Crown Prosha Joint Venture

Eastlakes Shopping Centre Redevelopment

2012 National Construction Code Section J Assessment

Report No. 20C-11-0069-TRP-265526-1
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Eastlakes Shopping Centre Redevelopment 2012 National Construction Code Section J Assessment	
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EXECUTIVE SUMMARY

VIPAC Engineers & Scientists Limited has been commissioned to assess the proposed Eastlakes Shopping Centre Redevelopment development in terms of compliance with National Construction Code (NCC) 2012 Section J (Energy Efficiency). The proposed development is assessed as a Class 7a for car park areas, Class 6 for retail areas and Class 5 for commercial suites. The proposed development is located in **NCC Climate Zone 5**.

The need for this study is a result of a development approval & condition of consent for the developer, namely Section J in the NCC. The main objective of Section J (Energy Efficiency) is to reduce greenhouse gas emissions by efficiently using energy. It requires that a building, including its services, must have, to the degree necessary, features that facilitate efficient use of energy. Performance requirements for the following areas are included in NCC Section J:

- J1: Building fabric
- J2: Glazing
- J3: Building Sealing
- J4: Air Movement
- J5: Air conditioning and ventilation systems
- J6: Artificial Lighting & Power
- J7: Hot water supply
- J8: Access to maintenance

As a result of compliance with the NCC 2012 Section J, the improved development will reduce the need for non-renewable energy sources, minimising both energy costs and atmospheric air pollution while maintaining acceptable levels of comfort.

Compliance with NCC is achieved through a mix of passive and active measures:

- The building fabric has a high thermal performance in terms of effective wall and roof insulation where required. This has ensured compliance with NCC requirements.
- The development achieves compliance with the air-infiltration requirements. The roof/wall construction is sealed in accordance to fire safety requirements. Windows are to have compliance with the relevant Australian Standard for sealing requirements.

- A hot water system with efficient insulation and lagging and an efficient HVAC system achieve compliance with the NCC.
- The development complies with the requirement for access for maintenance by making necessary provisions.

This study is based on the latest drawings of the improved development. The specific energy performance requirements and criteria required in Section J (Energy Efficiency) of NCC 2012 are listed in the text boxes for reference. Subsequently a brief response is provided to demonstrate compliance with the NCC requirements.

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1. RESIDENTIAL NCC SECTION J ASSESSMENT

1.1 PART J0: ENERGY EFFICIENCY

NSW Subsection J(A) Energy Efficiency - Class 2 buildings and Class 4 parts

This Subsection contains energy efficiency requirements for Class 2 buildings and Class 4 parts of buildings.
The need for separating these requirements from the requirements for Class 3 buildings arises because, in NSW, Class 2 buildings and Class 4 parts of buildings are subject to BASIX (the Building Sustainability Index), however Class 3 buildings are not.
BASIX is the web-based planning tool designed to assess the potential performance of certain residential buildings against a range of sustainability indices including thermal comfort and energy. Commitments made under BASIX become a condition of the relevant development consent or complying development certificate.
BASIX applies in NSW to all new Class 1 and 2 buildings, and Class 4 parts of buildings; and to alterations and additions to buildings of those classes where the work is subject to BASIX and also where an applicant elects to comply with BASIX.
The provisions of NSW Subsection J(A) are therefore designed to complement requirements that arise under BASIX and which are implemented via the development consent. Where BASIX is not applied to alterations and additions to Class 1 and 2 buildings, and Class 4 parts of buildings, these provisions will also complement council development controls that require energy efficiency measures to be incorporated as part of the alterations and additions.

All residential areas have been assessed under the NSW Subsection J(A) of the NCC. BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.

1.2 NSW PART J(A)1: BUILDING FABRIC

1.2.1 NSW J(A)1.0: Deemed-to-Satisfy Provisions

(a) Where a *Building Solution* is proposed to comply with the *Deemed-to-Satisfy Provisions*, Performance Requirement NSW J(A)P1 is satisfied by complying with NSW J(A)1.1 and NSW J(A)1.2.

(b) Where a *Building Solution* is proposed as an *Alternative Solution* to the *Deemed-to-Satisfy Provisions* of NSW J(A)1.1 and NSW J(A)1.2, the relevant *Performance Requirements* must be determined in accordance with A0.10.

1.2.2 NSW J(A)1.1: Application of Part

(a) The *Deemed-to-Satisfy Provisions* only apply to thermal insulation in a Class 2 building or Class 4 part of a building where a development consent or complying development certificate specifies that the insulation is to be provided as part of the development.

(b) In (a), development consent and complying development certificate, have the meaning given to these terms by the Environmental Planning and Assessment Act 1979.

(c) The *Deemed-to-Satisfy* provisions of this Part for thermal breaks apply to all Class 2 buildings and Class 4 parts.

1.2.3 NSW J(A)1.2: Compliance with BCA Provisions

Class 2 buildings and Class 4 parts of buildings must comply with the national BCA provisions of J0.2(b) to (e) - except that the reference to "Where *required*" in J1.2 is deemed to refer to "Where a development consent specifies that insulation is to be provided as part of the development."

Note: Compliance is not *required* with the national BCA provisions of J0.2(a) as those matters are regulated under BASIX and national BCA provisions of J0.2(f) are covered by NSW J(A)2.2.

1.2.4 J0.2: Heating and Cooling loads of Sole-Occupancy Units of a Class 2 building or a Class 4 Part

The *sole-occupancy units* of a Class 2 building or a Class 4 part must—

(b) for general thermal construction, comply with J1.2; and

(c) for thermal breaks, comply with J1.3(d) and J1.5(c); and

(d) for compensating for a loss of ceiling insulation, comply with J1.3(c); and

(e) for floor edge insulation, comply with J1.6(c) and J1.6(d); and

1.2.4.1 J1.2: Thermal construction general

(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.

Compliance will be achieved through appropriate installation practices undertaken to ensure that insulation forms a continuous barrier with the thermal fabric of the building. Installation techniques such as using several layers of insulation with staggered joints are to be used to avoid air voids and to make sure that insulation fills out the available space.

Installation will be done in accordance with the safety and accessibility requirements around various fittings and services such as water pipes and electrical cabling etc.

1.2.4.2 J1.3: Roof and Ceiling Construction

(c) Where, for operational or safety reasons associated with exhaust fans, flues or recessed downlights, the area of *required* ceiling insulation is reduced, the loss of insulation must be compensated for by increasing the *R-Value* of the insulation in the remainder of the ceiling in accordance with Table J1.3b.

(d) A roof that—

(i) is *required* to achieve a minimum *Total R-Value*; and

(ii) has metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and

(iii) does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens (see Specification J1.3 Figure 2(c) and (f)), must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.

1.2.4.3 J1.5 Walls

(c) A wall that—

(i) is *required* to achieve a minimum *Total R-Value*; and

(ii) has lightweight external cladding such as weatherboards, fibre cement or metal sheeting fixed to a metal frame; and

(iii) does not have a wall lining or has a wall lining that is fixed directly to the same metal frame, must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed between the external cladding and the metal frame.

1.2.4.4 J1.6 Floors

(c) A concrete slab-on-ground—

(i) with an in-slab heating or cooling system; or

(ii) located in *climate zone* 8, must have insulation installed around the vertical edge of its perimeter.

(d) Insulation *required* by (c) must—

(i) have an *R-Value* of not less than 1.0; and

(ii) be water resistant; and

(iii) be continuous from the adjacent finished ground level—

(A) to a depth of not less than 300 mm; or

(B) for the full depth of the vertical edge of the concrete slab-on-ground.

BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.

1.3 NSW PART J(A)2: BUILDING SEALING

1.3.1 NSW J(A)2.0: Deemed-to-Satisfy Provisions

(a) Where a *Building Solution* is proposed to comply with the *Deemed-to-Satisfy Provisions*, *Performance Requirement* NSW J(A)P2 is satisfied by complying with NSW J(A)2.1 and NSW J(A)2.2.

(b) Where a *Building Solution* is proposed as an *Alternative Solution* to the *Deemed-to-Satisfy Provisions* of NSW J(A)2.1 and NSW J(A)2.2, the relevant *Performance Requirements* must be determined in accordance with A0.10.

1.3.2 NSW J(A)2.1: Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to a Class 2 building and a Class 4 part of a building, but exclude—

(a) a building in *climate zones* 2 and 5 where the only means of *air-conditioning* is by using an evaporative cooler; and

(b) a building *ventilation opening* that is necessary for the safe operation of a gas appliance; and

(c) parts of buildings that cannot be fully enclosed.

1.3.3 NSW J(A)2.2: Compliance with BCA Provisions

Class 2 buildings and Class 4 parts of buildings must comply with the following national BCA provisions—

(a) J3.2 Chimneys and flues; and

(b) J3.3 Roof lights; and

(c) J3.4 External doors and *windows*; and

(d) J3.5 Exhaust fans; and

(e) J3.6 Construction of roofs, walls and floors; and

(f) J3.7 Evaporative coolers.

BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.

1.3.4 Part J3: Building Sealing

1.3.4.1 J3.2 Chimneys and Flues

There is no chimney or flue in this development hence J3.2 is not applicable.

