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Proposed Retail Tenancies

22-26 Albert Street Freshwater

NCC 2015 Section J - Energy Efficiency

Deemed-to-Satisfy Method

Report Number 610.11608-R1

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FW Projects Pty Ltd
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Executive Summary

SLR Consulting Pty Ltd (SLR) has been commissioned by FW Projects Pty Ltd to assess the proposed retail tenancies at 22-26 Albert Street, Freshwater for compliance with the National Construction Code (NCC) 2015 provision for Energy Efficiency under Section J. The objective of NCC Section J is to reduce greenhouse gas emissions by efficiently using energy in buildings.

It is proposed to construct:

- 2 basement carpark levels;
- Ground floor with 3 retails tenancies, loading dock, garbage room; and
- Level 1 and 2 with 24 residential apartments;

This report will provide advice about each subsection and identify how compliance with the NCC Section J can be achieved for these new requirements in regards to the proposed retail tenancies. It shall remain the responsibility of the building designers to ensure that the installation meets the requirements of this report, and in turn the NCC.

SLR recommends the following to comply with NCC 2015 Section J:

- R3.2 ceiling insulation blanket to the exposed ceiling below L1 terraces;
- R2.5 and R2.0 bulk insulation to the AFS 150 external walls as per **Figure 4**;
- R1.5 bulk insulation to the internal walls separating the retail spaces and the unconditioned spaces (refer to **Figure 4**);
- R1.75 underslab insulation to the concrete retail floor above basement carpark;
- Single clear glazing to the majority of the retail tenancies with modification for LowE clear glazing to one of the glazed panels in Retail 1 as per **Figure 5**.

Requirements for building sealing, air-conditioning, artificial lighting, hot water supply and access for maintenance are found in the body of this report.

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1 INTRODUCTION

SLR Consulting Pty Ltd (SLR) has been commissioned by FW Projects Pty Ltd to assess the proposed retail tenancies at 22-26 Albert Street, Freshwater for compliance with the National Construction Code (NCC) 2015 provision for Energy Efficiency under Section J. The objective of NCC Section J is to reduce greenhouse gas emissions by efficiently using energy in buildings.

It is proposed to build a 3-storey mixed-use development at 22-26 Albert Street, Freshwater with 2 basement carpark levels. The proposed development site is bounded by Albert Street to the southeast and surrounded by low-rise premised. The development site location is shown in **Figure 1**.

Figure 1 Aerial View of Site Location

1.1 Proposed Development Description

It is proposed to construct:

- 2 basement carpark levels;
- Ground floor with 3 retails tenancies, loading dock, garbage room; and
- Level 1 and 2 with 24 residential apartments;

2 NATIONAL CONSTRUCTION CODE ENERGY EFFICIENCY REQUIREMENTS

Since the 2006 release of the Building Code of Australia (BCA), it is a mandatory requirement for all BCA class buildings except Class 4 and Class 10 buildings to achieve efficient use of energy. In the 2015 release of the National Construction Code (NCC) it is also a mandatory requirement for NCC class 2 to 9 buildings to achieve efficient use of energy.

This requirement has been defined in Volume 1 of the 2015 NCC under Section J and is titled *Energy Efficiency*. There are seven (7) Deemed-to-Satisfy subsections, J1 to J8 (J4 has been removed), that focus on separate aspects of energy efficiency.

- J1 - Building Fabric.
- J2 - External Glazing.
- J3 - Building Sealing.
- J5 - Air Conditioning and Ventilation Systems.
- J6 - Artificial Lighting and Power.
- J7 - Hot Water Supply.
- J8 - Access for Maintenance.

This report will provide advice about each subsection and identify how compliance with the NCC can be achieved for these new requirements in regards to the proposed addition.

It shall remain the responsibility of the building designers to ensure that the installation meets the requirements of this report, and in turn the NCC.

2.1 Defining the Building Class

This assessment covers the commercial retails areas of the site. The classification for the building is therefore:

- Retail – Class 6
- Carpark – Class 7a

2.2 Defining the Energy Efficiency Requirements

The objective of Section J from Volume 1 of the NCC defines this section as being applicable to Class 2 to 9 buildings. In this instance, there are requirements for compliance with NCC Section J.

