

National Construction Code Building Code of Australia (2022)

BCA Assessment Report - Section J

Proposed alterations & additions to an existing commercial building –
153A Market Street, Mudgee NSW.

Prepared for Mudgee Disability Support Services

Report No: 24071

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Register

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A		16/12/2024

Introduction

This Section J – Energy Efficiency report has been prepared for Mudgee Disability Support Services and refers to the proposed alterations and additions to an existing commercial building at 153A Market Street, Mudgee NSW.

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

- Giselle Denley Drafting Services dwg no. 3901-A01 to A03 (rev A dated Oct 2024).

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 (2022).

Report Format

The report identifies the parts of Section J of the Building Code of Australia (2022) 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 alterations and additions to an existing commercial building at 153A Market Street, Mudgee NSW.
- BCA Building Classification – 5
- Floor area (additions) – 110m²
- BCA climate zone - 6
- The building additions (new office and staff areas) meet the definition of a conditioned space and as such the new works will require compliance with Section J (Parts J4 to J9).
- The existing commercial building is undergoing an internal refurbishment and compliance with Section J is constrained due to the limitations of the existing building construction. As such Section J compliance is applicable to new lighting and AC systems where replacement is part of the refurbishment works, and installation of new glazing and wall / ceiling insulation for new construction only.

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
J2D2 – Application of Section J	Y	compliance readily achievable
J3D3 – Heating and Cooling Loads Class 2 & 4	N	not applicable
J3D4 – Ceiling Fans Class 2 & 4	N	not applicable
J3D5 – Roof Thermal Breaks Class 2 & 4	N	not applicable
J3D6 – Wall Thermal Breaks Class 2 & 4	N	not applicable
J4D3 – Thermal Construction General	Y	compliance readily achievable
J4D4 – Roof and Ceiling Construction	Y	compliance readily achievable
J4D5 – Roof Lights	N	n/a – not present
J4D6 – Walls and Glazing	Y	compliance readily achievable
J4D7 – Floors	Y	compliance readily achievable
J5D3 – Chimneys and Flues	N	n/a – not present
J5D4 – Roof Lights	N	n/a – not present
J5D5 – Windows and Doors	Y	compliance readily achievable
J5D6 – Exhaust Fans	Y	compliance readily achievable
J5D7 – Construction of roofs, walls and floors	Y	compliance readily achievable
J5D8 – Evaporative coolers	N	n/a – not present
J6D3 – Air-conditioning system control	Y	compliance readily achievable
J6D4 – Mechanical ventilation system control	N	n/a – not present
J6D5 – Fans and duct systems	N	n/a – not present
J6D6 – Ductwork insulation	Y	compliance readily achievable
J6D7 – Ductwork sealing	N	n/a – not present
J6D8 – Pump systems	N	n/a – not present
J6D9 – Pipework insulation	N	n/a – not present
J6D10 – Space heating	Y	compliance readily achievable
J6D11 – Refrigerant chillers	N	n/a – not present
J6D12 – Unitary air-conditioning equipment	Y	compliance readily achievable
J6D13 – Heat rejection equipment	N	n/a – not present
J7D3 – Artificial lighting	Y	compliance readily achievable
J7D4 – Interior artificial lighting and power control	Y	compliance readily achievable
J7D5 – Interior decorative and display lighting	N	n/a – not present
J7D6 – Exterior artificial lighting	Y	compliance readily achievable
J7D7 – Boiling water and chilled water storage units	N	n/a – not present
J7D8 – Lifts	N	n/a – not present
J7D9 – Escalators and moving walkways	N	n/a – not present
J8D2 – Heated water supply	Y	compliance readily achievable
J8D3 – Swimming pool heating & pumping	N	n/a – not present
J8D4 – Spa pool heating and pumping	N	n/a – not present
J9D3 – Facilities for energy monitoring	N	n/a – existing system
J9D4 – Facilities for electric vehicle charging	N	n/a – not present
J9D5 – Facilities for solar PV and battery systems	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
J2D2 Application of Section J	Performance requirement J1P1 is satisfied by complying with Parts J4, J5, J6, J7, J8 and J9.
J4D3 Thermal Construction general	<p>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.</p> <p>Compliance to be certified during construction.</p>
J4D4 Roof and Ceiling Construction	<p>The ceiling must achieve a <i>Total R-Value</i> greater than or equal to R3.2 for a downward direction of heat flow;</p> <p>And;</p> <p>The solar absorptance (SA) of the upper surface of the roof sheeting must be not more than 0.45.</p> <p>Compliance with J4D4 can be achieved by the following combination:</p> <ul style="list-style-type: none"> • Installation of R3.5 bulk insulation above the ceiling (areas of new work and existing ceiling space – where accessible). <p>Note: recessed lighting will reduce the effectiveness of ceiling insulation. Contact author of report for advice if recessed lighting is proposed.</p> <p>Note: the roof sheeting is existing.</p> <p>Compliance to be certified during construction.</p>