1.3.4.2 J3.3 Roof Lights

There are no roof lights in this development hence Section J3.3 is not applicable.

1.3.4.3 J3.4 Windows and Doors

(a) A seal to restrict air infiltration must be fitted to each edge of a door, openable *window* or the like forming part of—

(i) the *envelope* of a *conditioned space*; or

(ii) the external fabric of a *habitable room* or public area in *climate zones* 4, 5, 6, 7 and 8.

(b) The requirements of (a) do not apply to—

(i) a *window* complying with AS 2047; or

(ii) a fire door or smoke door; or

(iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.

(c) A seal *required* by (a)—

(i) for the bottom edge of an external swing door, must be a draft protection device; and

(ii) for the other edges of an external 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.

(d) An entrance to a building, if leading to a *conditioned space* must have an airlock, *self-closing* 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 cafe, 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 cafe, restaurant, open front shop or the like, *self-closing* doors.

BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.

1.3.4.4 J3.5 Exhaust Fans

A miscellaneous exhaust fan, such as a bathroom or domestic kitchen exhaust fan, must be fitted with a sealing device such as a self-closing damper, filter or the like when serving—

a) a *conditioned space*; or

b) a *habitable room* in *climate zones* 4, 6, 7 and 8.

BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.

1.3.4.5 J3.6 Construction of Roofs, Walls and Floors

(a) Roofs, 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) the external *fabric* of a *habitable room* or a public area in *climate zones* 4, 6, 7 and 8.

(b) 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 by caulking, skirting, architraves, cornices or the like.

(c) The requirements of (a) do not apply to openings, grilles and the like *required* for smoke hazard management.

The proposed development will comply. The walls and ceilings will be constructed to comply with Fire Rating regulations and also the acoustic requirements of the NCC. This will result in effective sealing of the external fabric.

Reducing air leakage can significantly cut heating and cooling loads by reducing escape of conditioned air. In addition, it can increase indoor environmental quality by reducing drafts, noise and moisture and keeping pollutants out.

1.3.4.6 J3.7 Evaporative Coolers

There are no evaporative coolers in this development hence Section J3.7 is not applicable.

1.4 NSW PART J(A)3: AIR-CONDITIONING AND VENTILATING SYSTEMS

1.4.1 NSW J(A)3.0: Deemed-to-Satisfy Provisions

(a) Where a *Building Solution* is proposed to comply with the *Deemed-to-Satisfy Provisions*, *Performance Requirement* NSW J(A)P3 is satisfied by complying with NSW J(A)3.1 and NSW J(A)3.2.

(b) Where a *Building Solution* is proposed as an *Alternative Solution* to the *Deemed-to-Satisfy Provisions* of NSW J(A)3.1 and NSW J(A)3.2, the relevant *Performance Requirements* must be determined in accordance with A0.10.

1.4.2 NSW J(A)3.1: Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to a Class 2 building and a Class 4 part of a building.

1.4.3 NSW J(A)3.2: Compliance with BCA Provisions

Class 2 buildings and Class 4 parts of buildings must comply with the following national BCA provisions, as applicable—

(a) J5.2 Air conditioning and ventilating systems; and

(b) J5.3 Time switch; and

(c) J5.4(a) and (c) to (i) Heating and cooling systems; and

(d) J5.5 Ancillary exhaust systems.

Note: Compliance is not *required* with the national BCA provisions of J5.4(b) as those matters are regulated under BASIX.

BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.

1.4.4 PART J5: AIR CONDITIONING AND VENTILATION SYSTEMS

1.4.4.1 J5.2 Air-Conditioning and Ventilation Systems

(a) An *air-conditioning* unit or system must—

(i) be capable of being deactivated when the *sole-occupancy unit*, building or part of the building served is not occupied; and

(ii) where the *air-conditioning* unit or system has motorised outside air and return dampers, close the dampers when the *air-conditioning* unit or system is deactivated; and

(iii) when serving a *sole-occupancy unit* of a Class 3 building, not operate when any external door including a door opening to a balcony, patio, courtyard or the like is open for more than 1 minute; and

(iv) have any supply and return ductwork sealed and insulated in accordance with Specification J5.2; and

(v) when serving more than one *sole-occupancy unit*, *air-conditioning* zone or area with different heating and cooling needs—

(A) thermostatically control the temperature of each *sole-occupancy unit*, zone or area; and

(B) not control the temperature by mixing actively heated air and actively cooled air; and

(C) limit reheating to not more than—

(aa) for a fixed supply air rate, a 7.5 K rise in temperature; and

(bb) for a variable supply air rate, a 7.5 K rise in temperature at the nominal supply air rate but increased or decreased at the same rate that the supply air rate is respectively increased or decreased; and

(vi) other than where a packaged *air-conditioning* unit is used, have a variable speed fan when its supply air quantity is varied; and

(vii) where the *air-conditioning* system provides the *required* mechanical ventilation, in other than process related applications where humidity control is needed, have an *outdoor air economy cycle*—

(A) in *climate zone* 2 and 3, when the *air-conditioning* unit capacity is over 50 kWr; and

(B) in *climate zones* 4, 5, 6, 7 and 8 when the *air-conditioning* unit capacity is over 35 kWr; and

(viii) in a Class 3 building, be capable of controlling the temperature of a *sole-occupancy unit* at a different temperature during sleeping periods than during other periods; and

(ix) when the air flow rate is greater than 1000 L/s, be designed so that the total *fan power* of the fans in the system is in accordance with Table J5.2, except the following need not comply with this requirement:

(A) The power for an energy reclaiming system that preconditions outdoor air.

(B) The power for process related components such as high efficiency particulate air filters.

(C) The power for miscellaneous exhaust systems complying with J5.5.

(b) A system that provides mechanical ventilation to other than a *sole-occupancy unit* in a Class 2 building or a Class 4 part of a building, either as part of an *air-conditioning* system or as a separate ventilation system, must—

(i) be capable of being deactivated when the building or part of the building served by that system is not occupied; and

(ii) when serving a *conditioned space*—

(A) not provide mechanical ventilation in excess of the minimum *outdoor air* quantity *required* by Part F4 for a mechanical ventilation system, where relevant, by more than 20% other than where there is—

(aa) additional unconditioned outside air supplied to provide free cooling or to balance process exhaust such as from a *health-care building* or laboratory; or

(bb) additional exhaust ventilation needed to balance the *required* mechanical ventilation; or

(cc) an energy reclaiming system that preconditions outside air; and

(B) in other than *climate zone* 2, where the number of square metres per person is 1 or less as specified in D1.13 and the air flow rate is more than 1000 L/s, have—

(aa) an energy reclaiming system that preconditions outside air; or

(bb) the ability to automatically modulate the mechanical ventilation *required* by Part F4 in proportion to the number of occupants; and

(iii) 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—

(A) have a *fan power* to air flow rate ratio of 0.5 W/(L/s) without filters or 0.75 W/(L/s) with filters for a general mechanical ventilation system; and

(B) for *carpark* exhaust, when serving a *carpark* with more than 40 vehicle spaces, be controlled by an atmospheric contaminant monitoring system in accordance with AS 1668.2

(c) The requirements of (a) and (b) must not inhibit—

(i) the smoke hazard management operation of *air-conditioning* and mechanical ventilation systems; and

(ii) essential ventilation such as for a garbage room, lift motor room, gas meter enclosure or gas regulator enclosure or the like.

(d) The provisions of (b)(iii) do not apply to the following:

(i) The power for an energy reclaiming system that preconditions outside air.

(ii) The power for process related components such as high efficiency particulate air filters.

(iii) The power for a miscellaneous exhaust system complying with J5.5.

(iv) The power for a mechanical ventilation system for a Class 8 *electricity network substation*.

BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.

1.4.4.2 J5.3 Time Switch

(a) A time switch in accordance with Specification J6 must be provided to control each of the following:

(i) An *air-conditioning* system of more than 10 kWr.

(ii) A ventilation system with an air flow rate of more than 1000 L/s.

(iii) A heating system of more than 10 $kW_{heating}$.

(b) The requirements of (a) do not apply to—

(i) an *air-conditioning* system or ventilation system that serves only one *sole-occupancy unit* of—

(A) a Class 2 or 3 building; or

(B) a Class 4 part of a building; or

(C) a Class 9c *aged care building*; or

(ii) a building where *air-conditioning* or ventilation is needed for 24 hour occupancy such as a manufacturing process or emergency services; or

(iii) a Class 8 *electricity network substation*.

BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.

1.4.4.3 J5.4 Heating and Cooling systems

(a) Systems that provide heating or cooling for *air-conditioning* systems must—

(i) have any *piping*, vessels, heat exchangers or tanks containing heated or chilled fluid, other than those with insulation levels covered by Minimum Energy Performance Standards (MEPS), insulated in accordance with Specification J5.4; and

(ii) where water is circulated by pumping at greater than 2 L/s—

(A) be designed so that the total of the *pump power* to the pump is in accordance with Table J5.4a; and

(B) 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

(c) Package *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 J5.4c when tested in accordance with AS/NZS 3823.1.2 at test condition T1.

