Vipac Engineers and Scientists Limited
3 Sir Thomas Mitchell Road, Chester Hill, NSW 2162, Australia

t. +61 2 9422 4222 | **e.** sydney@vipac.com.au
w. www.vipac.com.au | A.B.N. 33 005 453 627 | A.C.N. 005 453 627

Tony Owen Architects

24 Coronation Road, Congarinni North NSW

NCC Section J Assessment Report

20E-20-0186-TRP-6824284-0

9 February 2021

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Prepared For:	**Prepared By:**
Tony Owen Architects Level 2 12 Queen Street Chippendale, New South Wales, 2008, Australia **Contact:** Raja Vignesh **Tel:** +61 9698 2900	Vipac Engineers and Scientists Limited 3 Sir Thomas Mitchell Road, Chester Hill, NSW 2162, Australia **Tel:** +61 2 9422 4222

Author:	B. Shojaei 9 February 2021	Senior ESD Engineer
Reviewer:	M. Tsinonis 9 February 2021	Office Administration
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Executive Summary

VIPAC has been engaged to review the proposed development at 24 Coronation Rd, Congarinni North NSW, against the Deemed-to-Satisfy requirements for the National Construction Code 2019 provisions for energy efficiency under Section J (NCC 2019 Amendment 1 Volume 1).

This report nominates relevant NCC Section J requirements or 'deemed to satisfy' compliance provisions and possible areas in which alternative performance-based design solutions can be adopted where compliance with the nominated prescriptive provisions may not be practically achievable.

Subject to satisfaction of the provisions outlined in this report, this development will comply with the requirements of Section J of NCC 2019 Amendment 1.

Based on our assessment, the 'deemed to satisfy' glazing and insulation performance requirements may be prohibitive and costly to achieve. It is therefore recommended to consider achieving the NCC glazing compliance requirements through the performance-based method of verification (i.e. JV3 method, modelling, alternative method of verification). Based on our review, the JV3 assessment is very likely to simplify achieving the glazing performance requirements for the development and improve glazing consistency.

Location – 24 Coronation Rd, Congarinni North NSW 2447

Table of Contents

1 NATIONAL CONSTRUCTION CODE (NCC) SECTION J

Section J of the NCC sets regulations for energy efficiencies for all types of buildings with respect to the building's construction, design and activity.

The objective of the NCC Section J is to reduce the greenhouse gas emissions. Section J requires that a building, including its services, must have features to the degree necessary that facilitate the efficient use of energy.

The NCC offers two compliance methods that differ in complexity and flexibility. The two compliance methods are:

- Deemed-to-Satisfy (DTS) Compliance
- JV3 – Verification using a referenced building

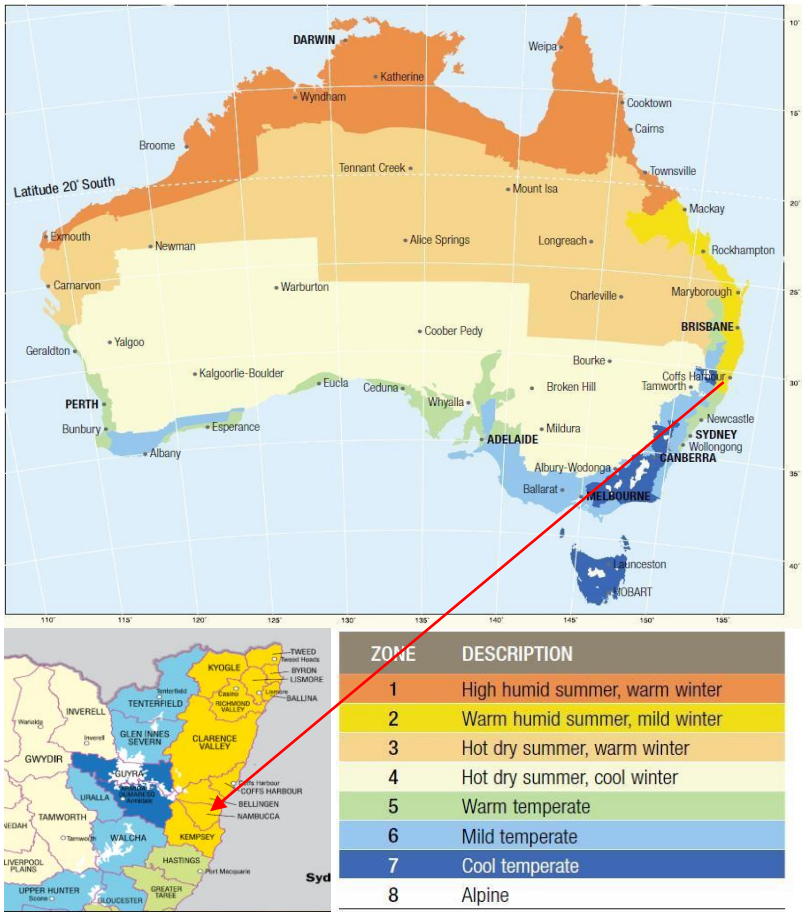
This report provides an assessment of building according to DTS provisions. The following works were carried out in order to assess DTS compliance:

