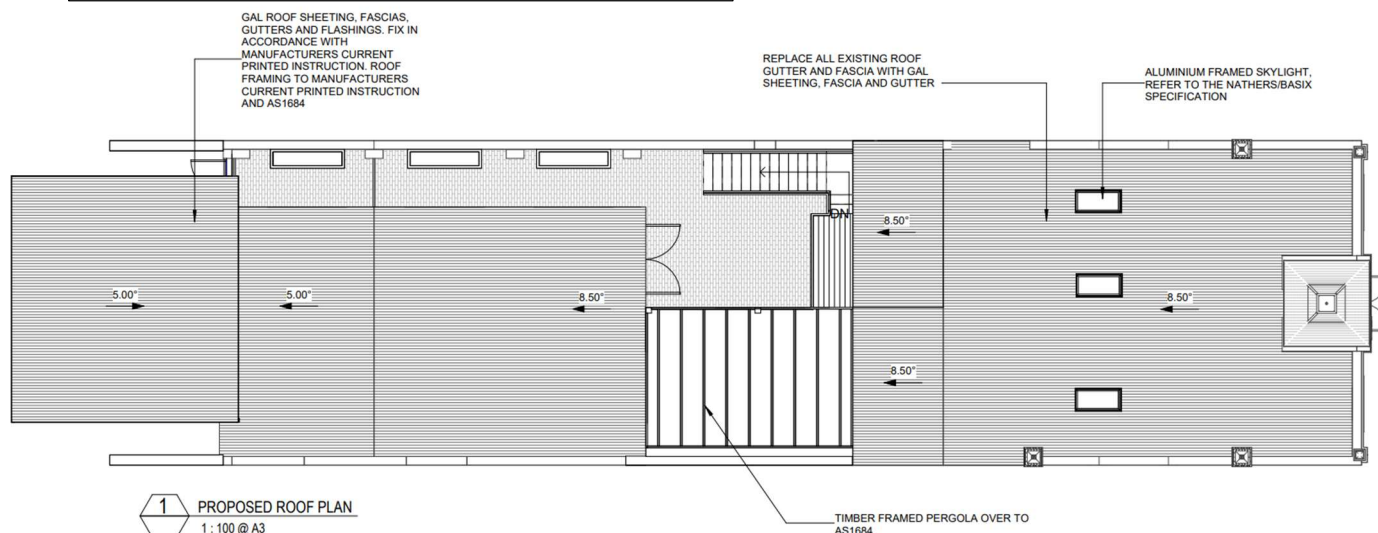


Figure 2c: Proposed Roof Plan



NSW J4D3 Thermal Construction - general

- 1) Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it:
 - a) abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like where the insulation must be against the member; and
 - b) forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
 - c) does not affect the safe or effective operation of a service or fitting.
- 2) Where required, reflective insulation must be installed with:
 - a) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and
 - b) the reflective insulation closely fitted against any penetration, door or window opening; and
 - c) the reflective insulation adequately supported by framing members; and
 - d) each adjoining sheet of roll membrane being
 - i. overlapped not less than 50 mm; or
 - ii. taped together.
- 3) Where required, bulk insulation must be installed so that:
 - a) it maintains its position and thickness, other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like; and
 - b) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50mm.
- 4) Roof, ceiling, wall and floor materials, and associated surface are deemed to have the thermal properties listed in Specification 36.
- 5) The required Total R-Value and Total System U-Value, including allowance for thermal bridging, must be
 - a) Calculated in accordance with AS/NZS 4859.2 for a roof or floor; or

- b) Determined in accordance with Specification 37 for wall-glazing construction; or
- c) Determined in accordance with Specification 39 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces.

NSW J4D4 Roof and ceiling construction

Existing roof gutter and fascia to be replaced with no replacement to existing roof.

NSW J4D5 Roof Lights

Not applicable to Class 9b development. Refer to BASIX requirements for Class 4 part of development requirements.