(d) A refrigerant chiller up to 350 kWr capacity that is part of an *air-conditioning* system, must have an energy efficiency ratio complying with Table J5.4d when determined in accordance with ARI 550/590.

(e) The fan motor of an air cooled condenser that is part of an *air-conditioning* system, other than one that is part of package *air-conditioning* equipment in (c) or that is part of a Liquid Chilling Package, using the vapour compression cycle in (d), 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 that is part of an *air-conditioning* system must not use more than—

(i) if a propeller or axial fan, 310 W of *fan power* for each L/s of cooling water circulated; or

(ii) if a centrifugal fan, 590 W of *fan 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—

(i) if a propeller or axial fan, 500 W of *fan power* for each L/s of cooled fluid circulated; and

(ii) 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—

(i) if a propeller or axial fan, 18 W of *fan power* for each kW of heat rejected; and

(ii) 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* for each L/s of spray water circulated.

BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.

1.4.4.4 J5.5 Miscellaneous Exhaust System

(a) A miscellaneous exhaust system with an air flow rate of more than 1000 L/s, that is associated with equipment having a variable demand such as a stove in a commercial kitchen or a chemical bath in a factory, must—

(i) have the means for the operator to—

(A) reduce the energy used, such as by a variable speed fan, and

(B) stop the motor when the system is not needed; and

(ii) be designed to minimise the exhausting of conditioned air.

(b) The requirements of (a) do not apply—

(i) within a *sole-occupancy unit* of a Class 2 or 3 building, Class 4 part of a building or Class 9c *aged care building*; or

(ii) where additional exhaust ventilation is needed to balance the *required* outside air for ventilation; or

(iii) where air flow must be maintained for safe operation.

(iv) to a Class 8 *electricity network substation*.

BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.

1.5 PART 6: ARTIFICIAL LIGHTING AND POWER

1.5.1 J6.2 Interior Artificial Lighting

(a) In a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building—

(i) the *lamp power density* or *illumination power density* of artificial lighting must not exceed—

(A) within the building, 5 W/m^2; and

(B) on a verandah or balcony of the building 4 W/m^2; and

(ii) the *illumination power density* in (i) may be increased by dividing it by the *illumination power density* adjustment factor for a control device in Table J6.2b; and

(iii) when designing the *lamp power density* or *illumination power density*, the power of the proposed installation must be used rather than nominal allowances for exposed batten holders or luminaires; and

(iv) where lamps are used that have a transformer or ballast, the transformer or ballast must be of the electronic type; and

(v) halogen lamps must be separately switched from fluorescent lamps.

BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.

1.6 NSW PART J(A)4: HOT WATER SUPPLY

1.6.1 NSW J(A)4.0: Deemed-to-Satisfy Provisions

(a) Where a *Building Solution* is proposed to comply with the *Deemed-to-Satisfy Provisions*, *Performance Requirement* NSW J(A)P3 is satisfied by complying with NSW J(A)4.1 and NSW J(A)4.2.

(b) Where a *Building Solution* is proposed as an *Alternative Solution* to the *Deemed-to-Satisfy Provisions* of NSW J(A)4.1 and NSW J(A)4.2, the relevant *Performance Requirements* must be determined in accordance with A0.10.

1.6.2 NSW J(A)4.1: Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to a Class 2 building and a Class 4 part of a building.

1.6.3 NSW J(A)3.2: Compliance with BCA Provisions

Class 2 buildings and Class 4 parts of buildings must comply with the national BCA provisions of J7.2 Hot water supply.

Note: Compliance is not *required* with the national BCA provisions of J7.3 and J7.4 as those matters are regulated under BASIX.

1.6.4 PART J7: HOT WATER SUPPLY

1.6.4.1 J7.2 Hot Water Supply

A hot water supply system for food preparation and sanitary purposes, other than a solar hot water supply system in *climate zones* 1, 2 and 3, must be designed and installed in accordance with Section 8 of AS/NZS 3500.4.

BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.

Gas will be used for the hot water supply system. The use of gas as the energy source for hot water system means lower greenhouse gas emissions, efficiency and lower running costs. Using a natural gas hot water system generates about one third of the greenhouse gas emissions of a conventional electric hot water heater[1].

[1] *Australian Gas Association, Research Paper No. 16*

1.7 NSW PART J(A)5: ACCESS FOR MAINTENANCE AND FACILITIES FOR MONITORING

1.7.1 NSW J(A)4.0: Deemed-to-Satisfy Provisions

(a) Where a *Building Solution* is proposed to comply with the *Deemed-to-Satisfy Provisions*, *Performance Requirement* NSW J(A)P4 is satisfied by complying with NSW J(A)5.1 to NSW J(A)5.3.

(b) Where a *Building Solution* is proposed as an *Alternative Solution* to the *Deemed-to-Satisfy Provisions* of NSW J(A)5.1 to NSW J(A)5.3, the relevant *Performance Requirements* must be determined in accordance with A0.10.

1.7.2 NSW J(A)4.1: Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to a Class 2 building except within a *sole-occupancy unit*.

1.7.3 NSW J(A)5.2: Access for Maintenance

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—

(i) an on-site renewable energy source; or

(ii) another process as reclaimed energy.

1.7.4 NSW J(A)5.3: Compliance with BCA Provisions

Class 2 buildings and Class 4 parts of buildings must comply with the national BCA provisions of J8.3.

1.7.4.1 J8.3 Facilities for Energy Monitoring

(a) A building or *sole-occupancy unit* with a *floor area* of more than 500 m^2 must have the facility to record the consumption of gas and electricity.

(b) A building with a *floor area* of more than 2,500 m^2 must have the facility to record individually the energy consumption of—

(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.

(c) The provisions of (b) do not apply to a Class 2 building with a *floor area* of more than 2,500 m^2 where the total area of the common areas is less than 500 m^2.

If the sole-occupancy units total floor area exceeds 500m^2, the facility must be able to record the consumption of gas and electricity as per J8.3(a) of the NCC.

2. RETAIL & SERVICED APARTMENTS NCC SECTION J ASSESSMENT

2.1 PART J1: BUILDING FABRIC

The *Deemed-to-Satisfy Provisions* of this Part apply to building elements forming the *envelope* of a Class 2 to 9 building other than—

(a) a Class 7, 8 or 9b building that does not have a *conditioned space*; or

(b) an atrium or solarium that is not a *conditioned space* and is separated from the remainder of the building by an

2.1.1 J1.2: Thermal Construction General

(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.

A total ***R-Value of 2.8*** for all external walls is required to satisfy the requirements for NCC compliance.

Compliance will be achieved through appropriate installation practices undertaken to ensure that insulation forms a continuous barrier with the thermal fabric of the building. Installation techniques such as using several layers of insulation with staggered joints are to be used to avoid air voids and to make sure that insulation fills out the available space.

Installation will be done in accordance with the safety and accessibility requirements around various fittings and services such as water pipes and electrical cabling etc.

2.1.2 J1.3: Roof and Ceiling Construction

(a) 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 for the direction of heat flow.

(b) For compliance with Table J1.3a, roof and ceiling construction is deemed to have the thermal properties listed in Specification J1.3.

(c) Where, for operational or safety reasons associated with exhaust fans, flues or recessed downlights, the area of *required* ceiling insulation is reduced, the loss of insulation must be compensated for by increasing the *R-Value* of the insulation in the remainder of the ceiling in accordance with Table J1.3b.

(d) A roof that—

(i) is *required* to achieve a minimum *Total R-Value*; and

(ii) has metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and

(iii) does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens (see Specification J1.3 Figure 2(c) and (f)), must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.

Table 1: Table J1.3a ROOFS AND CEILINGS - MINIMUM TOTAL R-VALUE FOR EACH CLIMATE ZONE

Climate zone	**1, 2,3, 4 and 5**	**6**	**7**	**8**
Direction of heat flow	**Downwards**		**Upwards**	
Minimum *Total R-Value* for a roof or ceiling with a roof upper surface solar absorptance value of not more than 0.4	3.2	3.2	3.7	4.8
Minimum *Total R-Value* for a roof or ceiling with a roof upper surface solar absorptance value of more than 0.4 but not more than 0.6	3.7	3.2	3.7	4.8
Minimum *Total R-Value* for a roof or ceiling with a roof upper surface solar absorptance value of more than 0.6	4.2	3.2	3.7	4.8

Retail spaces have exposed ceilings/roof consisted of:

- Concrete slab, roof airspace, and plasterboard/gypsum.
- The total R-value of this system calculated using the individual R-values of the outdoor air film, water proof membrane, roof construction and indoor air film is 0.57[2].
- **Therefore an additional R3.2 roof/ceiling insulation is required to comply with NCC requirements.**

Upper level serviced apartments have exposed ceilings/roof consisted of:

- Concrete slab, roof airspace, and plasterboard/gypsum.
- Metal cladding, roof airspace, and plasterboard/gypsum.
- The total R-value of the concrete roof system calculated using the individual R-values of the outdoor air film, water proof membrane, roof construction and indoor air film is 0.57[3].
- The total R-value of the metal cladding roof system calculated using the individual R-values of the outdoor air film, water proof membrane, roof construction and indoor air film is 0.47[4].
- **Therefore an additional R3.2 roof/ceiling insulation for concrete roofs is required to comply with NCC requirements.**
- **Therefore an additional R3.3 roof/ceiling insulation for metal roofs is required to comply with NCC requirements.**

2.1.3 J1.4 Roof Lights

The roof lights in this development are adjacent to an unconditioned space hence Section J1.4 is not applicable.