- Determine the applicable NCC Section J requirement for the climate zone and building class
- Provide recommendations to achieve compliance with DTS provisions

1.1 NCC Climate Zone

The climate zone is defined by the NCC as 'an area for specific locations, having energy efficiency provisions based upon a range of similar climatic characteristics.

The development will be located at Congarinni North NSW which is within the NCC climate zone 2 (High humidity summer, warm winter).



ZONE	DESCRIPTION
1	High humid summer, warm winter
2	Warm humid summer, mild winter
3	Hot dry summer, warm winter
4	Hot dry summer, cool winter
5	Warm temperate
6	Mild temperate
7	Cool temperate
8	Alpine

1.2 Information used

The assessment is based on the following architectural drawings provided by Tony Owen Architects in October 2020.

DRAWING NO - DRAWING TITLE
A000 - Cover sheet
A001 - Location Plan
A002 - Site Photos
A003 - Survey Plan
A004 - SiteAnalyis - Macro
A005 - Constrain map (Aerial Map)
A006 - Constraint Map
A007 - SitePlan Coloured
A008 - SitePlan
A009 - Coloured MasterPlan
A010 - MasterPlan Coloured
A011 - MasterPlan
A012 - Design Principles - Road Hierarchy
A013 - Design Principles - Amenities Diagram
A014 - Design Principles - Pedestrian Diagram
A015 - Design Principles - Green Spaces
A016 - Site Sections

Aged Care Centre
scale 1:500@A3
A100 - Ground Floor Plan
A101 - First Floor Plan
A102 - Roof Plan
A103 - Sections
A104 - Elevations

Communal Facility
scale 1:500@A3
A200 - Ground Floor Plan
A201 - Roof Plan
A202 - Section
A203 - Elevation

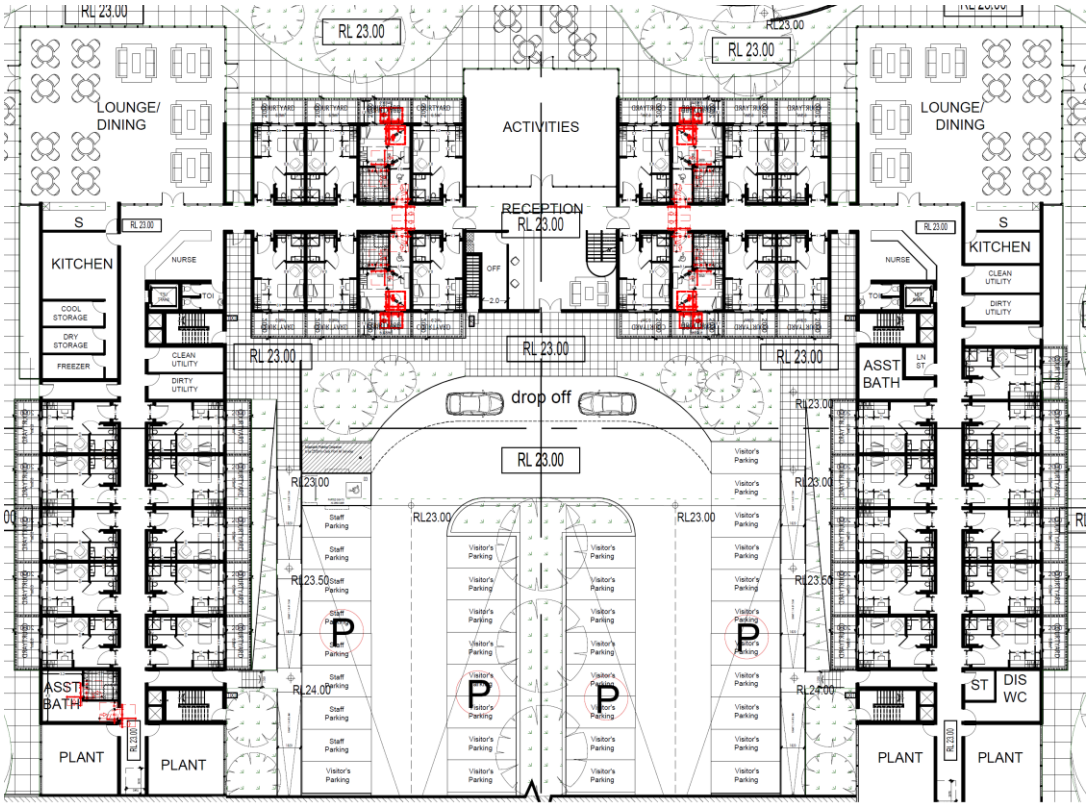
Typical Units
scale 1: 200@A3
A300 - 2 Bedroom type 1
A301 - 2 Bedroom type 2
A302 - 3 Bedroom
A303 - Kitome Plan (2 Bed - Type1)
A304 - Kitome Plan (2 Bed - Type2)
A305 - Kitome Plan (3 Bed)

