

# NCC BCA 2022 SECTION J DTS ASSESSMENT

119 GOLDSMITH STREET, GOULBURN NSW

> PREPARED FOR NORDON JAGO ARCHITECTS

> > DATE: 05<sup>TH</sup> NOVEMBER 2024 OUR REFERENCE: 230917 - A ENGINEER: SRINITHA RAJU



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### INTRODUCTION

#### GENERAL

The objective of NCC BCA 2022 Volume 1 Section J is to reduce greenhouse gas emissions by efficiently using energy. This report has been prepared to show how the proposed refurbishments of 119 Goldsmith St, Goulburn, can meet the requirements of the NCC BCA 2022 Volume 1 Section J. By incorporating the recommendations of this report, the building and its services can be capable of efficiently using energy. This report shall be read in conjunction with the Australian Building Codes Board (ABCB) National Construction Code (NCC) 2022 Volume 1.

This assessment is for all new building work including fabric and services. The new building work should not reduce the existing building's level of energy efficiency.

#### **PROJECT DESCRIPTION**

The project comprises a single storey existing building which is undergoing refurbishments.

#### **BUILDING CLASSIFICATION**

Class 9a – Healthcare building

#### CLIMATE ZONE

Zone 7

#### **ARCHITECTURAL DOCUMENTATION**

The following architectural documentation from Nordon Jago Architects was used for this assessment;

Project No.	Drawing No.	Description	Rev	Date
23256	DA.101A	Site Plan	А	21.10.2024
23256	DA.103A	Proposed Floor Plan	А	21.10.2024
23256	DA.310	Proposed Sections	А	21.10.2024



#### **PERFORMANCE REQUIREMENTS**

#### **J1P1 ENERGY USE**

A building, including its services, must have features that facilitate the efficient use of energy appropriate to—

- a) the function and use of the building; and
- b) the level of human comfort required for the building use; and
- c) solar radiation being
  - i. utilized for heating; and
  - ii. controlled to minimize energy for cooling; and
- d) the energy source of the services; and
- e) the sealing of the building envelope against air leakage; and
- f) for a conditioned space, achieving an hourly regulated energy consumption, averaged over the annual hours of operation, of not more than 43 kJ/m<sup>2</sup>.hr.

# J1P2 THERMAL PERFORMANCE (FOR SOLE OCCUPANCY OF CLASS 2 OR CLASS 4 PART OF A BUILDING)

Not applicable

# J1P3 ENERGY USAGE (FOR SOLE OCCUPANCY OF CLASS 2 OR CLASS 4 PART OF A BUILDING)

Not applicable

#### J1P4. RENEWABLE ENERGY AND ELCTRIC VEHICLE CHARGING

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

#### J2D2 APPLICATION OF SECTION J

- 1) Performance Requirements J1P1 is satisfied by complying with
  - a) Part J4, for the building fabric; and
  - b) Part J5, for building sealing; and
  - c) Part J6, for air-conditioning and ventilation; and
  - d) Part J7, for artificial lighting and power; and
  - e) Part J8, for heated water supply and swimming pool and spa pool; and
  - f) Part J9D3, for facilities for monitoring.
- 2) Not applicable
- 3) Not applicable
- 4) Performance Requirement J1P4 is satisfied by complying with J9D4 and J9D5



### INTERPRETATION

The following are some useful explanations of terms used throughout this report. These descriptions are taken from the NCC BCA.

**Envelope**, for the purposes of Section J, means the parts of a building's fabric that separate a conditioned space or habitable room from—

- a. the exterior of the building; or
- b. 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** means a space within a building, including a ceiling or under-floor supply air plenum or return air plenum, where the environment is likely, by the intended use of the space, to have its temperature controlled by air-conditioning.

**Air-conditioning** means a service that actively cools or heats the air within a space, but does not include a service that directly

- a. cools or heat cold or hot rooms; or
- b. maintains specialized conditioned for equipment or processes, where this is the main purpose of the service.

Habitable Room means a room used for normal domestic activities, and-

- a. includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre and sunroom; but
- b. excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes-drying room, and other spaces of a specialized nature occupied neither frequently nor for extended periods.

