



BUILDING CODE OF AUSTRALIA
Section “J” ASSESSMENT REPORT
For DA lodgement

Description

Proposed New Pre School

Address

**North Rocks Rd,
North Rocks,
NSW**

Client

The Hills Shire Council

Job number

BC15/131

Date

May 2015

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Contents

Contents	2
1.0 Introduction	3
1.1 Climate Zone	3
1.2 Modeled Building Elements – refer to recommendations	3
2.0 BCA Compliance Assessment Section J – Energy Efficiency	4
Part J1 Building Fabric	4
Part J2 External Glazing	7
Part J3 Building Sealing	8
Part J5.0 Air-conditioning & Ventilation Systems	9
Part J6 Artificial Lighting & Power	12
Part J7.2 Hot Water Supply	13
Part J8.2 Access For Maintenance & Facilities For Monitoring	14
3.0 Alternative Solution Assessment	15
4.0 Recommendations	17
Part J1 – Building fabric :	17
Part J2 – Glazing :	18
Part J3 – Building Sealing :	18
Part J5 - Air-Conditioning & Ventilation Systems :	19
Part J6 – Artificial Lighting & Power :	19
Part J7 – Hot Water Supply:	19
Part J8 – Access For Maintenance and Facilities for Monitoring:	19
4.1 Notification + Certificates Required for completion certificate	20
5.0 Conclusion	21
Attachments	22
Attachment “A” Specification J6	22
Attachment “B” Specification J5.2a Fans	25
Attachment “C” Specification J5.2b Ductwork Insulation and Sealing	27
Attachment “D” Specification J5.2c Piping, Vessel, Heat Exchanger and Tank Insulation	28
Attachment “E” Specification J5.2d – Space Heating	30
Attachment “F” Specification J5.2e – Energy efficiency Ratios	31
Attachment “G” Conditioned Space	32
Attachment “H” Simulation Inputs	33
Attachment “I” Simulation Outputs / Results	34
Attachment “J” Disclaimer	35



1.0 Introduction

B.E.C.A (Building Energy Consultants Australia) Pty, Ltd, have been commissioned to produce a Building Code of Australia (2015) Section J assessment of the subject development, in order to assess the level of development compliance.

This report only deals with the relevant provisions of Section J and does not deal with the following:

- Consideration of the remainder parts of the Building Code of Australia (BCA) 2015, other than Section J.
- Consideration of Council's local planning policies.
- Other documentation forming part of the Development application.
- Impact of FRL's by use of insulation

The proposal is to be located at North Rocks Rd, North Rocks, NSW. This report has been prepared, subject to the referenced documents, in accordance with the provisions of the Building Code of Australia (**BCA 2015**).

The following document references have been relied upon as prepared by A&N Design Sydney:

Job No: A22625
Sheets: 1, 2, 3, 4
Issue : C

1.1 Climate Zone

Fig A1.1 and Table A1.1 of the BCA 2015 **Climate Zone 5**

1.2 Modeled Building Elements – refer to recommendations

Suspended Floor of conditioned space	Concrete Suspended slab without in-slab heating system
Internal Walls of conditioned space	Lightweight
External walls of conditioned space	Brick Veneer / Metal Cladding - Insulated
Roof	Metal – Dark / Insulated



2.0 BCA Compliance Assessment Section J – Energy Efficiency

The following provides an assessment of the subject design against the relevant ‘Deemed To Satisfy (DTS) provisions of the BCA.

Part J1 Building Fabric

Section	Description	Requirements
J 1.1 Application of Part	The Deemed-to-Satisfy Provisions of this Part apply to building elements forming the envelope of the conditioned areas. Refer to “Attachment G” for outline of conditioned space	Required to comply
J 1.2 Thermal construction general	<p>(a) Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it—</p> <ul style="list-style-type: none"> (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 butt against the members; 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. <p>(b) Where required, reflective insulation must be installed with—</p> <ul style="list-style-type: none"> (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— <ul style="list-style-type: none"> (A) overlapped not less than 50 mm; or (B) taped together. <p>(c) Where required, bulk insulation must be installed so that—</p> <ul style="list-style-type: none"> (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. 	Readily achievable. Must be installed and certified to this section
J 1.3 Roof and ceiling construction	<ul style="list-style-type: none"> • The roof / Ceiling that is part of the envelope (exposed to the external environment) of the conditioned areas must achieve a minimum Total R-Value of <ul style="list-style-type: none"> - R4.2 (Direction of Heat Flow) Downwards where the roof has an upper surface solar absorptance value of more than 0.6 • Ensure the insulation is not compressed to the point where the R-Value is reduced. 	Readily achievable



- 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**

Table J1.3b Adjustment of Minimum R-Value for loss of ceiling insulation.

Table J1.3b ADJUSTMENT OF MINIMUM R-VALUE FOR LOSS OF CEILING INSULATION

Percentage of ceiling area uninsulated	Minimum R-Value of ceiling insulation required to satisfy J1.3(a)										
	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
	Adjusted minimum R-Value of ceiling insulation required to compensate for loss of ceiling insulation area										
0.5% to less than 1.0%	1.0	1.6	2.2	2.8	3.4	4.0	4.7	5.4	6.2	6.9	
1.0% to less than 1.5%	1.1	1.7	2.3	2.9	3.6	4.4	5.2	6.1	7.0		
1.5% to less than 2.0%	1.1	1.7	2.4	3.1	3.9	4.8	5.8	6.8			
2.0% to less than 2.5%	1.1	1.8	2.5	3.3	4.2	5.3	6.5				
2.5% to less than 3.0%	1.2	1.9	2.6	3.6	4.6	5.9					
3.0% to less than 4.0%	1.2	2.0	3.0	4.2	5.7						
4.0% to less than 5.0%	1.3	2.2	3.4	5.0							
5.0% or more											
Note: Where the minimum <u>R-Value</u> of ceiling insulation <u>required</u> to satisfy <u>J1.3(a)</u> is between the values stated, interpolation may be used to determine the adjusted minimum <u>R-Value</u> .											

- A roof that is required to achieve a minimum Total R-Value and has metal sheet roofing fixed to metal purlins / rafters or battens and has a ceiling lining fixed directly to those metal purlins / rafters or battens 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 member.