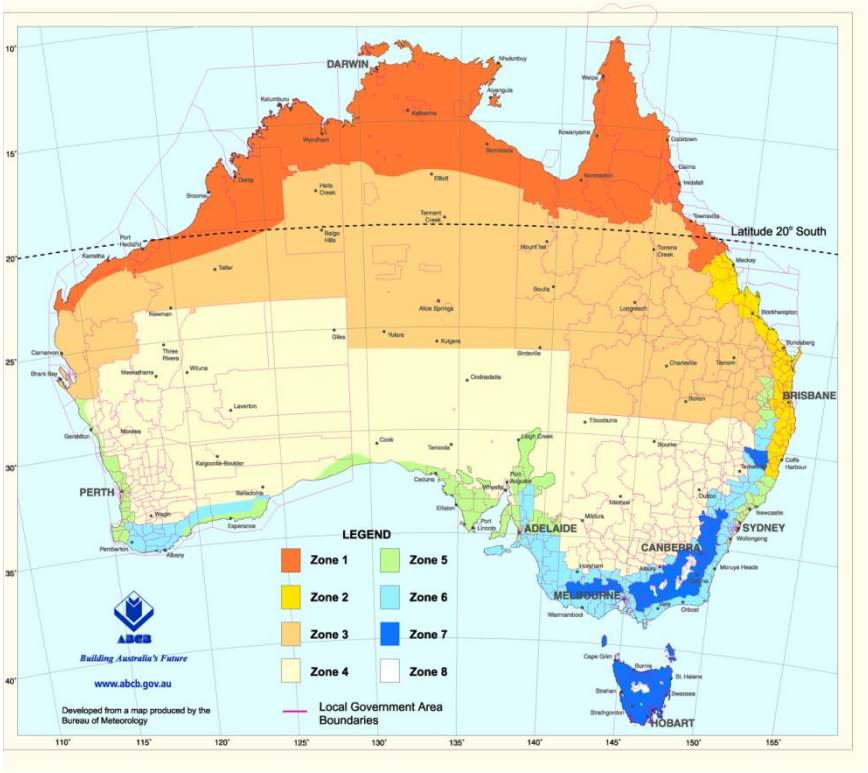
This report will include the requirements for the retail floor only for compliance with the 2015 NCC Section J via the deemed-to-satisfy method.

2.3 Defining the NCC Climate Zone

As the proposed development is in Freshwater NSW, parts of the NCC requirements will be based on these climate characteristics (shown in **Figure 2**). The proposed development site is in **Climate Zone 5**.

This climate zone is used by the NCC to define certain climate characteristics and determine if certain actions are required for these climate conditions to obtain compliance.

Figure 2 Building Code of Australia Climate Zone Map



3 PART J1 - BUILDING FABRIC

Part J1 of the 2015 NCC contains the requirements of the Deemed-to-Satisfy compliance of the building fabric. The purpose of this subsection is to ensure that the building fabric will provide sufficient thermal insulation to minimise heating and cooling loads placed on the building and the commensurate energy consumption HVAC systems servicing internal building spaces.

3.1 J1.1 - Application

As stated by the 2015 NCC, Part J1 applies to building elements forming the envelope a Class 2 to 9 building that are conditioned or likely to be conditioned. Part J1 therefore applies to the proposed retail only.

3.2 J1.2 - General Thermal Construction

Where thermal insulation is installed in exterior envelope walls or roof of the proposed development, the 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 that inherently contribute to the thermal barrier; and
- does not affect the safe or effective operation of a *service* or fitting.

Where reflective insulation is installed in exterior envelope walls or roof of the proposed development, it must be installed with:

- the necessary airspace to achieve the *required R-Value* between a reflective side of the *reflective insulation* and a building lining or cladding; and

- the *reflective insulation* closely fitted against any penetration, door or *window* opening; and
- the *reflective insulation* adequately supported by framing members; and
- each adjoining sheet of roll membrane being:
  - overlapped not less than 50 mm; or
  - taped together.

Where bulk insulation is installed in exterior envelope walls or roof of the proposed development, it must be installed so that:

- it maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and
- in ceilings where there is no bulk insulation or *reflective insulation* in the wall, it overlaps the wall member by not less than 50 mm.
- Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification J1.2

3.3 Roof and Ceiling Construction

A roof or ceiling that is part of the *envelope*, other than of a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, must achieve the *Total R-Value* specified in Table J1.3a of the 2015 NCC for the direction of heat flow.

This requires the roof and the exposed ceiling of the ground floor retail of the development located in climate zone 5 to:

- Achieve a minimum *Total R-Value* of 3.7.