Schedule of Areas
A400 - Schedule of Areas

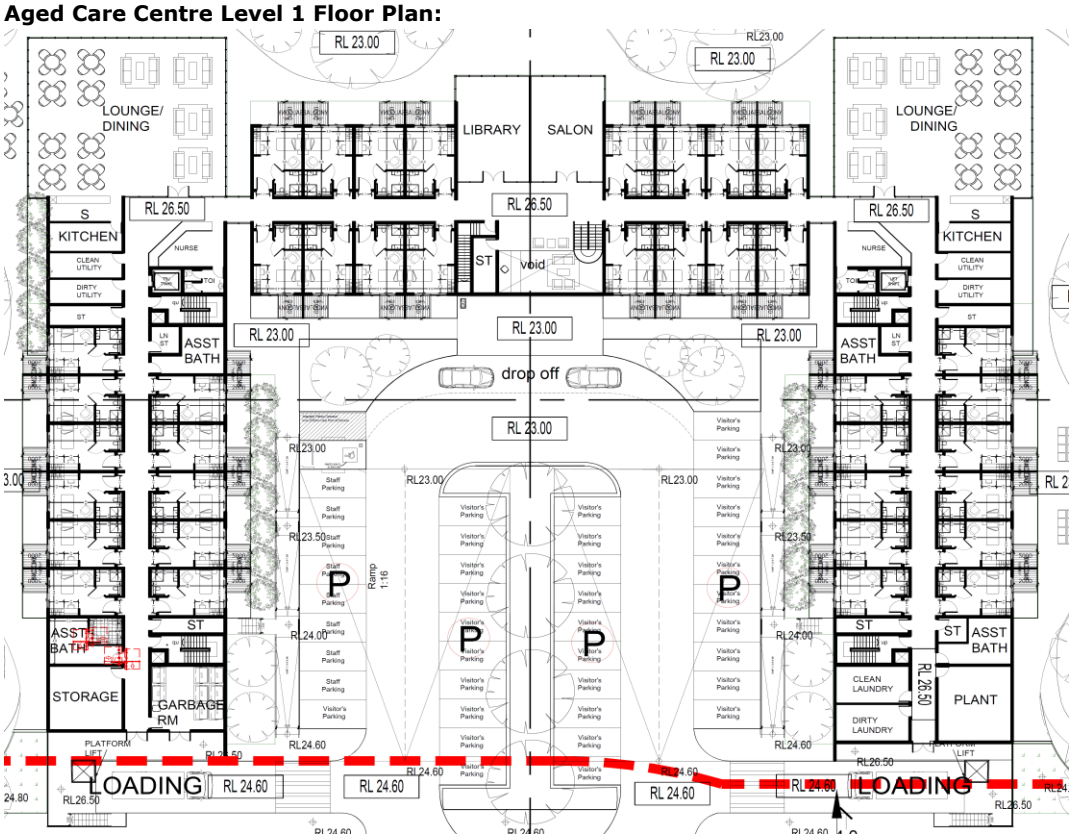
1.3 Architectural Drawings

Selected architectural drawings of the proposed development are provided below.

Aged Care Centre Ground Floor Plans:



Aged Care Centre Level 1 Floor Plan:



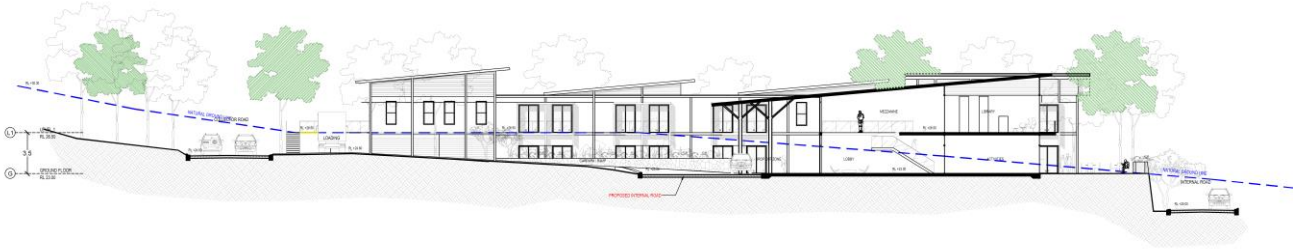
Aged Care Centre Elevations:

NORTH ELEVATION

EAST ELEVATION

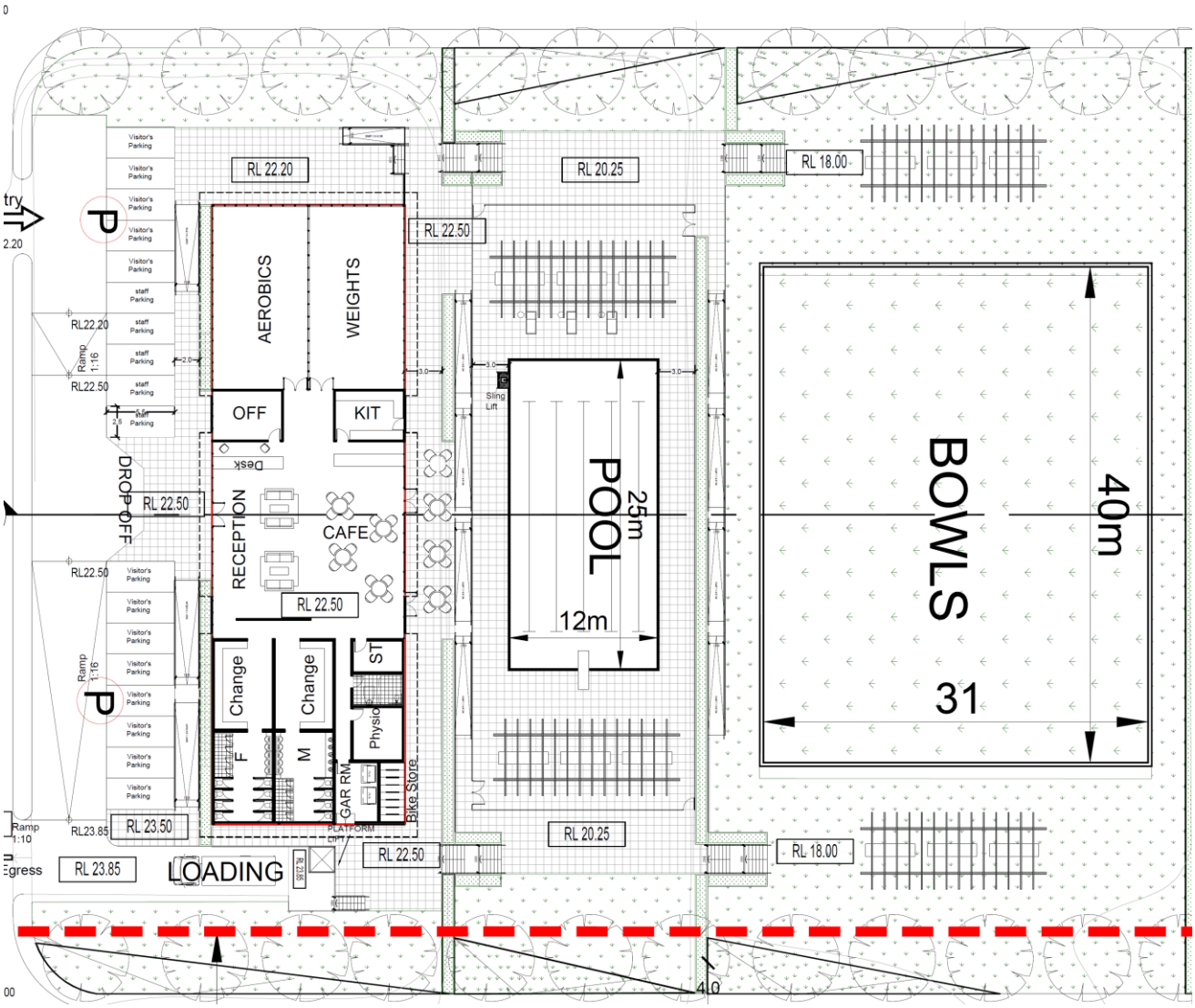
WEST ELEVATION

Aged Care Centre Section:

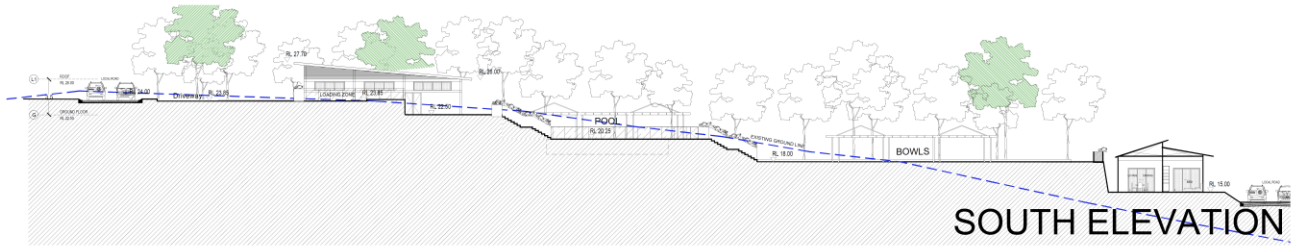


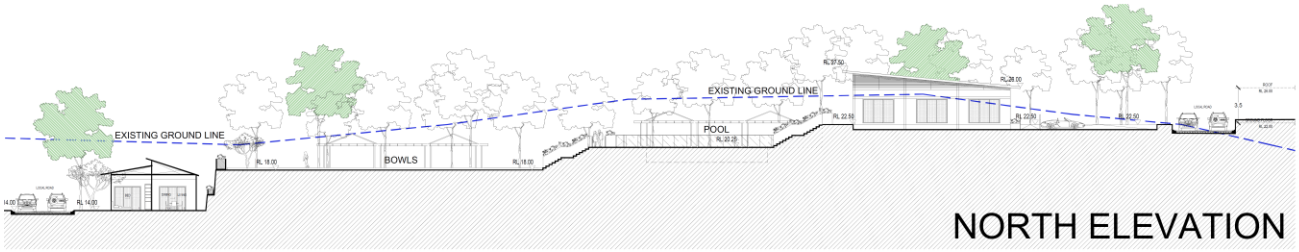
SECTION

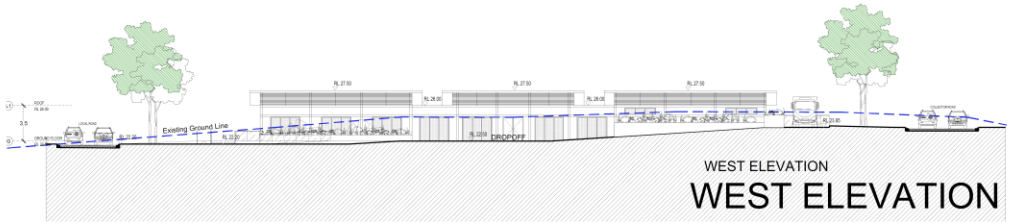
Sports Ground Floor Plan:

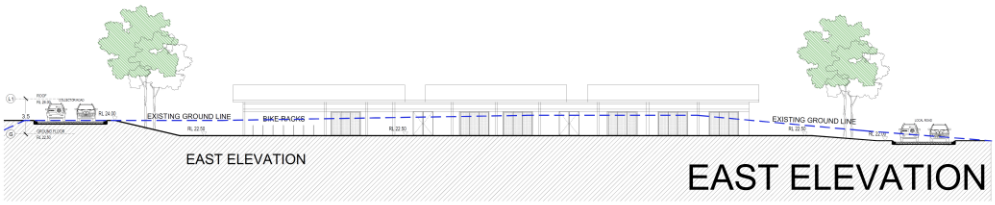


Sports Elevations:

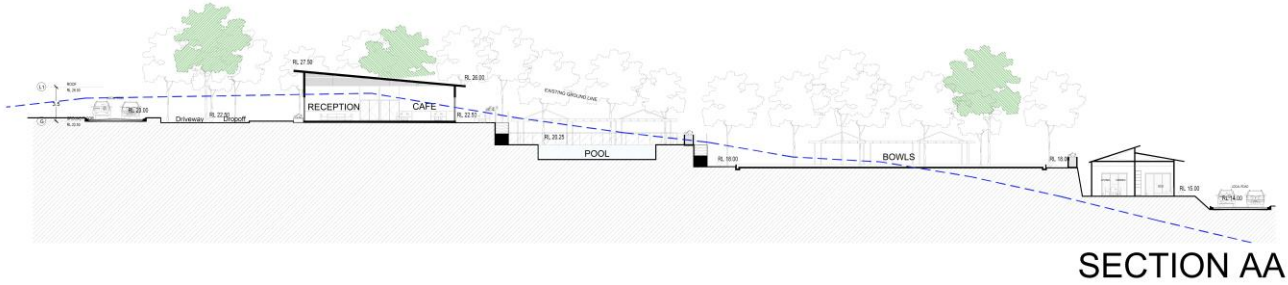








Sports Section:



2 DEEMED-TO-SATISFY PROVISIONS

NCC 2019 Amendment 1 requires that Class 2 to 9 buildings to achieve efficient use of energy. This requirement is defined in Volume 1 of the NCC 2019 Amendment 1 under Section J and is titled "Energy Efficiency". There are eight Deemed-to-Satisfy subsections, J1 to J8, which focus on separate aspects of energy efficiency. These are:

- Part J1 - Building Fabric relates to the building fabric and minimum thermal performance for constructions according to climate zone for roofs, ceilings, roof lights, walls, glazing and floors.
- Part J2 - Blank in NCC 2019 Amendment 1
- Part J3 - Building Sealing – Provisions to reduce the loss of conditioned air and restrict unwanted infiltration to a building.
- Part J4 – Blank in NCC 2019 Amendment 1
- Part J5 - Air-Conditioning and Ventilation Systems – Requirements to ensure these services are used and use energy in an efficient manner.
- Part J6 - Artificial Lighting and Power – Requirements for lighting and power to ensure energy is used efficiently within a building.
- Part J7 - Hot Water Supply – Restrictions for hot water supply design except for solar systems within climate zones 1, 2 and 3.
- Part J8 - Facilities for Energy Monitoring

2.1 National Construction Code – General Definitions

2.1.1 Envelope

For the purposes of Section J, the building envelope is defined by the NCC as "…the parts of a building's fabric that separate a conditioned space or habitable room from the exterior of the building or a non-conditioned space…". This also includes spaces which are indirectly conditioned either via exhaust/relief of conditioned air or via pressurization.

2.1.2 Glazing

The glazing definition needs to be read in conjunction with the definition of a window and roof light. It can include a glazed door. For the purposes of Section J, the glazing provides an aperture by which light and energy can flow into or from the conditioned space. Glazing includes the glass and any frame system.

2.1.3 Conditioned space

A conditioned space is one likely to be air-conditioned rather than one that is air-conditioned. In some cases, chilled and hot water may be reticulated through duct risers as part of the building design to enable conditioning to be provided as part of a later fitout. A conditioned space may include a ceiling or under-floor space that is open to the conditioned space such as a space separated by only a perforated or grille ceiling or floor where the space is a supply air or return air plenum.
Note

The thermal insulation and glazing performance requirements outlined in this report nominate the Section J compliance requirements only. The specified performance values therefore do not consider requirements for any other disciplines such as Acoustics, Fire, Thermal Comfort or Safety compliance. Where required, the development shall comply with any additional requirements related to other disciplines in addition to the Section J compliance requirements detailed in this report. The glazing and insulation performance requirements for the apartment (i.e. residential component shall comply with the minimum BASIX requirements) and not this report.

2.2 Part J1 – Building Fabric Requirements

2.2.1 Overview

Section J part J1 outlines the minimum requirements of building envelope. The envelope is defined by the NCC as parts of a building's fabric that separate a conditioned space or habitable room from the exterior of the building or a non-conditioned space.

2.2.2 Part J1.1 – Application

The Deemed-to-Satisfy Provisions of this Part apply to building elements forming the envelope of a Class 2 to 9 building other than J1.2(e), J1.3, J1.4, J1.5 and J1.6(a) which do not apply to a Class 2 sole-occupancy unit or a Class 4 part of a building. Part J1 is therefore applicable to the upgrade works.

2.2.3 J1.2 Thermal Construction General

All insulations installed are required to meet J1.2 and AS/NZS 4859.1. Builder is required to ensure compliance, during construction.

a) Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it—
   i. 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

   ii. forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the

      thermal barrier; and

   iii. does not affect the safe or effective operation of a service or fitting.

b) Where required, reflective insulation must be installed with—
   i. the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation

and a building lining or cladding; and

   ii. the reflective insulation closely fitted against any penetration, door or window opening; and
   iii. the reflective insulation adequately supported by framing members; and
   iv. each adjoining sheet of roll membrane being—

A. overlapped not less than 50 mm; or
B. taped together.

c) Where required, bulk insulation must be installed so that—
   i. 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
   ii. 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.

d) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification J1.2.

e) The required Total R-Value and Total System U-Value, including allowance for thermal bridging, must be:
   i. calculated in accordance with AS/NZS 4859.2 for a roof or floor; or
   ii. determined in accordance with Specification J1.5a for wall-glazing construction; or
   iii. determined in accordance with Specification J1.6 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces.