Refer to “Attachment G” for outline of conditioned space

J 1.4 Roof lights	Not applicable	Not applicable
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<p>J 1.5 Walls</p>	<ul style="list-style-type: none"> • Each part of an external wall of the conditioned areas must achieve a minimum Total R-Value of R2.8. • A wall that is required to achieve a minimum Total R-Value and has metal sheeting / lightweight cladding fixed to a metal frame and has wall lining fixed directly to the 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. <div data-bbox="418 577 1155 1003" data-label="Image"> </div> <p>A thermal break is required in the first diagram where there is only one member connecting the cladding to the lining but not in the second diagram where there are two members, i.e. a column and a cross member.</p> <ul style="list-style-type: none"> • Internal walls of the conditioned areas adjacent to the external store room must achieve a minimum Total R-Value of R1.8 • Insulation to extend to the underside of the roof. <p>Contact Building & Energy Consultants Australia if you need assistance with the selection of insulation.</p> <p>Refer to “Attachment G” for conditioned space</p>	<p>Readily achievable</p>
<p>J 1.6 Floors</p>	<p>The suspended floor of class room 2 and storage area must achieve a minimum Total R-Value of R2.0 Downwards.</p> <p>The insulation required to the suspended floor has been removed in the JV3 model</p> <p>Other floors. Assessed as slab on ground WITHOUT any in slab heating</p>	<p>Does not comply</p> <p>Alternative Solution to be provided – Refer to Section 3.0 of this report</p>



Part J2 External Glazing

Section	Description	Requirements																					
J 2.1 Application of Part	Glazing of a building must be designed and installed, as appropriate, in accordance with J2.4 for this building.	Required to comply																					
J 2.4 Glazing - Method 2	<p>Glazing and supporting frames must not exceed the performance values for Total U-Values and SHGC Values (Solar Heat Gain Coefficient) in (AFRC) (Australian Fenestration Rating Council) allowances attained below.</p> <p>Ground floor Glazing—DTS</p> <table border="1"> <thead> <tr> <th>Wall orientation</th> <th>Total U—Value (AFRC)</th> <th>SHGC (AFRC)</th> </tr> </thead> <tbody> <tr> <td>North West</td> <td>5.8</td> <td>0.42</td> </tr> <tr> <td>South East</td> <td>5.8</td> <td>0.99</td> </tr> <tr> <td>South West</td> <td>1.0</td> <td>0.99</td> </tr> <tr> <td>North East</td> <td>5.84</td> <td>0.60</td> </tr> </tbody> </table> <p>Ground Floor Glazing – JV3</p> <table border="1"> <thead> <tr> <th>Wall orientation</th> <th>Glass Type</th> <th>Frame type</th> </tr> </thead> <tbody> <tr> <td>All External Glazing</td> <td>Comfort Plus Clear Glass</td> <td>400 series Commercial</td> </tr> </tbody> </table> <p>Comfort Plus Clear Glass Total U Value 4.2 SHGC 0.63</p>	Wall orientation	Total U—Value (AFRC)	SHGC (AFRC)	North West	5.8	0.42	South East	5.8	0.99	South West	1.0	0.99	North East	5.84	0.60	Wall orientation	Glass Type	Frame type	All External Glazing	Comfort Plus Clear Glass	400 series Commercial	<p>Does not comply –</p> <p>Alternative Solution to be provided – Refer to Section 3.0 of this report</p> <p>Certification from the manufacturer to be provided stating compliance to AFRC values including frame (refer to recommendations)</p>
Wall orientation	Total U—Value (AFRC)	SHGC (AFRC)																					
North West	5.8	0.42																					
South East	5.8	0.99																					
South West	1.0	0.99																					
North East	5.84	0.60																					
Wall orientation	Glass Type	Frame type																					
All External Glazing	Comfort Plus Clear Glass	400 series Commercial																					
J 2.5 Shading	As per drawing	As per plans																					



Part J3 Building Sealing

Section	Description	Requirements
J 3.1 Application of Part	<p>The Deemed-to-Satisfy Provisions of this Part apply to the conditioned areas other than-</p> <ul style="list-style-type: none"> • A permanent ventilation opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; & • A building or space where the mechanical ventilation required by Part F4 provides sufficient pressurization to prevent infiltration. 	Required to comply subject to compliance with application
J 3.2 Chimneys and flues	Not applicable	Not Applicable
J 3.3 Roof lights	Not Applicable	Not Applicable
J 3.4 External windows and doors	<ul style="list-style-type: none"> • A seal to restrict air infiltration must be fitted to each edge of an external door, openable external window or the like when serving a conditioned space. • A seal required for the bottom edge of an external swing door, must be a draft protection device • For other edges of an external door or the edges of an openable window or other such opening, may be a foam or rubber compressible strip, fibrous seal or the like. <p>The requirements above do not apply to a window complying with AS 2047 & a fire door.</p> <ul style="list-style-type: none"> • An entrance door leading to a conditioned space must be self closing 	Readily achievable
J 3.5 Exhaust fans	Miscellaneous exhaust fans that form part of the conditioned space must have self closing dampers provided	Readily achievable
J 3.6 Construction of roofs, walls and floors	<p>(a) Roofs, ceilings, walls, floors and any opening such as a window, door or the like must be constructed to minimise air leakage in accordance with (b) when forming part of the envelope.</p> <p>(b) Construction required by (a) must be—</p> <ul style="list-style-type: none"> (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. <p>(c) The requirements of (a) do not apply to openings, grilles and the like required for smoke hazard management.</p>	Readily achievable
J 3.7	Not applicable	Not applicable