The roof/ceiling system for the exposed roof/ceiling of the commercial floor is:

- 200 mm concrete slab, 300mm ceiling space and plasterboard ceiling

Table 1 Roof R-value

Proposed Roofing System	R-Value	R-Value Requirement	Compliance	Additional R-Value Required	Recommendations
Concrete slab	0.53	3.7	No	3.17	SLR recommends an insulation blanket of R3.2 attached to a plasterboard ceiling

SLR recommends an insulation blanket of R3.2 attached to the retail plasterboard ceiling below the exposed terraces of Level 1 (area shown in pink in **Figure 3**)

Figure 3 Areas where ceiling insulation is required

LEGEND

	R3.2 ceiling insulation required to ground floor retail ceiling

3.4 J1.4 – Roof Lights

Due to the absence of roof lights, there are no requirements to be met on this part.

3.5 J1.5 – Walls

Table J1.5b of Part J1.5 of the 2015 NCC requires each part of an external wall of the conditioned spaces located in climate zone 5 to:

- Achieve a minimum *Total R-Value* of 2.3 for the south facing facades.
- Achieve a minimum *Total R-Value* of 2.8 for all other facades.

The external wall systems proposed Class 6 spaces are:

- AFS 150 wall

Table 2 External Wall R-value

Proposed Wall System	R-Value	R-Value Requirement	Compliance	Additional R-Value Required	Recommendations
AFS 150 wall	0.30	2.8	No	2.5	SLR recommends installing R2.5 bulk insulation into the wall system
AFS 150 wall – south wall	0.3	2.3	No	2.0	SLR recommends installing R2.0bulk insulation into the wall system

The **internal walls** separating the air-conditioned commercial spaces and the non-conditioned spaces are required to achieve R1.8 as per Table J1.5b.

The proposed internal walls between the loading dock/ fire stairs and the commercial spaces are AFS 150 with R-value of 0.30. SLR recommends adding bulk insulation of R1.5 to the internal walls to comply with J1.5.

Figure 4 Wall Insulation Requirements

3.6 J1.6 Floors

Section J1.6 of 2015 NCC states the minimum total R-value of the floors depending on the configuration.

The ground floor retail tenancies are located above the basement carpark and as per Table J1.6 of the NCC, the suspended floor is required to achieve a total R-value of R2.0.

Table 3 Floor R-value

Proposed Floor System	R-Value	R-Value Requirement	Compliance	Additional R-Value Required	Recommendations
200 Concrete slab	0.29	2.0	No	1.71	SLR recommends installing underslab insulation of R1.75 to the ground floor over carpark

4 PART J2 – EXTERNAL GLAZING

Part J2 of the 2015 NCC contains the requirements of the Deemed-to-Satisfy compliance of external glazing. The purpose of this subsection is to ensure that building glazing will provide sufficient thermal insulation, and be appropriately shaded, to minimize heating and cooling loads placed on the building and the commensurate energy consumption of HVAC systems servicing internal building spaces.

4.1 J2.1 - Application

As stated by the 2015 NCC, Part J2 applies to Class 6 buildings that have conditioned spaces. Part J2 therefore applies to the retail tenancies.

4.2 J2.4 - Glazing

The NCC 2015 provides one method for determining glazing compliance that will be used in this case.

The aggregated air-conditioning energy factor resulting from the thermal load through the glazing of each orientation of each storey of a building must not exceed the allowance obtained by multiplying the facade area for each orientation, by the energy index for the climate zone of the development.

Due to the proposed Class 6 retail being located in climate zone 5 the Energy Index options will be A - 0.257 and B – 0.236 for the retail spaces.

The aggregated air-conditioning energy factor resulting from the thermal load through the glazing of each orientation of each storey of a building is the sum of the air-conditioning energy factors resulting from the thermal loads through each glazing element calculated in accordance with the following formula:

$A_1[SHGC_1(C_A x S_{H1}+C_B x S_{C1})+C_C x U_1)$

Where:

A_1 = the area of the glazing element 1; and

$C_{A,B\ \&\ C}$ = the energy constants A, B and C for the specific orientation from Table J2.4b; and

$SHGC_1$ = the SHGC of the transparent and translucent element of glazing element 1; and

S_{H1} & S_{C1} = the heating shading multiplier and cooling shading multiplier of glazing element 1; and