Note:

The thermal insulation performance requirements outlined in this report nominate the Section J compliance requirements only. The specified performance values therefore do not consider requirements for any other disciplines such as Acoustics, Fire or Safety compliance. Where required, the development shall comply with any additional requirements related to other disciplines in addition to the Section J compliance requirements detailed in this report. All works need to comply with the minimum Section J1 requirements, Thermal bridging must be accounted for in accordance with J1.2 (e) and is the responsibility of the builder or the architect to obtain a construction build-up calculation from their insulation supplier.

2.2.4 J1.3 Roof and Ceiling Construction

For roof and ceiling constructions that form part of the building envelope of the conditioned space, NCC Section J Compliance shall be achieved with minimum total R3.7 thermal insulation.

The solar absorptance of the upper surface of a roof must be not more than 0.45.

2.2.5 J1.4 Roof Lights

Based on the architectural drawings provided, no roof lights are proposed to the conditioned areas and therefore section J1.4 is not applicable to the development.

Under any other design conditions, the roof light must meet the following criteria (Table J1.4 Roof Lights – Thermal Performance of transparent and translucent elements).

Roof light shaft index	Total area of roof lights up to 3.5% of the floor area of the room or space	Table Header Total area of roof lights more than 3.5% and up to 5% of the floor area of the room or space
< 1.0	≤ 0.45	≤ 0.29
≥ 1.0 to < 2.5	≤ 0.51	≤ 0.33
≥ 2.5	≤ 0.76	≤ 0.49

Notes:

1. The total area of a roof light serving the space as a percentage of the floor area of the space must not exceed 5%.
2. Roof lights must have—

a) a total area of not more than 5% of the floor area of the room or space served; and

b) transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of—

   i. for Total system SHGC, in accordance with Table J1.4; and

   ii. for Total system U-Value, not more than U3.9.

3. The roof light shaft index is determined by measuring the distance from the centre of the shaft at the roof to the centre of the shaft at the ceiling level and dividing it by the average internal dimension of the shaft opening at the ceiling level (or the diameter for a circular shaft) in the same units of measurement.
4. The area of a roof light is the area of the roof opening that allows light to enter the building. The total area of roof lights is the combined area for all roof lights serving the room or space.
5. The performance requirements of the total glazing system (glass + frame) must be demonstrated under NFRC100-2001 conditions and based on AFRC requirements and in compliance with the NCC

2.2.6 J1.5 Walls & Glazing

The table presented below provides a summary of the requirements for walls and glazing to achieve compliance with a comparison to the façade calculator results. For glazing consistency identical glazing performance has been nominated for all areas. All values specifically apply to the ABCB climate zone where the site is located. The thermal calculation methodology for walls and glazing shall comply with NCC 2019 Amendment 1 Section J requirements.

Walls	External Walls separating conditioned and non-conditioned zones: minimum total R2.0 thermal insulation. Internal walls separating conditioned and non-conditioned zones: minimum total R1.0 thermal insulation.
Glazing	To ensure glazing consistency, identical glazing performance has been nominated for all aspects (based on the minimum requirements): Total system U-Value $\leq$ 2.95 Total system SHGC $\leq$ 0.22

Note:

Based on our assessment, the 'deemed to satisfy' glazing and insulation performance requirements may be prohibitive and costly to achieve. It is therefore recommended to consider achieving the NCC glazing compliance requirements through the performance-based method of verification (i.e., JV3 method, modelling, alternative method of verification). Based on our review, the JV3 assessment is very likely to simplify achieving the glazing performance requirements for the development and improve glazing consistency.

2.2.7 J1.6 Floors

For floors without in-slab heating or cooling system:

- There are no requirements for floor insulation for the floors which are concrete slab on ground (assuming the wall thickness is 250mm or higher).
- NCC compliance shall be achieved with a minimum total thermal insulation of R2.0 for any suspended floors separating a conditioned space from a non-conditioned space.

2.3 Part J2

Part J2 of the NCC 2019 Amendment 1 is blank and therefore not applicable to this development

2.4 Part J3 – Building Sealing

Part J3 of the NCC 2019 Amendment 1 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.

Part J3 is applicable to the development.

Clause J3.2 refers to chimneys and flues. The chimney or flue of an open solid-fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue.

Clause J3.3 refers to roof lights.

Clause J3.4 outlines that a seal to restrict air infiltration must be fitted to each edge of doors, openable windows or the like that separate conditioned spaces from non-conditioned spaces or external areas. This provision is not required for windows complying with Australian Standard AS2047, 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 to restrict air infiltration—

i. for the bottom edge of a door, must be a draft protection device; and
ii. 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.