2.1.4 J1.5 Walls

(a) Each part of an *external wall* 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 satisfy one of the options in Table J1.5a except for—

(i) opaque non-glazed openings in *external walls* such as doors (including garage doors), vents, penetrations, shutters and the like; and

(ii) *glazing*; and

(iii) an earth retaining wall or earth-berm, in other than *climate zone* 8.

(b) Any wall, other than an *external wall*, that is part of the *envelope* must achieve the *Total R-Value* in Table J1.5b.

[2] BCA Specification J1.3 Figure 2(g)
[3] BCA Specification J1.3 Figure 2(f)
[4] BCA Specification J1.3 Figure 2(f)

(c) A wall that—

(i) is *required* to achieve a minimum *Total R-Value*; and

(ii) has lightweight external cladding such as weatherboards, fibre cement or metal sheeting fixed to a metal frame; and

(iii) does not have a wall lining or has a wall lining that is fixed directly to the same metal frame, must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed between the external cladding and the metal frame.

(d) For compliance with Table J1.5a and Table J1.5b, wall construction is deemed to have the thermal properties listed in Specification J1.5.

Table 2: Table J1.5a OPTIONS FOR EACH PART OF AN EXTERNAL WALL THAT IS PART OF AN ENVELOPE

Climate zone	**Options**						
1, 2 and 3	(a)	(i)	Achieve a minimum *Total R-Value* of 3.3.				
		(ii)	The minimum *Total R-Value* in (i) is reduced—				
			(A)	for a wall with a surface density of not less than 220 kg/m^2, by 0.5; and			
			(B)	for a wall that is—			
				(aa)	facing the south orientation as described in Figure J2.3, by 0.5; or		
				(bb)	shaded with a projection shade angle in accordance with Figure J1.5 of—		
					(AA)	15 degrees to not more than 45 degrees, by 0.5; or	
					(BB)	more than 45 degrees, by 1.0; and	
			(C)	if the outer surface solar absorptance value is not more than 0.6, by 0.5.			
	(b)	Where the only space for insulation is provided by a furring channel, top hat section, batten or the like—					
		(i)	achieve a minimum *Total R-Value* of 1.4; and				
		(ii)	satisfy *glazing* energy index Option B of Table J2.4a.				
4, 5 and 6	(a)	(i)	Achieve a minimum *Total R-Value* of 2.8.				
		(ii)	The minimum *Total R-Value* in (i) is reduced—				
			(A)	for a wall with a surface density of not less than 220 kg/m^2, by 0.5; and			
			(B)	for a wall that is—			
				(aa)	facing the south orientation as described in Figure J2.3, by 0.5; or		
				(bb)	shaded with a projection shade angle in accordance with Figure J1.5 of—		
					(AA)	30 degrees to not more than 60 degrees, by 0.5; or	
					(BB)	more than 60 degrees, by 1.0.	

Climate zone	Options		
	(b)	Where the only space for insulation is provided by a furring channel, top hat section, batten or the like—	
		(i)	achieve a minimum *Total R-Value* of 1.4; and
		(ii)	satisfy *glazing* energy index Option B of Table J2.4a.
7	(a)	Achieve a minimum *Total R-Value* of 2.8.	
	(b)	Where the only space for insulation is provided by a furring channel, top hat section, batten or the like—	
		(i)	achieve a minimum *Total R-Value* of 1.4; and
		(ii)	satisfy *glazing* energy index Option B of Table J2.4a.
8	(a)	Achieve a minimum *Total R-Value* of 3.8.	
	(b)	Where the wall is an earth retaining wall or earth-berm, achieve a minimum *Total R-Value* of 2.0.	

Table 3: Table J1.5b AN ENVELOPE WALL OTHER THAN AN EXTERNAL WALL – MINIMUM TOTAL R-VALUE

Location			*Climate zone*							
			1	2	3	4	5	6	7	8
(a)	With the non- *conditioned space*—		1.0	1.0	Nil	Nil	1.0	1.0	1.5	2.5
	(i)	enclosed, with mechanical ventilation of not more than 1.5 air changes per hour of outside air; and								
	(ii)	*glazing* not more than that *required* by Part J2.								
(b)	For other than (a)		2.3	2.3	2.3	1.8	1.8	1.8	2.8	3.8

External walls of **retail spaces** are constituted of:

- **Tilt up Concrete wall** (outdoor air film, concrete & air gap (non-reflective and unventilated), plasterboard, indoor air film[5]) construction has a total R-value of 0.5. Therefore an **additional minimum R2.3 wall insulation is required** to comply with NCC requirements.

External walls of **serviced apartments** are constituted of:

- **Brick Veneer wall** (outdoor air film, masonry, cavity & air gap (non-reflective and unventilated), plasterboard, indoor air film[6]) construction has a total R-value of 0.48. Therefore an **additional minimum R2.4 wall insulation is required** to comply with NCC requirements.

[5] BCA Specification J1.5 (d)
[6] BCA Specification J1.5 (a)

Thermal mass is important in decreasing temperature variations that would otherwise cause discomfort or increase auxiliary heating and cooling requirements. Thermal mass serves multiple purposes by reducing sound transmission from an adjoining space.

Internal walls of **retail spaces & serviced apartments** adjacent to unconditioned spaces are constituted of:

- **150mm Concrete wall** (indoor air film, 150mm solid reinforced concrete, cavity & air gap (non-reflective and unventilated), plasterboard, indoor air film[7]) construction has a total R-value of 0.58. Therefore an **additional minimum R1.3 wall insulation is required** to comply with NCC requirements J1.5a (b) for Climate Zone 5.

2.1.5 J1.6 Floors

(a) A floor that is part of the *envelope* of a building, other than a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, including a floor above or below a *carpark* or a plant room—

(i) must achieve the *Total R-Value* specified in Table J1.6; and

(ii) with an in-slab heating or cooling system, must be insulated around the vertical edge of its perimeter with insulation having an *R-Value* of not less than 1.0.

(b) In *climate zones* 1 to 6, the minimum *Total R-Value required* in (a) may be reduced by R0.5 provided R0.75 is added to the *Total R-Value required* for the roof and ceiling construction.

(c) A concrete slab-on-ground—

(i) with an in-slab heating or cooling system; or

(ii) located in *climate zone* 8, must have insulation installed around the vertical edge of its perimeter.

(d) Insulation *required* by (c) must—

(i) have an *R-Value* of not less than 1.0; and

(ii) be water resistant; and

(iii) be continuous from the adjacent finished ground level—

(A) to a depth of not less than 300 mm; or

(B) for the full depth of the vertical edge of the concrete slab-on-ground.

(e) Floor construction is deemed to have the thermal properties listed in Specification J1.6.

[7] BCA Specification J1.5 (d)

Table 4: Table J1.6 FLOORS — MINIMUM TOTAL R-VALUE

Location			Climate zone							
			1	2	3	4	5	6	7	8
(a)	A slab on ground:									
	(i)	Without an in-slab heating or cooling system	Nil	Nil	Nil	Nil	Nil	Nil	1.0	2.0
	(ii)	With an in-slab heating or cooling system	1.25	1.25	1.25	1.25	1.25	1.25	1.25	2.25
(b)	A suspended floor without an in-slab heating or cooling system where the non- *conditioned space* is—		1.0	1.0	Nil	Nil	1.0	1.0	1.5	2.5
	(i)	enclosed; and								
	(ii)	where mechanically ventilated by not more than 1.5 air changes per hour.								
(c)	A suspended floor with an in-slab heating or cooling system where the non- *conditioned space* is—		1.25	1.25	1.25	1.25	1.25	1.25	1.75	2.75
	(i)	enclosed; and								
	(ii)	where mechanically ventilated by not more than 1.5 air changes per hour								
(d)	For other than (a), (b) or (c)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.5
Direction of heat flow			Upwards	Downwards and Upwards		Downwards				
Note: A sub-floor space with not more than 150% of the *required* sub-floor ventilation is considered enclosed.										

The **Retail spaces** located on the ground floor have areas that are suspended (i.e. adjacent to the basement car park). The floor manufactured of:

- 200mm suspended solid concrete
- The total R-value of this system calculated using the individual R-values of the outdoor air film, floor construction and indoor air film is 0.33[8].

Therefore an additional minimum R1.7 floor insulation is required to comply with NCC requirements.

2.2 PART J2: EXTERNAL GLAZING

2.2.1 J2.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to elements forming the *envelope* of a building other than—

[8] BCA Specification J1.6 Figure 2(c) including internal carpet flooring

(a) a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building; or

(b) a Class 7, 8 or 9b building that does not have a *conditioned space*; or

(c) an atrium or solarium that is not a *conditioned space* and is separated from the remainder of the building by an *envelope*.