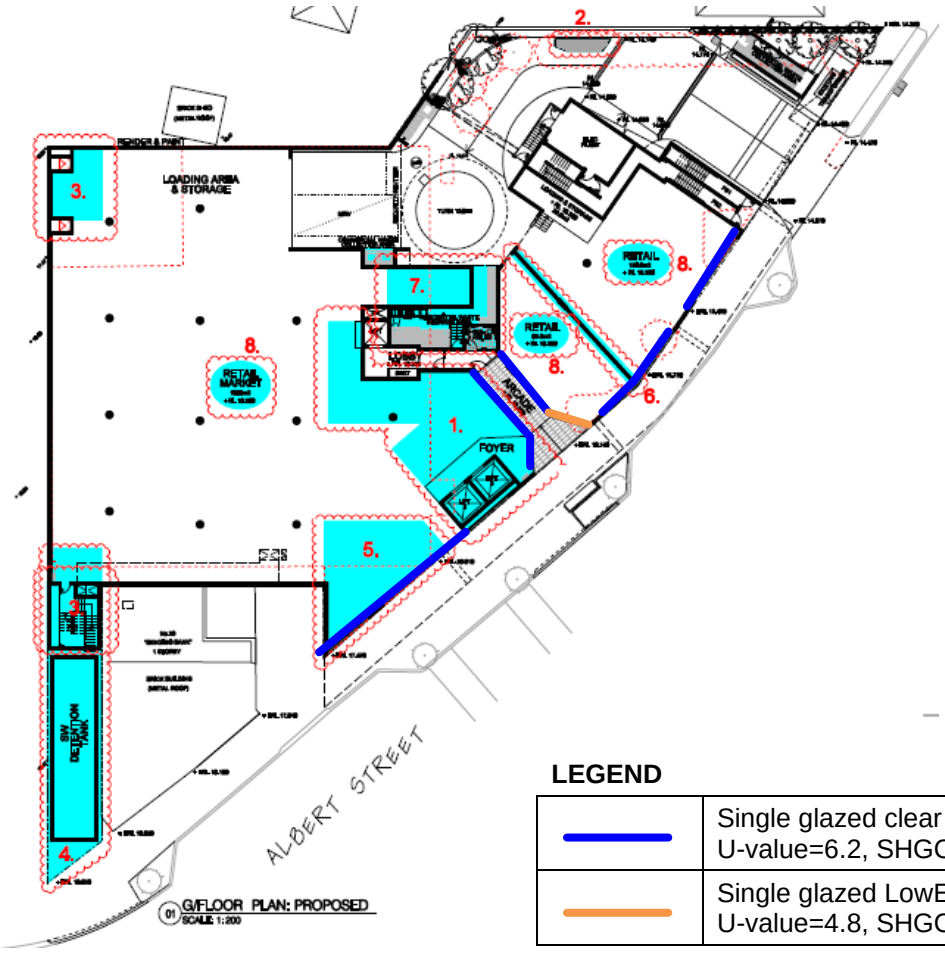
U_1 = the Total U-Value of glazing element 1.

To achieve NCC Section J2 compliance, the glazing of the additional commercial spaces is to be as recommended in **Table 4**.

Table 4 Recommended Glazing Options for Additional Commercial Spaces

Space	Orientation	Glazing System U-value (<=)	Glazing System SHGC (±10%)	Glazing Option
Retail Market	All	6.2	0.70	Single glazed clear
Retail 1	SW and SE	6.2	0.70	Single glazed clear
	South	4.8	0.67	Single LowE clear
Retail 2	All	6.2	0.70	Single glazed clear

Figure 5 Glazing Requirement Markup



LEGEND

	Single glazed clear U-value=6.2, SHGC=0.70
	Single glazed LowE clear U-value=4.8, SHGC=0.67

5 PART J3 - BUILDING SEALING

Part J3 of the 2015 NCC contains the requirements of the Deemed-to-Satisfy compliance for building sealing. The purpose of this subsection is to ensure that additional heating and cooling loads will not be introduced through building leakage.

5.1 J3.1 - Application

As stated by the 2015 NCC, Part J3 applies to Class 6 tenancies with conditioned space.

5.2 J3.2 - Chimneys and Flues

Due to the absence of chimneys and flues within this development, there are no requirements to be met on this part.

5.3 J3.3 - Roof Lights

Due to the absence of roof lights, there are no requirements to be met on this part.

5.4 J3.4 - External Windows and Doors

Part J3.4 of the 2015 NCC requires that a seal to restrict air infiltration must be fitted to each edge of an external door, operable external window or the like when serving the envelope of a conditioned space. This requirement does not apply to –

- a window complying with AS 2047; or
- a fire door or smoke door; or
- a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.