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—

i. where the conditioned space has a floor area of not more than 50 m 2; or
ii. where a café, restaurant, open front shop or the like has—
    A. a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and
    B. at all other entrances to the café, restaurant, open front shop or the like, self-closing doors.

A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like.

Clause J3.5is related to exhaust fans. An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving—

i. a conditioned space; or
ii. a habitable room in climate zones 4, 5, 6, 7 or 8.

Clause J3.6is related to construction of ceilings, walls and floors.

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 leakage in accordance with (b) when forming part of—

i. the envelope; or
ii. in climate zones 4, 5, 6, 7 or 8.

Construction required by (a) must be—

i. enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or
ii. sealed at junctions and penetrations with—
    A. close fitting architrave, skirting or cornice; or
    B. expanding foam, rubber compressible strip, caulking or the like.
    C. The requirements of (a) do not apply to openings, grilles or the like required for smoke hazard management.

Clause J3.7 is related to evaporative coolers. An evaporative cooler must be fitted with a self-closing damper or the like—

a. when serving a heated space; or
b. in climate zones 4, 5, 6, 7 or 8.

2.5 Part J4

Part J4 of the NCC 2019 Amendment 1 is blank and therefore not applicable to this development

2.6 Part J5 – Air Conditioning and Ventilation Systems

Part J5 of the NCC outlines the performance requirements for air conditioning and ventilation systems to ensure these services operate in an efficient manner.

All services consultants and contractors shall design the air conditioning and ventilation systems to ensure compliance with Part J5 of the NCC Section J and all subsections associated

Part J6 of the NCC outlines the performance requirements for illumination power density and the efficient use of lighting power and controls.

All services consultants and contractors shall design and install the artificial lighting systems to ensure compliance with Part J6 of the NCC Section J and all subsections associated therein with regards to power.

2.7 Part J6 – Artificial Lighting and Power

Part J6 of the NCC outlines the performance requirements for illumination power density and the efficient use of lighting power and controls.

All services consultants and contractors shall design the artificial lighting systems to ensure compliance with Part J6 of the NCC Section J and all subsections associated therein with regards to power.

2.8 Part J7 – Hot Water Supply

Part J7 of the NCC outlines the provisions for the energy efficient use of hot water supply systems.

Clause J7.2 of Part J7 states that a hot water supply system for food preparation or sanitary purposes must be designed and installed in accordance with Section 8 of AS/NZS 3500.4.

All services consultants and contractors shall design the Hot Water supply systems to ensure compliance with Part J7 of the NCC Section J and all subsections associated therein.

2.9 Part J8 – Facilities for Energy Monitoring

Part J8 of the NCC outlines the provisions of facilities for energy monitoring. Facilities for energy monitoring shall be provided in accordance to Part J8 of the NCC.

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

A building with a floor area of more than 2,500m2 must have the facility to record individually the energy consumption of the following services. Energy meters required by must be interlinked by a communication system that collates the time-of-use energy consumption data to a single interface monitoring system where it can be stored, analysed and reviewed.

i. air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and

ii. artificial lighting; and
iii. appliance power; and
iv. central hot water supply; and
v. internal transport devices including lifts, escalators and travelators where there is more than one serving the building; and
vi. other ancillary plant.

All services consultants and contractors shall design for access for maintenance and facilities for monitoring to ensure compliance with Part J8 of the NCC Section J and all subsections associated therein.

3 Disclaimer

This report is prepared using the information described above and inputs from other consultants. Whilst VIPAC has endeavoured to ensure the information used is accurate, no responsibility or liability to any third party is accepted for any loss or damage arising out of the use of this report by any third party. Any third party wishing to act upon any material contained in this report should first contact VIPAC for detailed advice which will take into account that party's particular requirements.

Computer performance assessment provides an estimate of building performance. This estimate is based on a necessarily simplified and idealised version of the building that does not and cannot fully represent all the intricacies of the building once built. As a result, simulation results only represent an interpretation of the potential performance of the building. No guarantee or warrantee of building performance in practice can be based on simulation results alone. VIPAC and its employees and agents shall not be liable for any loss arising because of, any person using or relying on the Report and whether caused by reason or error, negligent act or omission in the report. The draft assessment has been prepared based on the preliminary building services and architectural design with the view to conduct a detailed assessment once the design is further developed.

Performance of the completed building may be significantly affected by the quality of construction; the quality of commissioning, ongoing management of the building, and the way the building is operated, monitored and maintained. Building fabric inputs require verifiable manufacturer data to confirm thermal properties.

This report is intended as a guide to assist with the application of NCC Section J. It should be read in conjunction with the NCC 2019 Amendment 1, specific applications may vary during the design development of the project.