National Construction Code
Building Code of Australia (2019)

BCA Assessment Report - Section J

Proposed office additions –
Council pound, 21 Blain Road, Mudgee NSW.

Prepared for Mid-Western Regional Council

Report No: 21056
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Building Code of Australia - Section J - BASIX & NatHERS

Register

Issue No	Remarks	Date
A	CC issue	03/08/2021

Introduction

This Section J – Energy Efficiency report has been prepared for Mid-Western Regional Council and refers to the proposed office additions at the Council pound, 21 Blain Road, Mudgee NSW.

The report is based on, and limited to, the information shown on the following documentation:

- Drawing no. 21.89 sheets sk1-3

Exclusions

This report does not include:
- Assumptions regarding the design intention or the like (except as noted in the report).
- An assessment of sections A through to H of the Building Code of Australia (2019).

Report Format

The report identifies the parts of Section J of the Building Code of Australia (2019) relevant to the project as summarised in the following table (see below).

The prescriptive BCA requirements and status of each of the relevant parts is discussed in the following body of the report.

Building description

- Proposed office additions at the Council pound, 21 Blain Road, Mudgee NSW.
- BCA Building Classification – 5
- Floor area (approximate) – 100 m2
- BCA climate zone - 6
- The construction of the office areas will require full compliance with Section J.
- The animal pens in the shed area are exempt from the thermal construction requirements of Section J (parts J1 to J5) as the space will not be heated or cooled.

The above is addressed in the following Section J analysis and summary table located at the end of the report.

Section J – Energy Efficiency

BCA Section J – parts	Referenced	Comment
J1.2 – thermal construction general	Y	compliance readily achievable
J1.3 – roof and ceiling construction	Y	compliance readily achievable
J1.4 – roof lights	N	n/a – not present
J1.5 – walls and glazing	Y	compliance readily achievable
J1.6 – floors	Y	compliance readily achievable
J3.2 – chimneys and flues	N	n/a – not present
J3.3 – roof lights	N	n/a – not present
J3.4 – windows and doors	Y	compliance readily achievable
J3.5 – exhaust fans	Y	compliance readily achievable
J3.6 – construction of roofs, walls and floors	Y	compliance readily achievable
J3.7 – evaporative coolers	N	n/a – not present
J5.2 – air-conditioning system control	Y	compliance readily achievable
J5.3 – mechanical ventilation system control	N	n/a – not present
J5.4 – fan systems	N	n/a – not present
J5.5 – ductwork insulation	N	n/a – not present
J5.6 – ductwork sealing	N	n/a – not present
J5.7 – pump systems	N	n/a – not present
J5.8 – pipework insulation	N	n/a – not present
J5.9 – space heating	N	n/a – not present
J5.10 – refrigerant chillers	N	n/a – not present
J5.11 – unitary air-conditioning equipment	Y	compliance readily achievable
J5.12 – heat rejection equipment	N	n/a – not present
J6.2 – artificial lighting	Y	compliance readily achievable
J6.3 – interior artificial lighting and power control	Y	compliance readily achievable
J6.4 – interior decorative and display lighting	N	n/a – not present
J6.5 – exterior artificial lighting	Y	compliance readily achievable
J6.6 – boiling water and chilled water storage units	N	n/a – not present
J6.7 – lifts	N	n/a – not present
J6.8 – escalators and moving walkways	N	n/a – not present
J7.2 – heated water supply	Y	compliance readily achievable
J7.3 – swimming pool heating & pumping	N	n/a – not present
J7.4 – spa pool heating and pumping	N	n/a – not present
J8.3 – facilities for energy monitoring	Y	compliance readily achievable

Section J – Energy Efficiency Assessment – Analysis

The parts identified in the previous table are further analysed and comments regarding the project are included in italics and bold.

A summary sheet is included which should be attached to the drawings and read in conjunction with this report.

BCA Reference	**Prescriptive BCA requirements / comments**
J1.2 Thermal Construction general	Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it abuts or overlaps adjoining insulation and forms a continuous barrier with ceilings, walls, bulkheads, floors or the like. **Compliance to be certified during construction.**
J1.3 Roof and Ceiling Construction	The office roof / ceiling combination must achieve a *Total R-Value* greater than or equal to R3.2 for a downward direction of heat flow; And; The solar absorptance (SA) of the upper surface of the roof sheeting must be not more than 0.45. Compliance with J1.3 can be achieved by the following combination: • *Installation of R3.5 bulk insulation above the office ceiling; and* • *Reflective sarking under light colour roof sheeting (SA<0.45)* Note: recessed lighting will reduce the effectiveness of ceiling insulation. Contact author of report for advice if recessed lighting is proposed. Note: the R value of ceiling insulation can be reduced by the R value of anticon blanket (if installed). **Compliance to be certified during construction.**
J 1.5 Walls & glazing	The Total System U-Value of the internal and external wall-glazing construction must not be greater than U2.0; and the Total System U-Value of wall-glazing construction must be calculated in accordance with Specification J1.5a. And; The solar admittance of externally facing wall-glazing construction must not be greater than the values specified in Table J1.5b; and the solar admittance of a wall-glazing construction must be calculated in accordance with Specification J1.5a. (cont. over)