NSW J4D6 Walls and glazing

- 1) The Total System U-Value of wall-glazing construction, including wall-glazing construction which wholly or partly forms the envelope internally, must not be greater than U2.0 for a Class 9b building
- 2) The Total System U-Value of display glazing² must not be greater than U5.8
- 3) The Total System U-Value of wall-glazing construction must be calculated in accordance with Specification 37.
- 4) Wall components of a wall-glazing construction must achieve a minimum Total R-Value of
 - a) R1.0 where a wall is <80% of the area of the wall-glazing construction; or
 - b) R1.4 as per NSW Table J4D6a for Class 9b building in Climate Zone 7 with >80% wall area

NSW Table NSW J4D6a: Minimum wall Total R-Value - Wall area 80% or more of wall-glazing construction area

Climate zone	Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area	Class 3 or 9c building or Class 9a ward area
1	2.4	3.3
2	1.4	1.4
3	1.4	3.3
4	1.4	2.8
5	1.4	1.4
6	1.4	2.8
7	1.4	2.8
8	1.4	3.8

- Refer to Attachment A and Attachment B which shows glazing for this development achieves U2.0 with Maximum U-value 4.8; SHGC 0.3 – 0.7 (and walls SA 0.5) as calculated in accordance with NSW J4D6 using Method 2 (Multiple aspects)
- Light weight new external walls FRL 90/90/90 to have minimum R1 insulation added.

² Glazing used to display retail goods in a shop or showroom directly adjacent to a walkway or footpath, but not including that used in a café or restaurant.

Table 3	Total R-Value required	R-Value of construction ³	
External Wall - New	1.4	Outdoor air film	0.03
		Fibre cement (FC) 8mm sheeting	0.03
		Airspace (non-reflective, unventilated)	0.17
		Plasterboard 10mm	0.06
		Indoor air film	0.12
		Total	0.42
		Required R-value	1.00

³ As per NCC Specification 36 Material Properties

NSW Table J4D6b: Maximum wall-glazing construction solar admittance - Class 5, 6, 7, 8 or 9b building or Class 9a building other than a ward area

Climate zone	Eastern aspect solar admittance	Northern aspect solar admittance	Southern aspect solar admittance	Western aspect solar admittance
1	0.12	0.12	0.12	0.12
2	0.13	0.13	0.13	0.13
3	0.16	0.16	0.16	0.16
4	0.13	0.13	0.13	0.13
5	0.13	0.13	0.13	0.13
6	0.13	0.13	0.13	0.13
7	0.13	0.13	0.13	0.13
8	0.2	0.2	0.42	0.36

NSW J4D7 Floors

Not applicable to this development.

Part J5 Building Sealing

NSW J5D2

The DTS provisions of this part apply to elements forming the envelop as defined in [J4D2 Table 1](#) other than where mechanical ventilation is a requirement by Part F6 providing sufficient pressurisation to prevent infiltration or parts of buildings cannot be fully enclosed.

NSW J5D3 Chimneys and flues

Not applicable to this development.

NSW J5D4 Roof lights

Refer to Class 4 part building requirements under J3.3.

NSW J5D5 Windows and doors

- 1) A door, openable window or the like must be sealed when forming part of the envelope to restrict air infiltration in climate zone 7.
- 2) The requirements for 1) do not apply to
 - a. A window complying with AS 2047; or
 - b. A fire door or smoke door; or
 - c. A roller shutter door, roller shutter grill or other security door or device installed only for out-of-hours security
- 3) A seal to restrict air infiltration
 - a. For the bottom edge of a door, must be a draft protection device; and
 - b. For the other edges of a door or the edges of an openable window or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.
- 4) An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, rapid roller door, revolving door or the like, other than
 - a. Where the conditioned space has a floor area of not more than 50m²; or
 - b. Where a café, restaurant, open front shop or the like has
 - i. A 3m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and
 - ii. At all other entrances to the café, restaurant, open front shop or the like, self-closing doors.
- 5) A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like.

- Entrance doors must have a self-closing door and seal to restrict air infiltration in accordance with J5D5.

NSW J5D6 Exhaust fans

An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving –

- a) A conditioned space; or
- b) A habitable room in climate zone 7

- Exhaust fans serving a conditioned space or habitable room must be fitted with a sealing device such as a self-closing damper in accordance with NSW J5D6.

NSW J5D7 Construction of ceilings, walls and floors

- 1) Ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leaking in accordance with (2) When forming part of the envelope in climate zone 7.
- 2) Construction required by (1) must be –
 - a. Enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or
 - b. Sealed at junctions and penetrations with –
 - i. Closed fitting architrave, skirting or cornice; or

- ii. Expanding foam, rubber compressible strip; caulking or the like.
- 3) The requirements of (1) do not apply to openings, grilles or the like required for smoke hazard management.