2.2.2 J2.4 Glazing

(a) The *glazing* in each *storey*, including any *mezzanine*, of a building must be assessed separately in accordance with (b) and (c) for—

(i) *glazing* in the external *fabric* facing each orientation; and

(ii) *glazing* with a P/H value of not less than 2 in the internal *fabric* using the south orientation sector energy constants in Table J2.4b and shading multipliers in Table J2.4c and Table J2.4d.

(b) The aggregate *air-conditioning* energy value attributable to the *glazing* must not exceed the allowance obtained by multiplying the facade area that is exposed to the *conditioned space* for the orientation by the energy index in Table J2.4a.

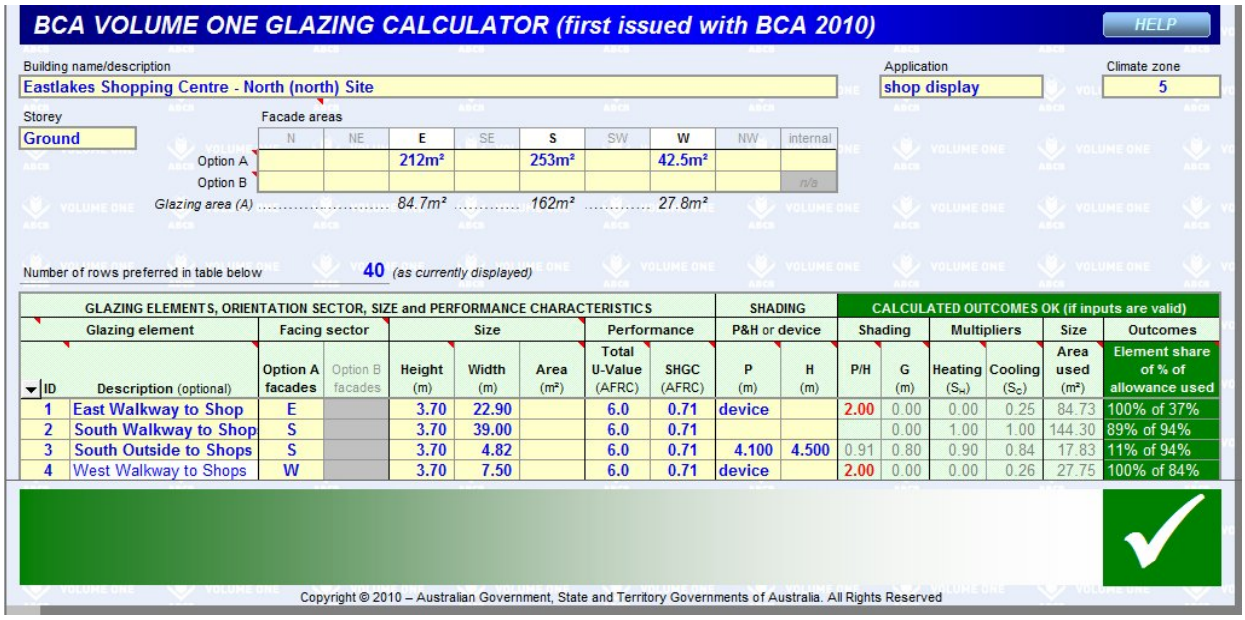
2.2.3 Glazing Calculators

The following tables outline the glazing requirements for the commercial components of the proposed development.

The glazing treatments are based on the following assumptions:

- Ground floor shopping and commercial has 1m ceiling space. Hence, façade height is 5m
- All internal walkways are naturally ventilated and thus the facades facing the walkways are consider external
- Walkway overhead coverings provide sufficient shading to be considered to be a BCA shading “device” (blocks 80% of summer solar radiation)

2.2.3.1 Ground Floor – North Site:



BCA VOLUME ONE GLAZING CALCULATOR (first issued with BCA 2010) — HELP

Building name/description: Eastlakes Shopping Centre - North (north) Site | Application: shop display | Climate zone: 5

Storey: Ground

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A			212m²		253m²		42.5m²		
Option B									n/a
Glazing area (A)			84.7m²		162m²		27.8m²		

Number of rows preferred in table below: 40 (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 U-Value (AFRC)	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	East Walkway to Shop	E		3.70	22.90		6.0	0.71	device		2.00	0.00	0.00	0.25	84.73	100% of 37%
2	South Walkway to Shop	S		3.70	39.00		6.0	0.71				0.00	1.00	1.00	144.30	89% of 94%
3	South Outside to Shops	S		3.70	4.82		6.0	0.71	4.100	4.500	0.91	0.80	0.90	0.84	17.83	11% of 94%
4	West Walkway to Shops	W		3.70	7.50		6.0	0.71	device		2.00	0.00	0.00	0.26	27.75	100% of 84%

Using the NCC calculator illustrated above, glazing calculations are performed for all commercial spaces. Table 5 - Table 7 list the required treatments for each component of the proposed development.

Please note, all glazing listed in the below tables are for example only. Furthermore, where 'shading devices' are recommended, these must meet the BCA definition (blocks 80% of summer solar radiation).

Table 5: Glazing requirments for Ground Floor Commercial.

Façade Direction	Location	Glazing/Shading Requirements
All glazing facing internal walkway	North and South Site	GJA-024-07 - 6mm Clear (U = 6.0, SHGC = 0.71)
North	All ground floor commercial on north façade of South Site (Evans Avenue)	GJA-024-07 - 6mm Clear (U = 6.0, SHGC = 0.71)
West	All West facing Glazing on both North and South Sites	GJA-024-30 - 6.38mm ComfortPlus Neutral Laminate (U = 4.1, SHGC = 0.45)
South	All South facing Glazing on both North and South Sites	GJA-024-07 - 6mm Clear (U = 6.0, SHGC = 0.71)

Table 6: Glazing requirements for Serviced Apartment Building 4.

Façade Orientation	Location	Glazing/Shading Requirements
North	Typical Levels 1-4	GJA-024-30 - 6.38mm ComfortPlus Neutral Laminate (U = 4.1, SHGC = 0.45) & At least 50% of glazed areas to have vertical shading device
North	Level 5	GJA-024-30 - 6.38mm ComfortPlus Neutral Laminate (U = 4.1, SHGC = 0.45) & At least 60% of glazed areas to have vertical shading device
West	All Levels 1-5	GJA-024-07 - 6mm Clear (U = 6.0, SHGC = 0.71)
South	Typical Levels 1-4	GJA-075-08 - 6mm Clear / 12mm Air Gap / Energy Advantage Low-E (U = 3.3, SHGC = 0.55)
South	Level 5	GJA-075-08 - 6mm Clear / 12mm Air Gap / Energy Advantage Low-E (U = 3.3, SHGC = 0.55) & Reduce glazed area by 14.85m^2
East	All Levels 1-5	GJA-024-07 - 6mm Clear (U = 6.0, SHGC = 0.71)

Table 7: Glazing requirements for Serviced Apartment Building 4A.

Façade Orientation	Location	Glazing/Shading Requirements
North	All north facing glazing on typical Levels 1-4	GJA-024-07 - 6mm Clear (U = 6.0, SHGC = 0.71)
North	Level 5	GJA-074-51 – 10.76mm Optilight HL719 Laminate (U = 4.3, SHGC = 0.32)
Northwest	All north facing glazing on typical Levels 1-4	GJA-024-07 - 6mm Clear (U = 6.0, SHGC = 0.71)
Northwest	Level 5	GJA-024-07 - 6mm Clear (U = 6.0, SHGC = 0.71)
West	All west facing glazing on typical Levels 1-4	GJA-074-51 – 10.76mm Optilight HL719 Laminate (U = 4.3, SHGC = 0.32) & Reduce glass by 10.6m^2 & At least 60% of glazed areas

Façade Orientation	Location	Glazing/Shading Requirements
		to have vertical shading device
West	Level 5	GJA-074-51 – 10.76mm Optilight HL719 Laminate (U = 4.3, SHGC = 0.32) & Reduce glass by 5.9m^2 & At least 80% of glazed areas to have vertical shading device
South	To corridor on typical Levels 1-4	GJA-024-07 - 6mm Clear (U = 6.0, SHGC = 0.71)
South	Level 5	GJA-075-08 - 6mm Clear / 12mm Air Gap / Energy Advantage Low-E (U = 3.3, SHGC = 0.55)
East	All west facing glazing on typical Levels 1-4	GJA-074-51 – 10.76mm Optilight HL719 Laminate (U = 4.3, SHGC = 0.32) & Reduce glass by 3.2m^2 & At least 75% of glazed areas to have vertical shading device
East	Level 5	GJA-074-51 – 10.76mm Optilight HL719 Laminate (U = 4.3, SHGC = 0.32) & At least 60% of glazed areas to have vertical shading device

Using the methods above, the glazing in the proposed development comply with NCC requirements.