	(cont.) Compliance with J1.5 can be achieved by the following insulation and glazing combination(s): <u>*External walls (office only)*</u> *Lightweight clad framed walls:* • *Installation of R2.0 bulk insulation within a minimum 90mm framed wall and vapour permeable sarking fixed to outside of framed wall.* <u>*Internal walls adjoining shed*</u> *90mm framed walls:* • *Installation of R2.0 bulk insulation within a minimum 90mm framed wall.* <u>*All façades (office only):*</u> *Total U value (NFRC) = 5.8 (U values less than this value are satisfactory)* *Total SHGC value (NFRC) = 0.60 (SHGC values +or- 10% of this value are satisfactory)* Note: Any variation to the shading indicated on the plans will require a reassessment of the glass type specified in J1.5. **Compliance to be certified during construction.**
J1.6 Floors	The proposed office floor construction consists of a concrete slab on ground (no in-slab heating). The floor slab requires a minimum total construction R-value of R2.0 for a downward direction of heat flow. Compliance with J1.6 can be achieved by the following insulation: • *R-value of soil in contact with underside of slab of R1.7; and* • *Installation of R1.1 polystyrene insulation boards (25mm KingSpan Kooltherm K3) on the underside of the slab – office area only.* **Compliance to be certified during construction.**
J3.4 External Windows and Doors	The following draught sealing is required (conditioned spaces only): • *A foam seal around the perimeter of the frame and a draught stopper along the bottom edge of external doors.* • *External doors to be fitted with a self-closer.* • *Windows to comply with AS2047.* **Compliance to be certified during construction.**

J 3.5 Exhaust fans	Any exhaust fan in the bathroom must be fitted with a self-closing damper or the like. **Compliance to be certified during construction**.
J3.6 Construction of roof, walls and floors	Construction of the conditioned spaces using plasterboard lined walls and ceilings with cornices, skirting and architraves will achieve draught sealing compliance.
J 5.2 Air-conditioning system control	The following controls apply to air-conditioning systems (office area only): • *An air-conditioning system must be capable of being deactivated when the building or part of a building served by that system is not occupied; and comply with J5.2 (ii) to (xii) as applicable.* • *A time switch must be provided to control —* o *an air-conditioning system of more than 2 kWr; and* o *a heater of more than 1 $kW_{heating}$ used for air-conditioning.* *The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.* **Compliance to be certified during construction.**
J5.9 Space heating	Space heating forming part of an air-conditioning system must comply with the requirements of J5.9 (a), (b), (c), and (d) as applicable. Compliance with J5.9 can be achieved using the following space heating system: • heat pump heater (package AC system).
J5.11 Unitary air-conditioning equipment	Unitary air-conditioning equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must comply with MEPS. **Compliance to be certified during construction.**

J6.2 Interior Artificial Lighting	The aggregate maximum illumination power density must not exceed the following (except as allowed by adjustment factors from table J6.2a where motion detectors, dimming, daylight sensors or room size allows). See author of report for upgrade calculations if limits noted below are unachievable - • *Office area (min 200 lx):* *4.5W / sq.m.* • *Staff / toilet areas:* *3W / sq.m.* • *Shed area (160-240lx):* *3W / sq.m.* The above wattage allowances generally limit all fixed lighting to low wattage fluorescent or LED sources. The following is exempt from the above: • Emergency lighting required by part E4; • A heater where the heater also emits light, such as in a bathroom. **Compliance to be certified during construction.**
J6.3 Interior artificial lighting and power control	Artificial lighting and power within the building must incorporate the following controls: • *All artificial lighting of a room or space must be individually operated by a switch or other control device; or a combination of both.* • *An artificial lighting switch or other control device must (if an artificial lighting switch) be located:* o *in a visible and easily accessed position in the room or space being switched.* The above requirements do not apply to the following: • Emergency lighting in accordance with Part E4; and • Where artificial lighting is needed for 24-hour occupancy; and • Artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation, • A heater where the heater also emits light, such as in bathrooms. **Compliance to be certified during construction.**

J6.5 Exterior artificial lighting	Artificial lighting around the perimeter of the building must:
	• *Be controlled by a daylight sensor or time switch (complying with spec J6), and*
	• *When the total perimeter lighting load exceeds 100W –*
	  ○ *Must use LEDs for 90% of the total lighting load; or*
	  ○ *Be controlled by a motion sensor*
	• *When used for façade or signage lighting have a separate time switch in accordance with Specification J6.*
	
	Emergency lighting required by part E4 is exempt from the above.
	