Part J5.0 Air-conditioning & Ventilation Systems

Section	Description	Requirements
J 5.2 Air-conditioning systems	<p>(a) Control —</p> <p>(i) An <i>air-conditioning</i> system—</p> <p>(A) must be capable of being deactivated when the building or part of a building served by that system is not occupied; and</p> <p>(B) when serving more than one <i>air-conditioning</i> zone or area with different heating or cooling needs, must—</p> <p>(aa) thermostatically control the temperature of each zone or area; and</p> <p>(bb) not control the temperature by mixing actively heated air and actively cooled air; and</p> <p>(cc) limit reheating to not more than—</p> <p>(AA) for a fixed supply air rate, a 7.5 K rise in temperature; and</p> <p>(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</p> <p>(C) which provides the <i>required</i> mechanical ventilation, other than in process-related applications where humidity control is needed, must have an <i>outdoor air economy cycle</i>—</p> <p>(aa) in <i>climate zones</i> 2 or 3, when the <i>air-conditioning</i> system capacity is more than 50 kW_r; or</p> <p>(bb) in <i>climate zones</i> 4, 5, 6, 7 or 8, when the <i>air-conditioning</i> system capacity is more than 35 kW_r; and</p> <p>(D) which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating; and</p> <p>(E) except for a packaged <i>air-conditioning</i> system, must have a variable speed fan when its supply air quantity is capable of being varied; and</p> <p>(F) when serving a <i>sole-occupancy unit</i> in a Class 3 building, must not operate when any external door of the <i>sole-occupancy unit</i> that opens to a balcony or the like, is open for more than one minute.</p> <p>(ii) When an <i>air-conditioning</i> system is deactivated, any motorised outside air and return dampers must close.</p> <p>(iii) Compliance with (i) must not adversely affect—</p> <p>(A) smoke hazard management measures <i>required</i> by Part E2; and</p> <p>(B) ventilation <i>required</i> by Part E3 and Part F4.</p> <p>(b) Fans — Fans of an <i>air-conditioning</i> system must comply with Specification J5.2a.</p> <p>(c) Pumps —</p> <p>(i) An <i>air-conditioning</i> system, where water is circulated by pumping at more than 2 L/s, must be designed so that the maximum <i>pump power</i> to the pump complies with Table J5.2.</p> <p>(ii) An <i>air-conditioning</i> system pump that is rated at more than 3 kW of <i>pump power</i> and circulates water at more than 2 L/s must be capable of varying its speed in response to varying load.</p>	<p>Readily achievable. Must be installed & certified to this section.</p> <p>Refer to Attachment “B” for Specification J5.2</p>



(iii) A spray water pump of an *air-conditioning* system's closed circuit cooler or evaporative condenser must not use more than 150 W of *pump power* for each L/s of spray water circulated.

Table J5.2 MAXIMUM PUMP POWER

Cooling or heating load (W/m ² of the floor area of the conditioned space)	Maximum <i>pump power</i> (W/m ² of the floor area space)		
	Chilled water	Condenser water	
Up to 100	1.3	0.9	
101 to 150	1.9	1.2	
151 to 200	2.2	2.2	
201 to 300	4.3	3.0	
301 to 400	5.0	3.6	
More than 400	5.6	5.6	

Note: Values do not include any motor losses.

(d) Insulation —

(i) The ductwork of an *air-conditioning* system must be insulated and sealed in accordance with **Specification J5.2b**.

(ii) *Piping*, vessels, heat exchangers and tanks containing heating or cooling fluid that are part of an *air-conditioning* system, other than those with insulation levels covered by MEPS, must be insulated in accordance with **Specification J5.2c**.

(e) Space heating — A heater used for *air-conditioning* or as part of an *air-conditioning* system must comply with **Specification J5.2d**.

(f) Energy efficiency ratios —

- (i) refrigerant chillers used as part of an *air-conditioning* system; and
- (ii) packaged *air-conditioning* equipment,

must comply with **Specification J5.2e**.

(g) Time switches —

(i) A time switch complying with **Specification J6** must be provided to control—

- (A) an *air-conditioning* system of more than 10 kW_r; and
- (B) a heater of more than 10 kW heating used for *air-conditioning*.

(ii) The requirements of **(i)** do not apply to—

- (A) an *air-conditioning* system that serves—
 - (aa) only one *sole-occupancy unit* in a Class 2 or 3 building; or
 - (bb) a Class 4 part of a building; or
 - (cc) only one *sole-occupancy unit* in a Class 9c building; or

(B) a building where *air-conditioning* is needed for 24 hour occupancy.



<p>J 5.3 Mechanical Ventilation Systems</p>	<p>(a) Control —</p> <p>(i) A mechanical ventilation system, including one that is part of an <i>air-conditioning</i> system, except where the mechanical system serves only one <i>sole-occupancy unit</i> in a Class 2 building or serves only a Class 4 part of a building, must—</p> <p>(A) be capable of being deactivated when the building or part of the building served by that system is not occupied; and</p> <p>(B) when serving a <i>conditioned space</i>—</p> <p>(aa) not exceed the minimum <i>outdoor air</i> quantity <i>required</i> by Part F4, where relevant, by more than 20%; and</p> <p>(bb) in other than <i>climate zone 2</i>, where the number of square metres per person is not more than 1 as specified in D1.13 and the air flow rate is more than 1000 L/s, have—</p> <p>(AA) an energy reclaiming system that preconditions outside air; or</p> <p>(BB) the ability to automatically modulate the mechanical ventilation <i>required</i> by Part F4 in proportion to the number of occupants.</p> <p>(ii) The requirements of (a)(i)(B)(aa) do not apply where—</p> <p>(A) additional unconditioned outside air is supplied for free cooling or to balance process exhaust; or</p> <p>(B) additional exhaust ventilation is needed to balance the <i>required</i> mechanical ventilation; or</p> <p>(C) an energy reclaiming system preconditions all the outside air.</p> <p>(iii) Compliance with (a)(i) must not adversely affect—</p> <p>(A) smoke hazard management measures <i>required</i> by Part E2; and</p> <p>(B) ventilation <i>required</i> by Part E3 and Part F4.</p> <p>(b) Fans — Fans of a mechanical ventilation system covered by (a) must comply with Specification J5.2a.</p> <p>(c) Time switches —</p> <p>(i) A time switch complying with Specification J6 must be provided to control a mechanical ventilation system with an air flow rate of more than 1000 L/s.</p> <p>(ii) The requirements of (i) do not apply to—</p> <p>(A) a mechanical ventilation system that serves—</p> <p>(aa) only one <i>sole-occupancy unit</i> in a Class 2 or 3 building; or</p> <p>(bb) a Class 4 part of a building; or</p> <p>(cc) only one <i>sole-occupancy unit</i> in a Class 9c building; or</p> <p>(B) a building where mechanical ventilation is needed for 24 hour occupancy.</p>	<p>Readily achievable. Must be designed and certified to this section</p>
<p>J 5.4 Miscellaneous exhaust systems</p>	<p>Not Applicable</p>	<p>Not Applicable</p>