2.2.4 J2.5 Shading

Where shading is *required* to comply with J2.4, it must—

(a) be provided by an external permanent projection, such as a verandah, balcony, fixed canopy, eaves or shading hood, which—

(i) extends horizontally on both sides of the *glazing* for the same projection distance P in Figure J2.4; or

(ii) provides the equivalent shading to (i) with a reveal or the like; or

(b) be provided by an external shading device, such as a shutter, blind, vertical or horizontal building screen with blades, battens or slats, which—

(i) is capable of restricting at least 80% of summer solar radiation; and

(ii) if adjustable, is operated automatically in response to the level of solar radiation.

All shading devices must comply with Section J2.5.

2.3 PART J3: BUILDING SEALING

2.3.1 J3.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to elements forming the *envelope* of a Class 2 to 9 building, other than—

(a) a building in *climate zones* 1, 2, 3 and 5 where the only means of *air-conditioning* is by using an evaporative cooler; or

(b) a permanent building opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; or

(c) a Class 6, 7, 8 and 9b building that does not have a *conditioned space*; or

(d) a building or space where the mechanical ventilation *required* by Part F4 provides sufficient pressurisation to prevent infiltration; or

(e) an atrium or solarium that is not a *conditioned space* and is separated from the remainder of the building by an *envelope*.

2.3.2 J3.2 Chimneys and Flues

There is no chimney or flue in this development hence J3.2 is not applicable.

2.3.3 J3.3 Roof Lights

The roof lights in this development are adjacent to an unconditioned space hence Section J3.3 is not applicable.

2.3.4 J3.4 Windows and Doors

(a) A seal to restrict air infiltration must be fitted to each edge of a door, openable *window* or the like forming part of—

(i) the *envelope* of a *conditioned space*; or

(ii) the external fabric of a *habitable room* or public area in *climate zones* 4, 5, 6, 7 and 8.

(b) The requirements of (a) do not apply to—

(i) a *window* complying with AS 2047; or

(ii) a fire door or smoke door; or

(iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.

(c) A seal *required* by (a)—

(i) for the bottom edge of an external swing door, must be a draft protection device; and

(ii) for the other edges of an external 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.

(d) An entrance to a building, if leading to a *conditioned space* must have an airlock, *self-closing* 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 cafe, 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 cafe, restaurant, open front shop or the like, *self-closing* doors.

The developer intends on installing windows complying with AS 2047. Therefore the offices comply with NCC requirements.

2.3.5 J3.5 Exhaust Fans

A miscellaneous exhaust fan, such as a bathroom or domestic kitchen exhaust fan, must be fitted with a sealing device such as a self-closing damper, filter or the like when serving—

c) a *conditioned space*; or

d) a *habitable room* in *climate zones* 4, 6, 7 and 8.

The developer intends that all bathrooms and kitchens (if any) in all retail area & serviced apartments will be fitted with a sealing device where applicable hence Section J3.5 will comply with NCC requirements.

2.3.6 J3.6 Construction of Roofs, Walls and Floors

(a) Roofs, ceilings, walls, floors and any opening such as a *window* frame, door frame, *roof*

(i) the *envelope*; or

(ii) the external *fabric* of a *habitable room* or a public area in *climate zones* 4, 5, 6.

(b) Construction *required* by (a) must be—

(b) 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 by caulking, skirting, architraves, cornices or the like.

(c) The requirements of (a) do not apply to openings, grilles and the like *required* for smoke hazard management.

The proposed development will comply. The walls and ceilings will be constructed to comply with Fire Rating regulations and also the acoustic requirements of the NCC. This will result in effective sealing of the external fabric.

Reducing air leakage can significantly cut heating and cooling loads by reducing escape of conditioned air. In addition, it can increase indoor environmental quality by reducing drafts, noise and moisture and keeping pollutants out.

2.3.7 J3.7 Evaporative Coolers

There are no evaporative coolers in this development hence Section J3.7 is not applicable.

2.4 PART J4

This part has deliberately been left blank

2.5 PART J5: AIR CONDITIONING AND VENTILATION SYSTEMS

2.5.1 J5.2 Air-Conditioning and Ventilation Systems

(a) An *air-conditioning* unit or system must—

(i) be capable of being deactivated when the *sole-occupancy unit*, building or part of the

(ii) where the *air-conditioning* unit or system has motorised outside air and return

(iii) when serving a *sole-occupancy unit* of a Class 3 building, not operate when any

(iv) have any supply and return ductwork sealed and insulated in accordance with

(v) when serving more than one *air-conditioning* zone or area with different

(A) thermostatically control the temperature of each zone or area; and

(B) not control the temperature by mixing actively heated air and actively cooled air;

and

(C) limit reheating to not more than—

(aa) for a fixed supply air rate, a 7.5 K rise in temperature; and

(bb) for a variable supply air rate, a 7.5 K rise in temperature at the nominal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased; and

(vi) other than where a packaged *air-conditioning* unit is used, have a variable speed fan when its supply air quantity is varied; and

(vii) where the *air-conditioning* system provides the *required* mechanical ventilation, in other than process related applications where humidity control is needed, have an *outdoor air economy cycle*—

(A) in *climate zone* 2 and 3, when the *air-conditioning* unit capacity is over 50 kWr; and

(B) in *climate zones* 4, 5, 6, 7 and 8 when the *air-conditioning* unit capacity is over 35 kWr; and

(viii) in a Class 3 building, be capable of controlling the temperature of a *sole-occupancy unit* at a different temperature during sleeping periods than during other periods; and

(ix) 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 J5.2, except the following need not comply with this requirement:

(A) fans in unducted *air-conditioning* units with a supply air capacity of less than 1000 L/s,

(B) The power for a fan in an energy reclaiming system that preconditions outdoor air.

(C) The power for process related components such as high efficiency particulate air filters.

(b) A system that provides mechanical ventilation to other than a *sole-occupancy unit* in a Class 2 building or a Class 4 part of a building, either as part of an *air-conditioning* system or as a separate ventilation system, must—

(i) be capable of being deactivated when the building or part of the building served by that system is not occupied; and

(ii) when serving a *conditioned space*—

(A) not provide mechanical ventilation in excess of the minimum *outdoor air* quantity *required* by Part F4 for a mechanical ventilation system, where relevant, by more than 20% other than where there is—

(aa) additional unconditioned outside air supplied to provide free cooling or to balance process exhaust such as from a *health-care building* or laboratory; or

(bb) additional exhaust ventilation needed to balance the *required* mechanical ventilation; or

(cc) an energy reclaiming system that preconditions all the outside air; and

(B) in other than *climate zone* 2, where the number of square metres per person is 1 or less as specified in D1.13 and the air flow rate is more than 1000 L/s, have—

(aa) an energy reclaiming system that preconditions outside air; or

(bb) the ability to automatically modulate the mechanical ventilation *required* by Part F4 in proportion to the number of occupants; and

(iii) 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—

(A) have a *fan power* to air flow rate ratio of 0.5 W/(L/s) without filters or 0.75 W/(L/s) with filters for a general mechanical ventilation system; and

(B) for *carpark* exhaust, when serving a *carpark* with more than 40 vehicle spaces, be controlled by an atmospheric contaminant monitoring system in accordance with AS 1668.2

(c) The requirements of (a) and (b) must not inhibit—

(i) the smoke hazard management operation of *air-conditioning* and mechanical ventilation systems; and

(ii) essential ventilation such as for a garbage room, lift motor room, gas meter enclosure or gas regulator enclosure or the like.

(d) The provisions of (b)(iii) do not apply to the following:

(i) The power for an energy reclaiming system that preconditions outside air.

(ii) The power for process related components such as high efficiency particulate air filters.

(iii) The power for a miscellaneous exhaust system complying with J5.5.

(iv) The power for a mechanical ventilation system for a Class 8 *electricity network substation*.

The developer intends that the proposed Air Conditioning & Mechanical Ventilation system will comply with Part J5 of the NCC.

2.5.2 J5.3 Time Switch

(a) A time switch in accordance with Specification J6 must be provided to control each of the following:

(i) An *air-conditioning* system of more than 10 kWr.

(ii) A ventilation system with an air flow rate of more than 1000 L/s.

(iii) A heating system of more than 10 $kW_{heating}$.

(b) The requirements of (a) do not apply to—

(i) an *air-conditioning* system or ventilation system that serves only one *sole-occupancy*

(i) an *air-conditioning* system or ventilation system that serves only one *sole-occupancy unit* of—

(A) a Class 2 or 3 building; or

(B) a Class 4 part of a building; or

(C) a Class 9c *aged care building*; or

(ii) a building where *air-conditioning* or ventilation is needed for 24 hour occupancy such as a manufacturing process or emergency services.

(iii) a Class 8 *electricity network substation*.

The time switch (if any) to be installed in this development will comply with J5.3.