A seal for the bottom edge of an external swing door must be a draft protection device and for other edges of an external door, openable window or other such openings, may be a foam or rubber compressible strip, fibrous seal or the like.

An entrance the retail space, if leading to a conditioned space must have an airlock, self-closing door, revolving door or the like, other than where a café, open front shop or the like has:

- a 3m deep un-conditioned zone between the main entrance, including an open front and the conditioned space; and
- all other entrances to the café, open front shop or the like, self-closing doors.

5.5 J3.5 – Exhaust Fans

Compliance with J3.5 is not required for non-habitable room

5.6 J3.6 - Construction of Roofs, Walls and Floors

Ceilings, roofs, walls, floors and any opening including all *window* frame and door frame must be constructed to minimise air leakage when forming part of the envelope or the external fabric of a habitable room or a public area.

The construction required must be:

- Enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or
- Sealed by caulking, skirting, architraves, cornices or the like.

5.7 J3.7 - Evaporative coolers

Due to the absence of evaporative coolers within this development, there are no requirements to be met on this part.

6 PART J5 - AIR CONDITIONING AND VENTILATIONS SYSTEMS

Part J5 of the 2015 NCC contains the requirements of the Deemed-to-Satisfy compliance of a building's air conditioning and ventilation systems. The purpose of this subsection is to ensure that conditioned air (when required) is generated, controlled and supplied to the building in an energy efficient manner. This subsection also ensures that ventilation and exhaust systems are efficient, while also keeping the wasted conditioned air to a minimum.

The mechanical services engineer should ensure that the proposed air-conditioning systems for the commercial spaces comply with the following sections.

6.1 J5.2 - Air-Conditioning and Ventilation Systems

6.1.1 Air Conditioning Unit or Ventilation System

The air-conditioning unit or system serving the conditioned spaces is to comply with the following performance requirements.

An air-conditioning unit or system must:

- Be capable of -
  - being inactivated when the building served is not occupied; and
  - Closing the dampers when the air-conditioning unit or system is inactivated (only where the a/c unit or system has motorized outside air and return dampers).
- Have any supply and return ductwork sealed and insulated in accordance with **Specification J5.2;**
- Be designed so that the total fan power of the air-conditioning supply air and return air fans in the building, divided by the floor area served by those fans is, in accordance with **Table 5** except for the following need not comply with this requirement:
  - The power for an energy reclaiming system that preconditions outdoor air.
  - The power for process related components such as high efficiency particulate air filters.
  - Fans in unducted air-conditioning units with a supply air of less than 1000 L/s.

Table 5 Copy of Table J5.2 - Maximum Fan Power

Air-conditioning sensible heat load (W/m² of the floor area of the conditioned space)	Maximum Fan Power (W/m² of the floor area of the conditioned area	
	For an air-conditioning system serving not more than 500 m²	For an air-conditioning system serving more than 500 m²
Up to 100	5.3	8.3
101 to 150	9.5	13.5
151 to 200	13.7	18.3
201 to 300	22.2	28.0
301 to 400	30.7	37.0

For more than 400 W/m² internal load:-

a. in a building of not more than 500 m² floor area, use 0.09W of fan power for each watt of internal load; and
b. in a building of more than 500 m² floor area, use 0.12W of fan power for each watt of internal load.

6.1.2 Mechanical Ventilation System

This subsection of J5.2 applies all components of the proposed development as all spaces are to be mechanically ventilated. The mechanical ventilation systems are to comply with the following performance requirements.

A mechanical ventilation system must:

- Be capable of being deactivated when the building or part of the building served by that system is not occupied; and
- When serving a conditioned space-
  - Not provide mechanical ventilation in excess of the minimum quantity required by part F4 of the NCC for a mechanical ventilation system, where relevant, by more than 20% other than where there is-
    - Additional unconditioned outside air supplied to provide free cooling or to balance process exhaust as from a health-care building or laboratory; or
    - additional exhaust ventilation needed to balance the required mechanical ventilation; or
    - an energy reclaiming system that preconditions outsider air.
  - Where the number of square metres per person is 1 or less as specified in NCC section D1.13 and the air flow rate is more than 1000 L/s, have-
    - An energy reclaiming system that preconditions outsider air; or
    - The ability to automatically modulate the mechanical ventilation required by Part F4 in proportion to the number of occupants; and
- When the mechanical ventilation is provided by means other than an air-conditioning system and the air flow rate is more than 1000 L/s-
  - Have a fan power to air flow rate ration of 0.65 W/ (L/s) without filters or 0.98 W/ (L/s) with filters for a general mechanical ventilation system.