Part J6 Artificial Lighting & Power

Section	Description	Requirements
J 6.1 Application of Part	The Deemed-to-Satisfy Provisions of this Part do not apply within a sole-occupancy unit of a Class 2 building or a Class 4 part of a building.	Required to comply
J 6.2 Interior artificial lighting	<p>The aggregate design illumination power load for this Building must not exceed 6,316 Watts in total.</p> <p>If this is exceeded, further assessment will be required to achieve compliance.</p> <p>The requirements listed above do not apply to Emergency lighting in accordance with Part E4.</p>	Readily achievable. Must be designed and certified to this section
J6.3 Interior artificial lighting and power control	<ul style="list-style-type: none"> • An artificial lighting switch must— <ul style="list-style-type: none"> (i) be located in a visible position— <ul style="list-style-type: none"> (A) in the room or space being switched; or (B) in an adjacent room or space from where the lighting being switched is visible. • 95% of the light fittings in a building or storey of a building, of more than 250 m² in floor area must be controlled by— <ul style="list-style-type: none"> (i) a time switch in accordance with Specification J6; or (ii) an occupant sensing device such as— <ul style="list-style-type: none"> (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.(see Attachment A) • Artificial lighting adjacent to windows is to be switched separately from artificial lighting not adjacent to windows. • One lighting switch cannot operate more than 250m² of lighting in an area of not more than 2000m² <p>The requirements above do not apply to the following Emergency lighting in accordance with Part E4 and where artificial lighting is needed for 24-hour occupancy.</p>	Readily achievable. Must be designed / installed and certified to this section
J 6.4 Interior decorative and display lighting	<p>(a) Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled—</p> <ul style="list-style-type: none"> (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. <p>(b) Window display lighting must be controlled separately from other display lighting.</p>	Readily achievable. Must be designed and certified to this section



J 6.5 Artificial lighting around the perimeter of a building	<p>Artificial lighting around the perimeter of a building, must—</p> <ul style="list-style-type: none"> (i) be controlled by – <ul style="list-style-type: none"> (A) a daylight sensor or (B) a time switch that is capable of switching on and off electric power to the system at variable pre-programmed times and on variable pre-programmed days; and (ii) when the total perimeter lighting load exceeds 100 W— <ul style="list-style-type: none"> (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. <p>The requirements of above do not apply to Emergency lighting in accordance with Part E4.</p>	<p>Readily achievable. Must be designed / installed and certified to this section.</p> <p>See attachment “A” for Specification J6</p>
J 6.6 Boiling water and chilled water storage units	<p>Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification J6.</p> <p>Electric hot water systems are required to comply with this clause</p>	<p>Readily achievable</p>

Part J7.2 Hot Water Supply

Section	Description	Requirements
J 7.2 Hot water supply	<p>A heated water supply system for food preparation and sanitary purposes, must be designed and installed in accordance with Part B2 NCC Volume Three Plumbing Code of Australia</p> <p>The Design, construction, installation, replacement, repair, alteration and maintenance of a heated water service must be in accord with AS/NZS 3500.4 and the requirements of this part</p>	<p>Readily achievable. Must be installed and certified to this section</p>



Part J8.2 Access For Maintenance & Facilities For Monitoring

Section	Description	Requirements
J 8.1 Application of Part	The <i>Deemed-to-Satisfy Provisions</i> of this Part do not apply within a sole occupancy unit of a Class 2 building or a class 4 part of a building.	Required to comply
J8.3 Facilities for energy monitoring	A building with a floor area of more than 500m ² must have the facility to record the consumption of gas and electricity	Readily achievable. Must be designed and certified to this section



3.0 Alternative Solution Assessment

Summary: An alternative solution has been developed to address the DTS non-compliances identified in Section 2.0 above.

BCA DTS Requirement	J1.6 & J2.4
Non-Compliance with BCA DTS Provision	<ul style="list-style-type: none"> • J1.6- Floor insulation has been removed from class room 2 /Store room common to undercroft storage area. • J2.4- Comfort Plus Clear glazing is to be used in lieu of various types of glazing
Relevant Performance Requirements	<p>Pursuant to BCA Clause A0.10, all relevant performance requirements from within the same section and any other section must be identified and considered. The following performance requirements are identified as being the only relevant performance requirements:</p> <p>JP1 A building, including its services, must have, to the degree necessary, features that facilitate the efficient use of energy appropriate to—</p> <ul style="list-style-type: none"> (a) the function and use of the building and services; and (b) the internal environment; and (c) the geographic location of the building; and (d) the effects of nearby permanent features such as topography, structures and buildings; and (e) solar radiation being— <ul style="list-style-type: none"> (i) utilised for heating; and (ii) controlled to minimise energy for cooling; and (f) the sealing of the building envelope against air leakage; and (g) the utilisation of air movement to assist heating and cooling; and (h) the energy source of the services.
Assessment Methodology	<ul style="list-style-type: none"> • BCA Clause A0.5 (b) (i) complies with the Performance Requirements • BCA Clause A0.9 (b) (i) verification methods in the BCA



Assessment
& Analysis

Assessment Method

Assessment Method – BCA Volume 1, Part A0.9 b(i)

This Building has been assessed using the JV3 Verification method using a “reference building” which is a BCA Alternative Solution to the Deemed to Satisfy (DTS) provisions.

Simulations were conducted with EnergyPlus software which complies with the ABCB Protocol for Energy Analysis Software. This is in accordance with the requirements of the Verification Method JV3. Parameters for the energy simulation were taken from Specification JV – Annual Energy Consumption Criteria.

Refer to “**Attachment H**” for a Summary of Parameters

Compliance Summary

JP1

This Development has been assessed using energy modeling under Verification method JV3. This method uses the Deemed to Satisfy (DTS) requirements to create a “**Reference Building**” and set a target for annual energy consumption .

The calculated energy consumption for this building is **55457.73** kWh.