**Total R-Value (m<sup>2</sup>.K/W)**, for the purposes of Volume One, means the sum of the R-Values of the individual component layers in a composite element including any building material, insulating material, airspace, thermal bridging, and associated surface resistances.

**Total System Solar Heat Gain Coefficient (SHGC)**, for the purposes of Volume One, means the fraction of incident irradiance on a wall-glazing construction or a roof light that adds heat to a building's space.

**Total System U-Value (W/m<sup>2</sup>.K)**, for the purposes of Volume One, means the thermal transmittance of the composite element allowing for the effect of any airspaces, thermal bridging and associated surface resistances.



# **COMPLIANCE REQUIREMENT**

Building Element	Proposed Building	
Roof and Ceiling	N/A – Existing roof	
Roof Colour (Solar Absorptance)	N/A	
Roof Lights	N/A - None	
External Walls	<b>Total R2.1</b> – Double Brick with R1.1 reflective board insulation (See Appendix B for details)	
External Walls (Solar Absorptance)	$0.45 \leq SA \leq 0.6 - New external walls$	
Internal Walls	<b>Total R2.1</b> – Plasterboard walls adjacent to unconditioned area with R1.1 reflective board insulation (See Appendix B for details)	
Floors	No insulation required – Existing timber floor	
Glazing (all)	New glazing (Tea room) U-Value 5.8, SHGC – 0.80 (Single Glazed Clear Aluminium frame) Note: U-Value and SHGC must be less than or equal to the above	
Services	DTS compliant systems	



# **BUILDING ENVELOPE**

The building envelope is shaded in blue and red as per Figure 1 below.



Figure 1. Proposed floor layout



#### PART J4 - BUILDING FABRIC

#### J4D2. APPLICATION OF PART

The Deemed to Satisfy provisions of Part J4 Building Fabric apply to building elements forming the envelope of the building.

All existing walls, roof and floor that remain will not need to be upgraded to Section J requirements. The fabric (walls, roof and floor) on the envelope that is new need only comply with this Part. Where the new work provides access to the existing roof cladding, wall cladding or wall lining, insulation should be added where practical to comply with this Part.

#### J4.D3 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 50 mm.
- 4. Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have 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.



#### J4D4. ROOF AND CEILING CONSTRUCTION

Not applicable

#### J4D5 ROOF LIGHTS

Not applicable

#### 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
- 2) The Total System U-Value of display glazing must not be greater than U5.8
  - The Façade Calculator developed by the Australian Building Codes Board (ABCB) has been used to determine the glazing requirements.

Healthcare building				
Facade	Window Reference	Window U- Value (W/m <sup>2</sup> .K) NFRC	Window SHGC NFRC	Possible Glazing Type
w	New glazing	5.8	0.80	e.g. Single Glazed clear Aluminium Frame

\*Refer to Appendix A for Glazing Calculator. Examples of possible glazing systems can be found at <u>www.wers.net</u>.

**Note:** the above are listed to demonstrate possible glazing systems that will meet the requirements of Section J. The actual glazing systems installed must achieve equal to or lower U-Value and SHGC values as listed in the glazing table above.

- 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 R2.8.
- 5) The solar admittance of externally facing wall-glazing construction must not be greater than 0.13.
- 6) The solar admittance of a wall-glazing construction must be calculated in accordance with Specification 37.
- 7) The Total System SHGC of display glazing must not be greater than 0.81 divided by the applicable shading factor specified in S37C7.



External Wall – Double Brick			
Layer	Layer Description	R Value	
1	Outdoor Air Film	0.03	
2	110mm Brick	0.14	
3	*25mm Reflective Insulation Board	1.10	
4	Unventilated Reflective Airspace	0.61	
5	110m Brick	0.14	
6	Indoor Air Film (still air)	0.12	
Wall Construction Total		2.14	
Minimum Total R-Value required		1.40	

\*Possible Insulation : K8 Kingspan Cavity Insulation Board or approved equivalent.