6.2 J5.3 - Time Switch

Part J5.3 applies to the proposed development where applicable. Power supply must be controlled by a time switch for:

- air-conditioning system of more than 10 kW_r; or
- ventilation system with an air flow rate of more than 1000 L/s; or
- heating system of more than 10 $kW_{heating}$.

The requirements for time switch do not apply to a building where air-conditioning or ventilation is needed 24hour occupancy such as manufacturing process or emergency services.

The time switch must be capable of –

- Switching on and off electric power to systems –
  - at variable pre-programmed times and on variable pre-programmed days.

- limiting the period the system is switched on to 2 hours beyond the time for when the building is occupied.

- Being overridden by a manual switch for a period of up to 2 hours, after which the time switch must resume control.

6.3 J5.4 - Heating and Cooling System

Systems that provide heating or cooling for air-conditioning systems must:

- Have any piping, vessels, heat exchangers or tanks containing heated or chilled fluid, other than hose with insulation levels covered by Minimum Energy Performance Standards (MEPS), insulated in accordance with **NCC Specification J5.4**.
- Where water is circulated by pumping at greater than 2 L/s -
  - Be designed so that the total of the pump power to the pump is in accordance with **Table 6**; and

Table 6 Copy of Table J5.4a - Maximum Pump Power

Cooling or heating load (W/m² of the floor area of the conditioned space)	Maximum pump power(W/m² of the floor area of the conditioned space)		
	Chilled water	Condenser water	Heating water
Up to 100	1.3	0.9	1.0
101 to 150	1.9	1.2	1.3
151 to 200	2.2	2.2	1.7
201 to 300	4.3	3.0	2.5
301 to 400	5.0	3.6	3.5
More than 400	5.6	5.6	3.6

  - Have the pump capable of varying its speed in response to varying load when it is rated at more than 3 kW of pump power, except where the pump is needed to run at full speed for safe or efficient operation; and.
- If the system contains more than one water heater used for heating the building, chiller or coil, it must be capable of stopping the flow of water to those not operating.

B. A heater -

- For heating a space via water, such as a boiler in an air-conditioning system must achieve a thermal efficiency complying with **Table 7** when tested In accordance with BS 7190. and use reticulated gas where it is available at the allotment boundary; and

Table 7 Minimum Thermal Efficiency of a Water Heater

Fuel Type	Rated Capacity ($kW_{heating}$)	Minimum Gross Thermal Efficiency (%)
Gas	Not More than 750	80
	More than 750	83
Oil	All capacities	80

- For heating a space other than via water, must be:
  - A solar heater; or
  - A gas heater; or

- An oil heater if reticulated gas is not available at the allotment boundary; or
- A heat pump heater; or
- A solid fuel burning heater; or
- A heater using reclaimed heat from another process such as reject heat from refrigerant plant; or
- A combination of a. and f.; and

C. Packaged air-conditioning equipment with a capacity of not less than 65 kWr, including a split unit and a heat pump, must have an energy efficiency ratio complying with **Table 8** when tested in accordance with AS/NZS 3823.1.2 at test condition T1.

Table 8 Minimum Energy Efficiency Ratio for Packaged Air-Conditioning Equipment

Equipment	**Minimum Energy Efficiency Ratio ($W_r/W_{input\ power}$)**	
	65 kWr to 95 kWr Capacity	**More than 95 kWr Capacity**
Air-Conditioner -- Cooling	2.7	2.8
Heat Pump -- Cooling	2.6	2.7

D. A refrigerant chiller up to 350 kWr capacity must have an energy efficiency ratio complying with **Table 9** when determined in accordance with ARI 550/590.

Table 9 Minimum Energy Efficiency Ratio

Equipment	**Minimum energy efficiency ratio**	
	For full load operation	**For integrated part load**
Water cooled chiller	4.2	5.2
Air cooled or evaporatively cooled chiller	2.5	3.4

E. An air cooled condenser fan motor, other than part of package air-conditioning equipment or that is part of a Liquid Chilling Package, using vapour compression cycle, must not use more than 42 W of fan power for each kW of heat rejected from the refrigerant when determined in accordance with ARI 460.

F. The fan of a cooling tower must not use more than:

- If the propeller or axial fan, 310 W of motor shaft power for each L/s of cooling water circulated; and
- If a centrifugal fan, 590 W of motor shaft power for each L/s of cooling water circulated.