Compliance is verified when it is determined that the annual energy consumption of the “**Proposed Building**” with its services is not more than the annual energy consumption of the “**Reference Building**”

The “**Proposed Building**” specification was assessed to achieve an annual energy consumption for the building envelope of **54803** kWh.

The Deemed to Satisfy services are to be used for the proposed building. No changes to DTS Services.

The energy consumption of the Proposed Building is less than the Reference Building so compliance with JV3 and JP1 is achieved.



4.0 Recommendations

Part J1 – Building fabric :

CONTACT BUILDING & ENERGY CONSULTANTS AUSTRALIA PRIOR TO PURCHASING INSULATION TO ENSURE PRODUCTS COMPLY

1. Builder to ensure Insulation manufacturer supplies Total system R-Value of product and installation procedures. Certification required from installer when applying for an occupation certificate.
2. Insulation must be installed to comply with the requirements set out in Section J1.2 of this report. An installation certificate must be provided by the installer to state compliance with **Section J1.2** of this report & **AS/NZ 4859.1**.
3. **Roof / ceiling of the conditioned spaces** must be insulated as Per Section J1.2 and J1.3 of this report. Ensure compliant total systems R-Values are provided and installation procedures from manufacturer supplying insulation
4. External Walls of the conditioned spaces must be insulated as per Section J1.2 and J1.5 of this report. Ensure compliant total systems R-Values are provided and installation procedures from manufacturer supplying insulation

Refer to “**Attachment G**” for outline of conditioned space.

** Note 1: Please be advised of additional and specific Fire Hazard Property requirements for insulation and reflective foil materials necessitating compliance with the BCA Clause C1.10. Fire test reports and Specifications for products should be confirmed with the Certifying authority prior to purchase / installation.*



Part J2 – Glazing :

CONTACT BUILDING & ENERGY CONSULTANTS AUSTRALIA PRIOR TO PURCHASING WINDOWNS TO ENSURE WERS RATING COMPLIANCE

5. **Glazing and supporting frames** for this building must achieve a **U-Value and SHGC value (AFRC) as per the figures below. AFRC Certificate** to be provided at completion of job from the glazing supplier stating compliance with the nominated figures.

Ground Floor Glazing – JV3

Wall orientation	Glass Type	Frame type
All External Glazing	Comfort Plus Clear Glass	400 series Commercial

Comfort Plus Clear Glass Total U Value 4.2 SHGC 0.63

Part J3 – Building Sealing :

The recommendations below do not apply if to a ventilation opening that is necessary for the safe operation of a gas appliance & to a building where mechanical ventilation required by Part F4 provides sufficient pressurization to prevent infiltration.

6. A foam or rubber compressible strip, fibrous seal or the like is to be provided to restrict air infiltration. Must be fitted to each edge of an external door, doors separating a conditioned space from a non-conditioned space and to open-able windows. This requirement does not apply if windows comply with AS 2047 and to a fire door.
7. An entrance door to the conditioned areas must be self closing.
8. Miscellaneous exhaust fans located in the conditioned space must have self closing dampers installed.
9. Roofs, ceilings, walls, floors and any opening such as a window, door or the like must be constructed to minimise air leakage when forming part of the envelope. (these requirements do not apply to openings, grilles and the like required for smoke hazard management)



Part J5 - Air-Conditioning & Ventilation Systems :

Upon completion, when applying for an occupation certificate, a certificate is to be provided from the manufacturer/designer & installer demonstrating compliance with the following recommendations.

10. Proposed air conditioning / ventilation system **MUST** be designed to comply with **section J5 & J8** of this report.

Part J6 – Artificial Lighting & Power :

NOTE: IF there are any issues in not achieving compliance with the building total allowable wattage, please contact Building & Energy Consultants Australia. These recommendations do not apply to Emergency Lighting.

11. The **aggregate design illumination power load** for this Building must not exceed **6,316 Watts in total**.
12. Lighting switches and power controls to be installed as per Section J6.3 of this report.
13. If any interior decorative and display lighting is used, it must comply with Section J6.4 of this report.
14. Artificial lighting around the perimeter of the building must comply with Section J6.5 of this report.
15. Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with **Specification J6**. (Electric storage hot water systems are required to comply with this recommendation)
16. Electrician must also comply with Section J8.3 of this report.

Part J7 – Hot Water Supply:

Certification to be provided from a licensed plumber. Documentation to be provided on the Construction certificate plans.

17. All hot water supply systems must comply with Section J7 of this report

Part J8 – Access For Maintenance and Facilities for Monitoring:

Documentation to be provided on the construction certificate plans.

18. Facilities for **energy monitoring must be provided as per Section J8.3 of this report.**



4.1 Notification + Certificates Required for completion certificate

NOTE: the following states when B.E.C.A needs to carry out an inspection, what will be inspected and what certificates need to be collected.

INSPECTION 1: To be carried out prior to lining the walls/ceilings.

What will be inspected:

- Insulation to determine compliance with Part J1 of this report.

Certificates Required:

- Insulation certificate from installer/manufacture stating compliance with AS/NZS 4859.1 and Total Systems R-Value.

INSPECTION 2: To be carried when the building is complete.

What will be inspected:

- Glazing in accordance with Part J2 of this report
- Building sealing in accordance with Part J3 of this report
- Air – Conditioning & mechanical ventilation systems in accordance with Part J5 of this report
- Artificial lighting & power control in accordance with Part J6 of this report.
- Hot water supply in accordance with Part J7 of this report.
- Access for maintenance and facilities for monitoring energy in accordance with Part J8 of this report.
- **Facilities for Energy Monitoring**

Certificates Required:

- Glazing certificate in accordance with Part J2 of this report.
- Certificate from mechanical consultant stating compliance with Part J5 of this report for the Air-Conditioning & Mechanical systems (cert to state all work carried out and systems installed).
- Certificate from the electrical stating compliance with Part J6 of this report (cert to state all work carried out and systems installed).
- Certificate from the plumber stating compliance with Section 8 of AS/NZS 3500.4



5.0 Conclusion

This assessment was based on drawings (as stated on page 3) of this report) for the Development Application lodgment.

The proposed design was assessed against the DTS provisions of Section J of the BCA (refer to Section 2.0 of this report).