2.5.3 J5.4 Heating and Cooling Systems

(a) Systems that provide heating or cooling for *air-conditioning* systems must—

(i) have any *piping*, vessels, heat exchangers or tanks containing heated or chilled fluid, other

(ii) where water is circulated by pumping at greater than 2 L/s—

(A) be designed so that the total of the *pump power* to the pump is in accordance with

(B) have the pump capable of varying its speed in response to varying load when it is

(iii) if the system contains more than one water heater used for heating a building, chiller or

(b) A heater—

(i) for heating a space via water, such as a boiler, that is part of an *air-conditioning* system,

(A) achieve a thermal efficiency complying with Table J5.4b when tested in accordance

(B) use reticulated gas where it is available at the allotment boundary; and

(ii) for heating a space other than via water, must be—

(A) a solar heater; or

(B) a gas heater; or

(C) an oil heater, but only if reticulated gas is not available at the allotment

(D) a heat pump heater; or

(E) a solid-fuel burning heater; or

(F) a heater using reclaimed heat from another process such as reject heat from

refrigeration plant; or

(G) a combination of (A) to (F); or

(H) electric only—

(aa) if the heating capacity is not more than—

(AA) 10 W/m^2 of the *floor area* of the *conditioned space* in *climate zone* 1; or

(BB) 40 W/m^2 of the *floor area* of the *conditioned space* in *climate zone* 2; or

(CC) the value specified in Table J5.4c where reticulated gas is not available at the allotment boundary; or

(bb) if the annual energy consumption for heating is not more than 15 kWh/m^2 of the *floor area* of the *conditioned space* in *climate zones* 1 to 5; or

(cc) if for an in-duct heater complying with J5.2(a)(v)(C); and

(iii) that is a fixed space heating appliance installed outdoors, must be controlled to automatically turn off when not needed by an outdoor air temperature sensor, timer, motion detector, or the like.

(c) Package *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 when cooling complying with Table J5.4d when tested in accordance with AS/NZS 3823.1.2 at test condition T1.

(d) A refrigerant chiller up to 350 kWr capacity that is part of an *air-conditioning* system, must have an energy efficiency ratio complying with Table J5.4e when determined in accordance with ARI 550/590 or AHRI 550/590.

(e) The fan motor of an air cooled condenser that is part of an *air-conditioning* system, other than one that is part of package *air-conditioning* equipment in (c) or that is part of a Liquid Chilling Package, using the vapour compression cycle in (d), 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 or AHRI 460.

(f) The fan of a cooling tower that is part of an *air-conditioning* system must not use more than—

(i) if a propeller or axial fan, 310 W of *fan power* for each L/s of cooling water circulated; or

(ii) if a centrifugal fan, 590 W of *fan 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—

(i) if a propeller or axial fan, 500 W of *fan power* for each L/s of cooled fluid circulated; and

(ii) 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—

(i) if a propeller or axial fan, 18 W of *fan power* for each kW of heat rejected; and

(ii) 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* for each L/s of spray water circulated.

The heating & cooling system to be installed in the development will comply with J5.4.

2.5.4 J5.5 Miscellaneous Exhaust System

(a) A miscellaneous exhaust system with an air flow rate of more than 1000 L/s, that is associated with equipment having a variable demand such as a stove in a commercial kitchen or a chemical bath in a factory, must—

(i) have the means for the operator to—

(A) reduce the energy used, such as by a variable speed fan, and

(B) stop the motor when the system is not needed; and

(ii) be designed to minimise the exhausting of conditioned air.

(b) The requirements of (a) do not apply—

(i) within a *sole-occupancy unit* of a Class 2 or 3 building, Class 4 part of a building or Class 9c *aged care building*; or

(ii) where additional exhaust ventilation is needed to balance the *required* outside air for ventilation; or

(iii) where air flow must be maintained for safe operation.

(iv) to a Class 8 *electricity network substation*.

The miscellaneous exhaust system to be installed in the development will comply with J5.5.

2.6 PART 6: ARTIFICIAL LIGHTING AND POWER

2.6.1 J6.2 Interior Artificial Lighting

(b) In a Class 3,5, 6, 7, 8, 9a or 9b building —

(i) 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 J6.2a; and—

(ii) the aggregate design illumination power load in (i) is the sum of the design illumination power loads in each of the spaces served; and

(iii) in determining the design illumination power load for (ii) the following must be used:

(A) Where there are multiple lighting systems serving the same space—

(aa) the total illumination power load of all systems; or

(bb) for a control system that permits only one system to operate at a time, the design illumination power load is—

(AA) based on the highest illumination power load; or

(BB) determined by the formula—

[H x T/2 + P x (100 - T/2)] / 100
Where:
H = the highest illumination power load; and
T = the time for which the maximum illumination power load will occur, expressed as a percentage; and
P = the predominant illumination power load.

(B) Where there is adjustable position lighting such as trapeze lighting or track lighting other than trunking systems that accept fluorescent lamps—

(aa) the rating of the circuit breaker protecting the track; or

(bb) of extra low voltage, 80% of the power rating of the transformer; or

(cc) of mains voltage, 100 W per metre of track.

(c) The requirements of (a) and (b) do not apply to the following:

(i) Emergency lighting in accordance with Part E4.

(ii) Signage and display lighting within cabinets and display cases that are fixed in place.

(iii) Lighting for accommodation within the residential part of a *detention centre*.

(iv) A heater where the heater also emits light, such as in bathrooms.

(v) Lighting of a specialist process nature such as in an operating theatre, fume cupboard or clean workstation.

(vi) Lighting of performances such as theatrical or sporting.

(vii) Lighting for the permanent display and preservation of works of art or objects in

a museum or gallery other than for retail sale, purchase or auction.

Maximum lighting intensities are outlined below in Table 8.

Table 8: Maximum lighting intensity for all retail areas & serviced apartments North Site

Area name	Level	Maximum illumination power density (W/m^2)
Car park – General	B2, B1	25
Plant rooms	B2, B1	5
Fan rooms	B2, B1	5
Lift lobbies	B2	15
Residential Stores	B2	8
Pump rooms	B1	5
Switch room	B1	9
Garbage rooms	B1	5
Mall entry	B1, G	15
Car park – Entry zone (first 20m of travel)	B1&G	6
SP 01N – SP 11N	G	22
Mini Major Supermarket	G	22
Retail MGMT	G	22
Amenities	G	6
Entry lobby to residential buildings 1A & 1B	G	15
Corridors (non-residential areas)	G	8
Corridors on residential levels	1-7	8

Table 9: Maximum lighting intensity for all retail areas & serviced apartments South Site

Area name	Level	Maximum illumination power density (W/m^2)
Car park – General	B2, B1	25
Plant rooms	B2, B1	5
Fan rooms	B2, B1	5
Lift lobbies	B2	15
Residential & Serviced Apartment Stores	B2	8
Pump rooms	B1	5
Switch room	B1	9
Garbage rooms	B1	5
Travelator to Mall	B1	15
Bicycle parking	B1	6
Car park – Entry zone (first 20m of travel)	B1&G	6
SP 01S – SP 38N	G	22
MM 01S & MM 02S	G	22

Area name	Level	Maximum illumination power density (W/m^2)
Retail MGMT	G	22
Community	G	10
Amenities	G	6
Entry lobby to residential buildings 3, 5, 7 & serviced apartments	G	15
Corridors (non-residential areas)	G	8
Corridors on residential levels	1-7	8

Therefore each area of the development complies with the NCC requirements.

2.6.2 J6.3 Interior Artificial Lighting and Power Control

(a) Artificial lighting of a room or space must be individually operated by a switch or other control device.

(b) An occupant activated device, such as a room security device, a motion detector in accordance with Specification J6, or the like, must be provided in the *sole-occupancy unit* of a Class 3 building, other than where providing accommodation for people with a disability or the aged, to cut power to the artificial lighting, air-conditioner, local exhaust fans and bathroom heater when the *sole-occupancy unit* is unoccupied.

(c) An artificial lighting switch or other control device in (a) must—

(i) if an artificial lighting switch, be located in a visible position—

(A) in the room or space being switched; or

(B) in an adjacent room or space from where the lighting being switched is visible; and

(ii) for other than a single functional space such as an auditorium, theatre, *swimming pool*, sporting stadium or warehouse—

(A) not operate lighting for an area of more than 250 m^2 if in a Class 5 building or a Class 8 laboratory; or

(B) not operate lighting for an area of more than—

(aa) 250 m^2 for a space of not more than 2000 m^2; or

(bb) 1000 m^2 for a space of more than 2000 m^2,

If in a Class 3, 6, 7, 8 (other than a laboratory) or 9 building.

(d) 95% of the light fittings in a building or *storey* of a building, other than a Class 2 or 3 building or a Class 4 part, of more than 250 m^2 must be controlled by—

(i) a time switch in accordance with Specification J6; or

(ii) an occupant sensing device such as—

(A) a security key card reader that registers a person entering and leaving the building; or

(B) a motion detector in accordance with Specification J6.

(e) In a Class 5, 6 or 8 building of more than 250 m^2, artificial lighting in a natural

lighting zone adjacent to windows must be separately controlled from artificial lighting not in a natural lighting zone in the same *storey* except where—

(i) the room containing the natural lighting zone is less than 20 m^2; or

(ii) the room's natural lighting zone contains less than 4 luminaires; or

(iii) 70% or more of the luminaires in the room are in the natural lighting zone.

(f) The requirements of (a), (b), (c), (d) and (e) do not apply to the following:

(i) Emergency lighting in accordance with Part E4.

(ii) Where artificial lighting is needed for 24-hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a *detention centre*.