J4D6 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 37.

And;

The solar admittance of externally facing wall-glazing construction must not be greater than the values specified in Table J4D6b; and the solar admittance of a wall-glazing construction must be calculated in accordance with Specification 37.

Compliance with J4D6 can be achieved by the following insulation and glazing combination(s):

External walls

Brick veneer walls (new office / staff areas):

- Installation of R2.5 bulk insulation within a minimum 90mm framed wall inside existing brick external walls.

New windows & glass doors:

Total U value (NFRC) = 5.8 (U values less than this value are satisfactory)

Total SHGC value (NFRC) = 0.60 (SHGC values less than this value are satisfactory)

Note: Any variation to the shading indicated on the plans will require a reassessment of the glass type specified in J4D6.

Compliance to be certified during construction.

J4D7 Floors	<p>The existing 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.</p> <p>Compliance with J4D7 is achieved by the R-value of soil in contact with the underside of the slab (R>2.0). No additional insulation is required.</p>
J5D5 Windows and Doors	<p>The following draught sealing is required:</p> <ul style="list-style-type: none"> • 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 / glass doors to be fitted with weather seals. <p>Compliance to be certified during construction.</p>
J5D6 Exhaust fans	<p>Any exhaust fan in the bathrooms must be fitted with a self-closing damper or the like.</p> <p>Compliance to be certified during construction.</p>
J5D7 Construction of roof, walls and floors	<p>Construction of the conditioned spaces using plasterboard lined walls and ceilings with cornices, skirting and architraves will achieve draught sealing compliance.</p>
J6D3 Air-conditioning system control	<p>The following controls apply to air-conditioning systems:</p> <ul style="list-style-type: none"> • 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 J6D3 (1) as applicable. • When two or more air-conditioning systems serve the same space, they must use control sequences that prevent the systems from operating in opposing heating and cooling modes. • Single conditioned zone OR when serving more than 1 zone, thermostatically control the temperature of each zone in accordance with J6D3 (1)(b). • A time switch must be provided to control — <ul style="list-style-type: none"> ○ an air-conditioning system of more than 2 kW_r; and ○ a heater of more than 1 kW_{heating} used for air-conditioning. <p>The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.</p> <p>Compliance to be certified during construction.</p>

J6D6 Ductwork insulation	<p>(Clause only applies if ducting is installed) Ductwork and fittings in an air-conditioning system must be provided with insulation complying with AS/NZS 4859.1; and the requirements of J6D6 (1-4) as applicable.</p> <ul style="list-style-type: none"> • All supply and return ductwork insulated to R1.0 and sealed. <p>Compliance to be certified during construction.</p>
J6D10 Space heating	<p>Space heating forming part of an air-conditioning system must comply with the requirements of J6D10 (1)(a), (b), (c), and (d) as applicable.</p> <p>Compliance with J6D10 can be achieved using the following space heating system:</p> <ul style="list-style-type: none"> • heat pump heater (package AC system complying with MEPS).
J6D12 Unitary air-conditioning equipment	<p>Unitary air-conditioning equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must comply with MEPS.</p> <p>Compliance to be certified during construction.</p>
J7D3 Artificial Lighting	<p>The aggregate maximum illumination power density must not exceed the following (except as allowed by adjustment factors from table J7D3b where motion detectors, dimming, daylight sensors or room size allows).</p> <p>See author of report for upgrade calculations if limits noted below are unachievable -</p> <ul style="list-style-type: none"> • Office area (new work only): 4.5W / sq.m. (440 W max) • Bathrooms (new work only): 3W / sq.m. (30 W max) <p>The above wattage allowances generally limit all fixed lighting to low wattage fluorescent or LED sources.</p> <p>The following is exempt from the above:</p> <ul style="list-style-type: none"> • Emergency lighting required by part E4; • A heater where the heater also emits light, such as in a bathroom; • Lighting of a specialist process nature. <p>Compliance to be certified during construction.</p>