- Construction of ceilings, walls and floors must comply with NSW J5D7.

NSW J5D8 Evaporative coolers

An evaporate cooler must be fitted with a self-closing damper or the like when serving a heated space in climate zone 7.

Part J6 Air Conditioning and Ventilation

The provisions for the efficiency and control of air-conditioning, space heating and ventilation equipment, the efficiency, sealing and insulation requirements for ductwork systems containing fans, and for the efficiency and insulation of pipework and pump systems are set out in Attachment D – Extract of NCC 2022 Part J6 Air-conditioning and ventilation.

- The air conditioning supplier must certify that the installation complies with Part J6 Air-conditioning and ventilation of NCC 2022 at Attachment D.

Part J7 Artificial lighting and power

NSW J7D3(2) Artificial lighting

The aggregate design illumination power load in a Class 3 or Class 5 to 9 building must not exceed the allowances as defined by NSW J7D3(2) and Table J7D3a as defined in Attachment C.

- The lighting supplier must certify that artificial lighting complies with NSW J7D3(2) of NCC 2022 at Attachment C.

NSW J7D4(4) Interior artificial lighting and power control

95% of the light fittings in a building, other than a Class 3 building of more than 250m² must be controlled by

- a) A time switch in accordance with Attachment C Specification 40; or
- b) An occupant sensing device such as
 - i. A security key card reader that registers a person entering and leaving a building; or
 - ii. A motion detector in accordance with Attachment C Specification 40.

- The lighting supplier must certify that artificial lighting and power control complies with NSW J7D3 and Specification 40 at Attachment C.

NSW J7D7 Boiling water and chilled water storage units

Boiling water and chilled water storage units must be fit with a time switch capable of

switching on and off electric power at variable pre-programmed times and on variable pre-programmed days and in accordance with NSW J7D7.

A time switch for boiling water or 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.

- Boiling water and chilled water storage units must be fit with a time switch with manual override capability and efficiency measures as applicable and in accordance with NSW J7D7.

NSW J7D8 Lifts

Not included in this report. Refer to BASIX certificate for energy provisions for lifts.

NSW J7D9 Escalators and moving walkways

Not applicable to this development.

NSW J8D3 Swimming pool heating and pumping

Not applicable to this development.

NSW J8D4 Spa pool heating and pumping

Not applicable to this development.

Part J9 Energy monitoring and on-site distributed energy resources

NSW J9D3 Facilities for energy monitoring

- 1) The floor area of the envelope is not more than 500m², therefore does not require an energy meters configured to record the time-of-use consumption of electricity [and gas if applicable].
- 2) This development is <2,500 m², so there is no requirement for the facility to record individual time-of-use energy data recording for systems noted in NCC 2022 J9D3 (2).

NSW J9D4 Facilities for electric vehicle charging equipment

No carpark associated with this development.

NSW J9D5 Facilities for solar photovoltaic and battery systems

A building must have features that facilitate the future installation of on-site renewable energy generation and storage as per J1P4.

- 1) The main electrical switchboard of a building must
 - a. Contain at least two empty three-phase circuit breaker slots and four DIN rail spaces labelled to indicate the use of each space for
 - i. A solar photovoltaic system; and
 - ii. A battery system; and
 - b. Be sized to accommodate the installation of solar photovoltaic panels producing their maximum electrical output on at least 20% of the building roof area.
- 2) At least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels, except for buildings
 - a. With installed solar photovoltaic panels on
 - i. At least 20% of the roof area; or
 - ii. An equivalent generation capacity elsewhere on-site; or
 - b. Where 100% of the roof area is shaded for more than 70% of daylight hours; or
 - c. With a roof area of not more than 55m²; or
 - d. Where more than 50% of the roof area is used as a terrace, carpark, roof garden, roof light or the like.

Limitations

- 1) The requirements of J9D5(1)(a)(i) and (b) do not apply to a building with solar photovoltaic panels installed on at least 20% of the roof area.
- 2) The requirements of J9D5(1)(a)(ii) and (b) do not apply to a building with battery systems installed.

- The development must have features that facilitate the future installation of on-site renewable energy generation and storage as per J1P4, including at least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels with exception to limitations described under J9D5.

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