The assessment revealed that while the proposed design is generally capable of satisfying the DTS provisions of the BCA (subject compliance with recommendations in Section 4.0), that Clause J1.6 & J2.4 are proposed to be addressed by alternative solution.

An alternative solution to address the relevant Performance Requirement JP1 has been developed using the verification methods in the BCA (namely JV3). Refer to Section 3.0 of this report.

In summary, subject to the implementation of the recommendations of this report (as contained in Section 4.0, the Performance Requirements of Section J of the Building Code of Australia 2015, will be met.

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Attachments

Attachment “A” Specification J6

Lighting Timers

A lighting timer must –

- (a) be located within 2m of every entry door to the space; and
- (b) have an indicator light that is illuminated when the artificial lighting is off; and
- (c) not control more than –
 - (i) an area of 100m² with a single push button timer; and
 - (ii) 95% of the lights in spaces of area more than 25 m²; and
- (d) Be capable of maintaining the artificial lighting –
 - (i) For not less than 5 minutes and not more than 15 minutes unless it is reset; and
 - (ii) Without interruption if the timer is reset.

Time switch

(a) A time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.

(b) A time switch for internal lighting must be capable of being overridden by -

- (i) a means of turning the lights on, either by-
 - (A) a manual switch or an occupant sensing device that on sensing a person’s presence, overrides the time switch for a period of up to 2 hours, after which there is no further presence detected, the time switch must resume control; or
 - (B) an occupant sensing device that overrides the time switch upon a person’s entry and returns control to the time switch upon the person’s exiting, such as a security card reader; and
- (ii) a manual “off” switch.

(a) A time switch for external lighting must be capable of –

- (i) Limiting the period the system is switched on to between 30 minutes before sunset and 30 minutes after sunrise is determined or detected including any pre-programmed period between these times; and
- (ii) being overridden by a manual switch or a security access system for a period of up to 30 minutes, after which the time switch must resume control.

(b) A time switch for boiling water and chilled water storage units must be capable of being overridden by a manual switch or a security access system that senses a person’s presence, overrides for a period of up to 2 hours, after which if there is no further presence detected, the time switch must resume control.

Motion Detectors

In a Class 2, 3 or 9c aged care building other than within a sole-occupancy unit, a motion detector must –

- (i) be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means; and



- (ii) be capable of detecting a person before they are 1m into the space; and –
- (iii) other than within a sole-occupancy unit of a class 3 building, not control more than -
 - (A) an area of 100m²; and
 - (B) 95% of the lights in spaces of area more than 25m²; and
- (iv) be capable of maintaining the artificial lighting when activated –
 - (A) for not less than 5 minutes and not more than 15 minutes unless it is reset; and
 - (B) without interruption if the motion detector is reset by movement.

In a Class 5, 6, 7, 8, 9a or 9b a motion detector must-

- (v) be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means; and
- (vi) be capable of detecting –
 - (A) a person before they have entered 1m into the space; and
 - (B) movement of 500mm within the useable part of the space; and
- (vii) Not control more than -
 - (A) in other than a carpark, an area of 500m² with a single sensor or group of parallel sensors; and
 - (B) 75% of the lights in spaces using high intensity discharge; and
- (viii) be capable of maintaining the artificial lighting when activated –
 - (A) for a maximum of 30 minutes unless its reset; and
 - (B) without interruption if the motion detector is reset by movement; and
- (ix) not be overridden by a manual switch to permanently leave the lights on.



When outside a building, a motion detector must –

- (i) be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means; and
- (ii) be capable of detecting a person within a distance from the light equal to –
 - (A) twice the mounting height; or
 - (B) 80% of the ground area covered by the light's beam; and
- (iii) not control more than five lights; and
- (iv) be operated in series with a photoelectric cell or astronomical time switch so that the light will not operate in daylight hours; and
- (v) be capable of maintaining the artificial lighting when the switch is on for a maximum of 10 minutes unless it is reset; and
- (vi) have a manual override switch which is reset after a maximum period of 4 hours.

Daylight sensor and dynamic lighting control device

- (a) A daylight sensor and dynamic control device for artificial lighting must—
 - (i) for switching on and off—
 - (A) be capable of having the switching level set point adjusted between 50 and 1000 Lux; and
 - (B) have—
 - (aa) a delay of more than 2 minutes; or
 - (bb) a differential of more than 100 Lux for a sensor controlling high pressure discharge lighting, and 50 Lux for a sensor controlling other than high pressure discharge lighting; and
 - (ii) for dimmed or stepped switching, be capable of reducing the power consumed by the controlled lighting in proportion to the incident daylight on the working plane either—
 - (A) continuously down to a power consumption that is less than 50% of full power; or
 - (B) in no less than 4 steps down to a power consumption that is less than 50% of full power.
- (b) where a daylight sensor and dynamic control device has a manual override switch, the manual override switch must not be able to switch the lights permanently on or bypass the lighting controls



Attachment “B” Specification J5.2a Fans

1. Scope

This Specification contains the requirements for fans used as part of an *air-conditioning* system or a mechanical ventilation system.

2. Application

- (a) This Specification does not apply to—
- (i) fans in unducted *air-conditioning* systems with a supply air capacity of less than 1000 L/s; or
 - (ii) the power for a fan in an energy reclaiming system that preconditions outside air; or
 - (iii) the power for process related components.
- (b) Compliance with this Specification must not adversely affect—
- (i) smoke hazard management measures *required* by **Part E2**; and
 - (ii) ventilation *required* by **Part E3** and **Part F4**.

3. Air-conditioning system fans

- (a) An *air-conditioning* system must be designed so that the *fan motor power* of—
- (i) the supply and return air fans as a combined total is in accordance with **Table 3a**; and
 - (ii) the fan in a cooling tower, closed circuit cooler or an evaporative condenser is in accordance with **Table 3b**; and
 - (iii) the fan in an air-cooled condenser does not use more than 42 W of *fan motor power* for each kW of heat rejected from the refrigerant, when determined in accordance with AHRI 460.
- (b) The requirements of **(a)(iii)** do not apply to the fan of an air-cooled condenser that is part of—
- (i) a refrigerant chiller in an *air-conditioning* system that complies with the energy efficiency ratios in **Specification J5.2e**; or
 - (ii) packaged *air-conditioning* equipment that complies with the energy efficiency ratios in **Specification J5.2e**.