(g) The requirements of (d) do not apply to the following:

(i) Artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation such as in a *patient care area* in a Class 9a building or in a Class 9c *aged care building*.

(ii) A heater where the heater also emits light, such as in bathrooms.

Any Motion detector and dimming systems to be installed in the development will comply with J6.3 of the NCC.

2.6.3 J6.4 Interior Decorative and Display Lighting

(a) Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled—

(i) separately from other artificial lighting; and

(ii) by a manual switch for each area other than when the operating times of the displays are the same in a number of areas such as in a museum, art gallery or the like, in which case they may be combined; and

(iii) by a time switch in accordance with Specification J6 where the display lighting exceeds 1 kW.

(b) Window display lighting must be controlled separately from other display lighting.

All interior decorative and display lighting will comply with J6.4 of the NCC.

2.6.4 J6.5 Artificial Lighting Around the Perimeter of a Building

(a) Artificial lighting around the perimeter of a building, must—

(i) be controlled by—

(A) a daylight sensor; or

(B) a time switch that is capable of switching on and off electric power to the system at

(ii) when the total perimeter lighting load exceeds 100 W—

(A) have an average *light source efficacy* of not less than 60 Lumens/W; or

(A) have an average *light source efficacy* of not less than 60 Lumens/W; or

(B) be controlled by a motion detector in accordance with Specification J6; and

(iii) when used for decorative purposes, such as facade lighting or signage lighting, have a separate time switch in accordance with Specification J6.

(b) The requirements of (a)(ii) do not apply to the following:

(i) Emergency lighting in accordance with Part E4.

(ii) Lighting around a *detention centre*.

All artificial lighting around the perimeter will comply with J6.5 of the NCC.

2.6.5 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 in accordance with Specification J6.

All power supply installation for a boiler and chilled water storage units will comply with J6.6 of the NCC.

2.7 PART J7: HOT WATER SUPPLY

2.7.1 J7.2 Hot Water Supply

A hot water supply system for food preparation and sanitary purposes, other than a solar hot water supply system in *climate zones* 1, 2 and 3, must be designed and installed in accordance with Section 8 of AS/NZS 3500.4.

The developer intends that the proposed Hot Water System will comply with Part J7.2 of the NCC.

Gas should be considered for the hot water supply system, as the use of gas as the energy source for hot water system means lower greenhouse gas emissions, efficiency and lower running costs. Using a natural gas hot water system generates about one third of the greenhouse gas emissions of a conventional electric hot water heater[9].

2.7.2 J7.3 Swimming Pool Heating and Pumping

(a) Heating for a *swimming pool* must be by—

(i) a solar heater not boosted by electric resistance heating; or

(ii) a heater using reclaimed energy; or

(iii) a gas heater; or

(iv) a heat pump; or

(v) a combination of 2 or more of (i), (ii), (iii) and (iv).

(b) Where some or all of the heating *required* by (a) is by a gas heater or a heat pump, the *swimming pool* must have—

(i) a cover other than when located in a *conditioned space*; and

(ii) a time switch in accordance with Specification J6 to control the operation of the heater.

(c) A time switch must be provided in accordance with Specification J6 to control the operation of a circulation pump for a *swimming pool*.

(d) For the purpose of J7.3, a *swimming pool* does not include a spa pool.

All swimming pools heating & pumping will comply with J7.3 of the NCC.

2.7.3 J7.4 Spa Pool Heating and Pumping

There is no spa hence Section J7.4 is not applicable.

[9] *Australian Gas Association, Research Paper No. 16*

2.8 PART J8: ACCESS FOR MAINTENANCE

2.8.1 J8.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part do not apply—

(a) within a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building; or

(b) to a Class 8 *electricity network substation*.

2.8.2 J8.2 Access for Maintenance

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

PART I2
ENERGY EFFICIENCY INSTALLATIONS
Deemed-to-Satisfy Provisions

I2.0 Deemed-to-Satisfy Provisions

(a) Where a *Building Solution* is proposed to comply with the *Deemed-to-Satisfy Provisions*, *Performance Requirement* IP2.1 is satisfied by complying with I2.1 to I2.2.

(b) Where a *Building Solution* is proposed as an *Alternative Solution* to the *Deemed-to-Satisfy Provisions* of I2.1 to I2.2, the relevant *Performance Requirements* must be determined in accordance with A0.10.

I2.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part do not apply to *services* serving only one *sole-occupancy unit* of a Class 2 building or serving a Class 4 part of a building.

I2.2 Components of services

Components of *services* must be maintained to ensure that they perform to a standard not less than they were originally *required* to achieve, including—

(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—
(i) a source that is renewable on-site such as solar, geothermal or wind; or
(ii) another process as reclaimed energy.

The developer intends to comply. Necessary measures will be taken to ensure access for maintenance to all services and their components. It is envisaged at this stage that through regular maintenance, an ongoing evaluation of systems can be done to ensure that the systems are delivering maximum efficiency.

2.8.3 J8.3 Facilities for Energy Monitoring

(a) A building or *sole-occupancy unit* with a *floor area* of more than 500 m^2 must have the facility to record the consumption of gas and electricity.

(b) A building with a *floor area* of more than 2,500 m^2 must have the facility to record individually the energy consumption of—

(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.

(c) The provisions of (b) do not apply to a Class 2 building with a *floor area* of more than 2,500 m^2 where the total area of the common areas is less than 500 m^2.

If the buildings total floor area exceeds 2,500m^2, the facility must be able to record individually the consumption of all utilities as per J8.3(b) of the NCC.

3. CONCLUSION

The following recommendations have been made with the aim to achieve compliance of NCC Section J:

- BASIX requirements can be found in VIPAC report 20C-11-0069-TRP-265525-2 and BASIX Certificate No's. 425799M_02, 425840M_02, 425860M_02 AND 425857M_02.
- **An additional R3.2 roof/ceiling insulation** is required for all exposed **concrete** ceilings/roof for the retail areas & serviced apartments.
- **An additional R3.3 roof/ceiling insulation** is required for all exposed **metal cladding** ceilings/roof for the retail areas & serviced apartments.
- All retail areas require **an additional R2.3 insulation for all external walls** in order to satisfy the requirements for NCC compliance.
- All serviced apartments require **an additional R2.4 insulation for all external walls** in order to satisfy the requirements for NCC compliance.
- All retail areas & serviced apartments require **an additional R1.3 insulation for all internal walls adjacent to unconditioned spaces** in order to satisfy the requirements for NCC compliance.
- All retail areas require **an additional R1.7 insulation for all suspended floors** in order to satisfy the requirements for NCC compliance.
- Recommendations regarding glazing and lighting have been made within the body of the report.

While every endeavour has been made to provide a realistic energy rating for the proposed development, we note that the energy calculating process using computer program simulation is not 100% accurate.

The energy efficiency of any building is determined not only by the design but also by the energy consumption requirements and practices of the occupants. Actual energy consumption will not be known until a building is occupied and operational.

4. ARCHITECTURAL DRAWINGS

The building sustainability performance assessment carried out in this report was based on the following architectural drawings supplied by Rice Daubney Architects received on 26th June 2012.

Binder1-Residential.pdf
SK 217 RETAIL NLA SCHEDULE.PDF
SK225 GFA AREA SCHEDULE.PDF
DA 01 EXISTING SITE SURVEY PLAN.PDF
DA 02 SITE PLAN.PDF
DA 03 BASEMENT LEVEL 2 PLAN.PDF
DA 04 BASEMENT LEVEL 1 PLAN.PDF
DA 05 GROUND FLOOR PLAN.PDF
DA 06 LEVEL 1 PLAN.PDF
DA 07 LEVEL 2 PLAN.PDF
DA 08 LEVEL 3 PLAN.PDF
DA 09 LEVEL 4 PLAN.PDF
DA 10 LEVEL 5 PLAN.PDF
DA 11 LEVEL 6 PLAN.PDF
DA 12 LEVEL 7 PLAN.PDF
DA 13 LEVEL 8 PLAN.PDF
DA 14 ROOF PLAN.PDF
DA 15 BUILDING 1 & 1B LAYOUTS.PDF
DA 16 BUILDING 1A LAYOUTS.PDF
DA 17 BUILDING 2 & 3 LAYOUTS.PDF
DA 18 BUILDING 4 & 4A LAYOUTS.PDF
DA 19 BUILDING 5 LAYOUTS.PDF
DA 20 BUILDING 6 & 6A & 6B LAYOUTS.PDF
DA 21 BUILDING 7 LAYOUTS.PDF
DA 22 ELEVATIONS - SHEET 1 SOUTH SITE_ NORTH & WEST ELEVATIONS.PDF
DA 23 ELEVATIONS - SHEET 2 SOUTH SITE_ SOUTH & EAST ELEVATIONS.PDF
DA 24 ELEVATIONS - SHEET 3 NORTH SITE_ EAST & SOUTH ELEVATIONS.PDF
DA 25 ELEVATIONS - SHEET 4 NORTH SITE_ NORTH & WEST ELEVATIONS.PDF
DA 26 SECTIONS.PDF
DA 27 SECTIONS.PDF
DA 28 SECTIONS.PDF
DA 38 STAGING PLAN.PDF