<p>J7D4 Interior artificial lighting and power control</p>	<p>Artificial lighting and power within the building must incorporate the following controls:</p> <ul style="list-style-type: none"> • All artificial lighting of a room or space must be individually operated by a switch or other control device; or a combination of both. <p>The above requirements do not apply to the following:</p> <ul style="list-style-type: none"> • Emergency lighting in accordance with Part E4; and • Artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation, • plant room or lift motor room, workshops where power tools are used; and • A heater where the heater also emits light, such as in bathrooms. <p>Compliance to be certified during construction.</p>
<p>J7D6 Exterior artificial lighting</p>	<p>Artificial lighting around the perimeter of the building (including undercover parking area) must:</p> <ul style="list-style-type: none"> • Be controlled by a daylight sensor or time switch (complying with Specification 40), and • When the total perimeter lighting load exceeds 100W – <ul style="list-style-type: none"> ○ 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 40. <p>Emergency lighting required by part E4 is exempt from the above.</p> <p>Compliance to be certified during construction.</p>
<p>J8D2 Heated water supply</p>	<p>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).</p>
<p>J9D5 – Facilities for solar PV and battery systems</p>	<p>The following facilities for solar PV and battery systems are required:</p> <ul style="list-style-type: none"> • The main electrical switchboard is designed to accommodate a future solar PV and battery system in accordance with J9D5(1)(a); and • At least 20% of the roof area is left clear for the installation of solar panels.

Attachments


1/ Conditioned floor areas shown red below (area of new works).

2/ Façade report (compliance achieved with method 2).



Project Details


	North	East	South	West
Glazing Area (m²)		2.8	2.5	8.7
Glazing to Façade Ratio		9%	7%	27%
Glazing References		W01	W01	W01
Glazing System Types		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	0.00	0.80	0.80	0.80
Shading Systems	Horizontal	Horizontal	Horizontal	Horizontal
Wall Area (m²)		29.2	31.5	23.3
Wall Types		Wall	Wall	Wall
Methodology	Wall			
Wall Construction		Cavity masonry (90mm glass wool + timber studs)	Cavity masonry (90mm glass wool + timber studs)	Cavity masonry (90mm glass wool + timber studs)
Wall Thickness		250	250	250
Average Wall R-value (m².KW)		2.85	2.85	2.85
Solar Absorptance	0.5	0.5	0.5	0.5

3/ Lighting Calculations.



Non-residential Lighting




Calculator

Building name/description


155A Market St, Mudgee NSW

Classification

Class 5

Number of rows preferred in table below: 5 (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 % assn	Illuminance turnaround	Adjustment factor 2	Dimming % assn	Illuminance turnaround	Light colour adjustment factor 1	Light colour adjustment factor 2	System illumination power load allowance	Lighting system share of % of allowance used
1	Office area (over works only)	87.8 sqm			440 W	Office - intentionally lit to an ambient level of 200 lx or more									at CRI ≥ 90	at CCT ≤ 4000 K	441 W	94% of 99%
2	Bathroom area (over works only)	11.8 sqm			30 W	Toilet, locker room, shower room, shower room and the like											33 W	6% of 99%
Total																	474 W	

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 www.abcb.gov.au. The Australian Building Codes Board, the Commonwealth of Australia and States and Territories of Australia do not warrant any liability, individual liability for negligence, for any loss (however caused), damage, injury, expense or cost incurred by any person as a result of accessing, using or relying upon this publication, in the manner intended or permitted by law. No representation or warranty is made or given as to the accuracy, reliability, completeness, timeliness or otherwise of any information or data appearing in or on this website, or in other publications, notices, or 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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