Table 3a MAXIMUM FAN MOTOR POWER – SUPPLY AND RETURN AIR FANS

<i>Air-conditioning</i> sensible heat load (W/m ² of the floor area of the conditioned space)	Maximum <i>fan motor power</i> (W/m ² of the floor area of the conditioned space)	
	For an <i>air-conditioning</i> system serving not more than 500 m ²	For an <i>air-conditioning</i> system serving more than 500 m ²
Up to 100	5.3	8.3
101 to 150	9.5	13.5
151 to 200	13.7	18.3
201 to 300	22.2	28.0
301 to 400	30.7	37.0
More than 400	See Note	

Note: Where the *air-conditioning* sensible heat load is more than 400 W/m², the maximum *fan motor power* must be determined— (a) in a building of not more than 500 m² floor area, using 0.09 W of *fan motor power* for each Watt of *air-conditioning* sensible heat load; and (b) in a building of more than 500 m² floor area, using 0.12 W of *fan motor power* for each Watt of *air-conditioning* sensible heat load.



Table 3b MAXIMUM FAN MOTOR POWER – COOLING TOWER, CLOSED CIRCUIT COOLER AND EVAPORATIVE CONDENSERS

Type of fan	Maximum fan motor power per L/s of cooling fluid circulated		Maximum fan motor power per kW of heat rejected
	Cooling tower	Closed circuit cooler	Evaporative condenser
Propeller or axial	310 W	500 W	18 W
Centrifugal	590 W	670 W	22 W

Note: The cooling fluid circulated may be refrigerant, chilled water, brines or glycol mixtures.

4. Mechanical ventilation system fans

(a) When the air flow rate of a mechanical ventilation system is more than 1000 L/s, the system must—

(i) have a fan motor power to air flow rate ratio in accordance with—

- (A) for general mechanical ventilation systems, **Table 4a**; or
- (B) for *carpark* mechanical ventilation systems, **Table 4b**; and

(ii) for *carpark* exhaust, when serving a *carpark* with more than 40 vehicle spaces, have an atmospheric contaminant monitoring system in accordance with AS 1668.2.

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

- (i) a mechanical ventilation system that is part of an *air-conditioning* system; or
- (ii) the power for a miscellaneous exhaust system complying with **J5.4**; or
- (iii) a *sole-occupancy unit* in a Class 2 building or a Class 4 part of a building.

Table 4a MAXIMUM FAN MOTOR POWER TO AIR FLOW RATE RATIO – GENERAL MECHANICAL VENTILATION SYSTEMS

Filtration	Maximum fan motor power to air flow rate ratio (W/(L/s))
With filters	0.98
Without filters	0.65

Table 4b MAXIMUM FAN MOTOR POWER TO AIR FLOW RATE RATIO – CARPARK MECHANICAL VENTILATION SYSTEMS

Filtration		Maximum fan motor power to air flow rate ratio (W/(L/s))		
		Air flow rate (L/s)		
		1,000 to less than 5,000	5,000 to 50,000	More than 50,000
With filters		0.78	1.12	1.81
Without filters		0.52	0.74	1.2



Attachment “C” Specification J5.2b Ductwork Insulation and Sealing

1. Scope

- (a) This Specification contains the requirements for the sealing and insulating of supply and return ductwork and fittings used in an *air-conditioning* system.
- (b) For the purposes of this Specification, fittings—
- (i) include passive components of a ductwork system; and
 - (ii) exclude active components such as air-handling unit components.

2. Sealing of ductwork

- (a) Ductwork in an *air-conditioning* system must be sealed against air loss in accordance with the duct sealing requirements of AS 4254 Parts 1 and 2 for the static pressure in the system.
- (b) The requirements of (a) do not—
- (i) apply to ductwork located within the only or last room served by the system; and
 - (ii) include the air leakage testing requirements of clause 2.2.4 of AS 4254.2.

3. Insulation of ductwork and fittings

- (a) Ductwork and fittings in an *air-conditioning* system must be provided with insulation—
- (i) complying with AS/NZS 4859.1; and
 - (ii) having a material *R-Value* not less than—
 - (A) that specified in **Table 3**; or
 - (B) 1.0, for flexible ductwork with a length to an outlet or from an inlet of not more than 3 m.
- (b) Insulation must—
- (i) be protected against the effects of weather and sunlight; and
 - (ii) be installed so that it—
 - (A) abuts adjoining insulation to form a continuous barrier; and
 - (B) maintains its position and thickness, other than at flanges and supports; and
 - (iii) when conveying cooled air—
 - (A) be protected by a vapour barrier on the outside of the insulation; and
 - (B) where the vapour barrier is a membrane, be installed so that adjoining sheets of the membrane—
 - (aa) overlap by 50 mm; and
 - (bb) are bonded or taped together.
- (c) The requirements of (a) do not apply to—
- (i) ductwork and fittings located within the only or last room served by the system; or
 - (ii) fittings that form part of the interface with the *conditioned space*; or
 - (iii) return air ductwork in, or passing through, a *conditioned space*; or
 - (iv) ductwork for outside air and exhaust air associated with an *air-conditioning* system; or
 - (v) the floor of an in-situ air-handling unit; or
 - (vi) packaged *air-conditioning* equipment complying with MEPS; or (vii) flexible fan connections.

Table 3 DUCTWORK AND FITTINGS -MINIMUM MATERIAL R-VALUE

Location of ductwork and fittings	Climate zone	
	1, 2, 3, 4, 5, 6 and 7	8
Within a <i>conditioned space</i>	1.2	1.6
Where exposed to direct sunlight	3.0	3.4
All other locations	2.0	2.4



Attachment “D” Specification J5.2c Piping, Vessel, Heat Exchanger and Tank Insulation

1. Scope

- (a) This Specification contains the requirements for the insulating of *piping*, vessels, heat exchangers and tanks containing heating fluids or cooling fluids used in an *air-conditioning* system.
- (b) For the purposes of this Specification—
- (i) heating fluids include heated water, steam and condensate; and
 - (ii) cooling fluids include refrigerant, chilled water, brines and glycol mixtures, but do not include condenser cooling water.