G. the fan of a closed circuit cooler that is part of an air-conditioning system must not use more than:

- if a propeller or axial fan, 500 W of fan power for each L/s of cooled fluid circulated; and
- if a centrifugal fan, 670 W of fan power for each L/s of cooled fluid circulated.

H. the fan of an evaporative condenser that is part of an air-conditioning system must not use more than:

- if a propeller or axial fan, 18 W of fan power for each kW of heat rejected; and
- if a centrifugal fan, 22 W of fan power for each kW of heat rejected.

I. The spray water pump of a closed circuit cooler or evaporative condenser that is part of an air-conditioning system must not use more than 150 W of pump power of each L/s of spray water circulated.

6.4 J5.5 - Miscellaneous Exhaust Systems

A miscellaneous exhaust system with an air flow rate of more than 1000 L/s, that is associated with equipment having a variable demand must:

- Have the means for the operator to reduce the energy used, such as by variable speed fan, and stop motor when the system is not needed.
- Be designed to minimize the exhausting of conditioned air.

Part J5.5 does not apply:

- Where additional exhaust ventilation is needed to balance the required outside air to ventilation; or
- Where air flow must be maintained for safe operation.

7 ARTIFICIAL LIGHTING AND POWER

Part J6 of the 2015 NCC contains the requirements of the Deemed-to-Satisfy compliance of a building's artificial lighting and power. The purpose of this subsection is to ensure that efficient lighting systems are installed to maintain required lighting levels while keeping energy consumption to a minimum. This subsection also ensures that effective lighting control is utilised to reduce wasted energy consumption.

Always use fluorescent and compact fluorescent light fittings instead of incandescent lamp fittings. Fluorescent-based lamps have a significant increase in energy efficiency, efficacy and lamp-hours (lamp life time). This makes meeting the NCC energy efficiency requirements easier to achieve as the same lamp output can be achieved and maintained at a reduce consumption in energy. Fluorescent lamps have a larger lamp-hour by approximately six (6) to twelve (12) times that of a standard incandescent lamp. This reduces the maintenance requirements for these light fittings as there will be a significant reduction in lamp changes.

The electrical engineer should ensure that the artificial lighting design complies with section J6

7.1 J6.2 - Artificial Lighting

There is a requirement for the artificial lighting; the aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of the space by the maximum illumination power density in **Table 10**.

Table 10 Maximum Illumination Power Density of Relevant Spaces from Table J 6.2a

Space	Maximum illumination power density (W/m²)
Entry lobby from outside the building	15
Retail space	22
Restaurant, café, bar and a space for the serving and consumption of food or drinks	18
Toilet, locker room, staff room, rest room and the like	6
Carpark	6
Corridors	8

For artificial lighting, the aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of each space by the maximum illumination power density in **Table 10**.

All of the above interior artificial lighting requirements do not apply to artificial lighting used for the following applicable reasons:

- Emergency lighting in accordance with Part E4 from the 2015 NCC.
- Signage and display lighting within cabinets and display cases.
- A heater where the heater also emits light.
- Lighting of performances such as theatrical or sporting.

7.2 J6.3 - Interior Artificial Lighting and Power Control

- Artificial lighting of a room or space must be individually operated by switch or other control device.
- A light switch must:
  - be located in a visible position in the room or space being switched, or in an adjacent room or space from where the lighting being switched is visible.
  - not operate lighting for an area of more than 250 m²

These lighting and power control requirements do not apply to Emergency Lighting in accordance with Part E4, NCC Volume One or where artificial lighting is needed for 24-hour occupancy.

7.3 J6.4 - Interior Decorative and Display Lighting

Any interior/ lighting for display or decorative purposes, such as the illumination of foyer murals, must be separately controlled from other artificial lighting.

Each group of decorative/display lighting must be controlled by a manual light switch. Also window display lighting must be controlled separately from other display lighting.

7.4 J6.5 - Artificial Lighting around the Building

Artificial lighting around the perimeter of a building must be controlled either by a daylight sensor or a time switch. When the total perimeter lighting load exceeds 100 W, the perimeter artificial lighting must have an average light source efficacy of not less than 60 Lumens/W or be controlled by a motion sensor.

A daylight sensor and dynamic lighting control device needs to abide by the specification set out in the 2015 NCC. The specified requirements of the daylight and dynamic lighting control device are as follows: -

- Be capable of having the switching level set point adjusted between 50 and 1000 Lux
- Have a delay of more than 2 minutes or differential of more than 50 Lux
- 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:
- Continuously down to a power consumption that is less than 50% of full power; or
- In no less than 4 steps down to a power consumption that is less than 50% of full power
- Have a manual override switch that enables the lighting in an area to be turned off but is not able to switch the lights on permanently or bypass the lighting controls.