Internal Wall –Plasterboard (Internal Wall to Unconditioned Space)			
Layer	Layer Description	R Value	
1	Indoor Air Film (still air)	0.12	
2	13mm Plasterboard	0.08	
3	*25mm Reflective Insulation Board	1.10	
4	Unventilated Reflective Airspace	0.61	
5	13mm Plasterboard	0.08	
6	Indoor Air Film (still air)	0.12	
Wall Construction Total		2.11	
Minimum Total R-Value required		1.40	

\*Possible Insulation : K8 Kingspan Cavity Insulation Board or approved equivalent

#### J4D7 FLOORS

- 1) A floor must achieve a Total R-Value 2.0.
- 2) For the purposes of (1), a slab-on-ground that does not have an in-slab heating or cooling system is considered to achieve a total R-value of R2.0.
- 3) Not applicable
- 4) Not applicable



#### PART J5 – BUILDING SEALING

#### J5D2 APPLICATION OF PART

If the air conditioning or ventilation system provides sufficient outside air to pressurize the space and prevent infiltration, then **Part J5 is not applicable.** 

By not applying Part J3 outside air infiltration will occur whenever the ventilation systems are not operating and will put additional load on the air conditioning systems during start up. It is our recommendation to apply the deemed to satisfy provisions of Part J5 to satisfy the intent of Section J.

The deemed to satisfy provisions of Part J5 Building Sealing apply to building elements forming the envelope of the building. The envelope of the building is the fabric and elements that separate the conditioned spaces to the exterior of the building. See Figure 1 for building envelope details.

#### J5D3 CHIMNEYS AND FLUES

Not applicable

#### J5D4 ROOF LIGHTS

Not applicable

#### J5D5 WINDOWS AND DOORS

- 1) A door, openable window or the list must be sealed when forming part of the envelope.
- 2) The requirements of (1) do not apply to a window complying with AS 2047, a fire door or smoke door, or a roller shutter, roller shutter grille or other security door or device installed only for out-of-hours security.
- 3) A seal to restrict air filtration for the bottom edge of door, must be a draft protection device and 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) Any 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 50m<sup>2</sup>; or
  - b) where a café, restaurant, open front shop or the like has
    - i. a 3m deep unconditioned 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.

#### **J5D6 EXHAUST FANS**

All exhaust fans must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space or a habitable room.

#### 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 minimize air leakage in accordance with (2) when forming part of the envelope.



- 2) Construction required by (1) must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions or sealed at junctions and penetrations with close fitting architrave, skirting, or cornice or expanding form, rubber compressible strip, caulking or the like.
- 3) The requirements of (1) do not apply to openings, grilles and the like required for smoke hazard management.

#### J5D8 EVAPORATIVE COOLERS

Not applicable

#### PART J6 – AIR CONDITIONING AND VENTILATION SYSTEMS

The air conditioning and ventilation systems' compliance with this part shall be demonstrated by a design statement from the mechanical services consultant.

#### PART J7 – ARTIFICIAL LIGHTING AND POWER

The lighting and power systems' compliance with this part shall be demonstrated by a design statement from the electrical services consultant.

#### PART J8 – HEATED WATER SUPPLY AND SWIMMING POOL AND SPA POOL PLANT

The heated water supply compliance with this part shall be demonstrated by a design statement from the hydraulic services consultant.

#### PART J9 – FACILITIES FOR ENERGY MONITORING

#### J9D2 APPLICATION OF PART

The deemed to satisfy provisions of Part J9 Facilities for Energy Monitoring apply to this building.

#### J9D3 FACILITIES FOR MONITORING ENERGY

Not applicable

#### J9D4 FACILITIES FOR ELECTRIC VEHICLE CHARGING EQUIPMENT

The facilities for electric vehicle charging equipment compliance with this part shall be demonstrated by a design statement from the electrical services consultant.

#### J9D5 FACILITIES FOR SOLAR PHOTOVOLTAIC AND BATTERY SYSTEMS

The facilities for solar photovoltaic and battery systems compliance with this part shall be demonstrated by a design statement from the electrical services consultant.



#### CONCLUSION

This report demonstrates an assessment based on the Section J Deemed-to-Satisfy (DTS) method to specify the building fabrics requirements for all the new building works of 119 Goldsmith Street, Goulburn. By incorporating the recommendations of this report, the proposed alterations & additions can achieve compliance with the NCC BCA 2022 Volume 1 Section J.



## **APPENDIX A – DTS FAÇADE CALCULATOR**





# **APPENDIX B – BUILDING INSULATION MARK-UP**