	Compliance to be certified during construction.

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 Volume Three — Plumbing Code of Australia).
J8.3 Facilities for energy monitoring	The following facilities for energy monitoring are required: • *Gas and/or electricity meters (assumed to be existing onsite).* • *Sub metering is not required.*

Section J BCA requirements – Council pound – 21 Blain Rd, Mudgee

(to be read in conjunction with Section J report)

Insulation (office area only)

- Roof (light colour with SA<0.45): reflective sarking
- Ceiling: R3.5
- External walls: R2.0 and sarking
- Internal walls adjoining shed: R2.0
- Floor: R1.1 Kooltherm K3 board (office area only)

External windows & glass doors (office area only)

- All façades: U=5.8 SHGC=0.60
- Glazing to comply with AS2047

Draught sealing (office area only)

- External door to have foam seal around perimeter, draught stopper along bottom edge and self-closer.
- Bathroom exhaust fan to be fitted with a self-closing damper.

Air conditioning (office area only)

- Package AC units to comply with MEPS
- Minimum COP/EER of 2.90
- Any AC unit with a heating or cooling capacity of more than 2kWr to have a time switch controller (refer to spec J6 of BCA for details).

Internal lighting & power control

- Office area - maximum illumination power density of 4.5 W/m2.
- Staff / toilet areas - maximum illumination power density of 3 W/m2
- Shed areas - maximum illumination power density of 3 W/m2
- Office area lighting to be separately controlled from shed areas.

External lighting

- All new external lighting to be controlled by either a daylight sensor or time switch and where total perimeter lighting exceeds 100W have a minimum of 90% of light fittings to be LEDS or be controlled by a motion sensor.
- Façade lighting or illuminated signs to be controlled by a time switch or daylight sensor.

Hot water supply

- Heated sanitary water systems to be designed and installed as per part B2 NCC vol. 3

Metering of gas / electricity

- Electricity and gas meters (as required) are to be installed.
- Sub metering is not required

Attachments

1/ Conditioned floor areas shown **red** below.

2/ Façade report (compliance achieved with methods 1 & 2).

Façade

Report

Calculator

Project Summary

Date
5/08/2021

Name
Marc Kiho

Company
Kiho Building Consulting

Position
Section J / NatHERS assessor

Building Name / Address
Mudgee Council Pound, 21 Blain Rd Mudgee

Building State
NSW

Climate Zone
Climate Zone 6 - Mild temperate

Building Classification
Class 5 - office building

Storeys Above Ground
1

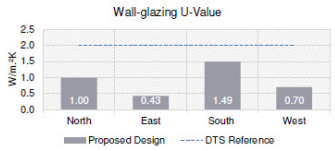
Tool Version
1.1 (April 2020)

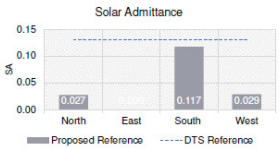
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

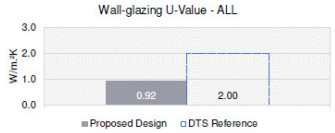
	Method 1 North	East	South	West	Method 2 All
Wall-glazing U-Value (W/m².K)	1.00	0.43	1.49	0.70	0.92
Solar Admittance	0.03		0.12	0.03	
AC Energy Value					0

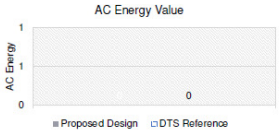
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	2.2	0	3.6	1.8
Glazing to Façade Ratio	10%	0%	20%	5%
Glazing References	w01		w01	w01
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Glass Types	Single glazing		Single glazing	Single glazing
Frame Types	Aluminium		Aluminium	Aluminium
Average Glazing U-Value (W/m².K)	5.80		5.80	5.80
Average Glazing SHGC	0.60	0.00	0.60	0.60
Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device	Horizontal Device
Wall Area (m²)	19.1	8.1	14.8	36
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	Clad & R2.0	Timber wall (90mm glass wool + timber studs)	Clad & R2.0	Clad & R2.0
Wall Thickness	110	110	110	110
Average Wall R-value (m².K/W)	2.25	2.32	2.25	2.25
Solar Absorptance	0.5 0.9	0.5 0.9	0.5 0.9	0.5 0.9