7.5 J6.6 - Boiling Water and Chilled Water Storage Units

Power supply to a boiling water or chilled water storage unit must be controlled by a time switch.

8 PART J7 - HEATED WATER SUPPLY AND SWIMMING POOL AND SPA POOL PLANT

Part J7 of the 2015 NCC contains the requirements of the Deemed-to-Satisfy compliance of a building's hot water supply system. The purpose of this subsection is to ensure that efficient hot water units and systems are installed.

8.1 J7.2 - Heated water supply

The heated water 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.

8.2 J7.3 - Swimming pool heating and pumping

Due to the absence of a swimming pool, there are no requirements to be met on this part.

8.3 J7.4 – Spa pool heating and pumping

Due to the absence of a spa pool, there are no requirements to be met on this part.

9 PART J8 - ACCESS FOR MAINTENANCE

Part J8 of the 2015 NCC contains the requirements of the Deemed-to-Satisfy compliance of a building's access to services for maintenance. The purpose of this subsection is to ensure that access can be gained to all services that will require regular maintenance. Maintenance to these services will ensure that reduction in efficiency over time is kept to a minimum.

9.1 J8.1 - Application

As stated by the 2015 NCC, Part J8 does apply to the Class 6 and 7a spaces within the development.

9.2 J8.2 - Access for maintenance

Access must be provided to all plant, equipment and components that require maintenance in accordance with the NCC Part I2.

In NSW, access for maintenance must be provided to:

a. Adjustable or motorised shading devices; and
b. Time switches and motion detectors; and
c. Room temperature thermostats; and
d. plant thermostats such as on boilers or refrigeration units; and
e. motorised air dampers and control valves; and
f. reflectors, lenses and diffusers of light fittings; and
g. heat transfer equipment. And

h. plant that receives a concession under JV3(b) for the use of energy obtained from an on-site renewable energy source.

9.3 J8.3 – Facilities for energy monitoring

A sole-occupancy unit with a floor area of more than 500 m² must have the facility to record the consumption of gas and electricity

J2 – Glazing Calculator

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: 610.11608 22-26 Albert St - Retail Market
Application: shop display
Climate zone: 5
Storey: ground

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		26.4m²	11.7m²	84.2m²					
Option B									n/a
Glazing area (A)		*21.3m²*	*9.92m²*	*38m²*					

Number of rows preferred in table below: 10 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device	Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	glazing	SE		3.20	11.89		6.5	0.75	3.300	3.200	1.03	0.00	0.55	0.46	38.03	100% of 74%
2	East glazing to arcade	E		3.20	3.10		6.5	0.70	7.000	3.700	1.89	0.50	0.09	0.34	9.92	100% of 99%
3	NE glazing to arcade	NE		3.20	6.67		6.5	0.75	6.000	3.700	1.62	0.50	0.18	0.30	21.34	100% of 85%
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5																
6																
7																
8																
9																
10																

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

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if inputs are valid

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: 610.11608 22-26 Albert St - Retail 1
Application: shop display
Climate zone: 5
Storey: ground

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A				19.8m²	11.8m²	26.3m²			
Option B									n/a
Glazing area (A)				*7.9m²*	*10.2m²*	*18.1m²*			

Number of rows preferred in table below: 10 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device	Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	SW glazing to arcade	SW		3.20	5.65		6.5	0.70	10.000	3.700	2.70	0.50	0.51	0.42	18.08	100% of 100%
2	South glazing to arcade	S		3.20	3.20		4.8	0.67	6.000	3.700	1.62	0.50	0.74	0.64	10.24	100% of 94%
3	SE glazing	SE		3.20	2.47		6.5	0.75	3.150	3.200	0.98	0.00	0.56	0.47	7.90	100% of 66%
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if inputs are valid

J2 – Glazing Calculator

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: 610.11608 22-26 Albert St - Retail 2

Application: shop display

Climate zone: 5

Storey: ground

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A				58.1m²					
Option B									n/a

Glazing area (A) 37.4m²

Number of rows preferred in table below: 10 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	South east glazing	SE		3.20	11.70		6.2	0.70	3.200	3.200	1.00	0.00	0.56	0.47	37.44	100% of 100%
2																
3																
4																
5																
6																
7																
8																
9																
10																

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if inputs are valid