2. Insulation

- (a) *Piping*, vessels, heat exchangers and tanks must be provided with insulation—
- (i) complying with AS/NZS 4859.1; and
 - (ii) for heated or chilled water *piping*, having a material *R-Value* not less than that specified in **Table 2a**; and
 - (iii) for refrigerant, steam or condensate *piping*, having a material *R-Value* not less than that specified in **Table 2b**; and
 - (iv) for vessels, heat exchangers or tanks, having a material *R-Value* not less than that specified in **Table 2c**.
- (b) Insulation must—
- (i) be protected against the effects of weather and sunlight; and
 - (ii) be able to withstand the temperatures within the *piping*, vessel, heat exchanger or tank.
- (c) Insulation provided to *piping*, vessels, heat exchangers or tanks containing cooling fluid must be protected by a vapour barrier on the outside of the insulation.
- (d) The requirements of (a) and (b) do not apply to *piping*—
- (i) located within the only or last room served by the system; or
 - (ii) encased within a concrete slab or panel which is part of a heating or cooling system; or
 - (iii) supplied as an integral part of a piece of plant; or
 - (iv) inside an air-handling unit, fan-coil unit or the like.

Table 2a WATER PIPING -MINIMUM MATERIAL R-VALUE

Type of water <i>piping</i>	Minimum material <i>R-Value</i>
Heated water <i>piping</i> of all diameters	1.5
Chilled water <i>piping</i> with nominal diameters not more than 40 mm	1.0
Chilled water <i>piping</i> with nominal diameters more than 40 mm but not more than 80 mm	1.5
Chilled water <i>piping</i> with nominal diameters more than 80 mm	2.0
<p>Notes: 1. <i>Piping</i> required to be insulated includes all supply and return <i>piping</i>, chilled water supply <i>piping</i> within 500 mm of the connection to the <i>air-conditioning</i> system and pressure relief <i>piping</i> within 500 mm of the connection to the <i>air-conditioning</i> system.</p> <p>2. The required minimum material <i>R-Value</i> may be halved— (a) for <i>piping</i> with nominal diameters not more than 40 mm, for the last 750 mm adjoining items of plant; and (b) for <i>piping</i> penetrating a structural member; and (c) for supply and return chilled water <i>piping</i> located internally, if the chilled water supply temperature is more than 14°C.</p>	



Table 2b REFRIGERANT, STEAM AND CONDENSATE PIPING— MINIMUM MATERIAL RVALUE

Temperature range	Nominal pipe size				
	15 mm to 40 mm	41 mm to 80 mm	81 mm to 125 mm	126 mm to 150 mm	151 mm to 200 mm
Refrigerant not more than 2°C	1.3	1.7	2.0	2.0	2.7
Refrigerant more than 2°C but not more than 20°C	1.0	1.5	2.0	2.0	2.0
Steam and condensate not more than 120°C	1.0	1.0	1.3	1.3	1.3
Steam more than 120°C	1.5	1.5	1.5	1.8	2.1

Table 2c VESSELS, HEAT EXCHANGERS AND TANKS – MINIMUM MATERIAL R-VALUE

Content of vessel, heat exchanger or tank	Minimum material R-Value
Refrigerant, brine or glycol that is not more than 2°C	2.7
Refrigerant or chilled water that is more than 2°C but not more than 20°C	1.8
Heated water	1.4
Steam 2.5	Steam 2.5



Attachment “E” Specification J5.2d – Space Heating

1. Scope

This Specification contains the requirements for heaters used for *air-conditioning* or as part of an *air-conditioning* system.

2. Heaters

(a) A heater used for *air-conditioning* must be—

- (i) a solar heater; or
- (ii) a gas heater; or
- (iii) an oil heater, but only if reticulated gas is not available at the allotment boundary; or
- (iv) a heat pump heater; or
- (v) a solid-fuel burning heater; or
- (vi) a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or
- (vii) an electric heater if—
 - (A) 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 2a** where reticulated gas is not available at the allotment boundary; or
 - (B) 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
- (C) the in-duct heater complies with **J5.2(a)(i)(B)(cc)**; or

(viii) any combination of (i) to (vii).

(b) An electric heater may be used for heating a bathroom in a Class 3 building or Class 9c building if the heating capacity is not more than 1.2 kW.

(c) A fixed space heating appliance installed outdoors must be capable of automatic shutdown.

(d) A water heater, such as a boiler, that is used as part of an *air-conditioning* system must—

- (i) achieve a thermal efficiency complying with **Table 2b** when tested in accordance with BS 7190; and
- (ii) use reticulated gas where it is available at the allotment boundary.

Table 2a MAXIMUM ELECTRIC HEATING CAPACITY

Table 2b MINIMUM THERMAL EFFICIENCY OF A WATER HEATER

<i>Floor area of the conditioned space</i>	<i>Climate zone</i>				
	3	4	5	6	7
W/m² of floor area					
Not more than 500 m ²	50	60	55	65	70
More than 500 m ²	40	50	45	55	60

Table 2b MINIMUM THERMAL EFFICIENCY OF A WATER HEATER

Fuel type	Rated capacity (kWheating)	Minimum gross thermalefficiency (%)
Gas	Not more than 750	80
	More than 750	83
Oil	All capacities	80



Attachment “F” Specification J5.2e – Energy efficiency Ratios

1. Scope

- (a) This Specification contains the requirements for the energy efficiency ratios of—
- (i) refrigerant chillers used as part of an *air-conditioning* system; and
 - (ii) packaged *air-conditioning* equipment.

2. Energy efficiency ratios

- (a) An *air-conditioning* system refrigerant chiller with a capacity not more than 350 kW_r must have an energy efficiency ratio complying with **Table 2a** when determined in accordance with AHRI 550/590.

Table 2a MINIMUM ENERGY EFFICIENCY RATIO FOR REFRIGERANT CHILLERS

Equipment		Minimum energy efficiency ratio(Wr/Winput power)	
For full load operation	For integrated partload		
Water cooled chiller		4.2	5.2
Air cooled or evaporatively cooled chiller		2.5	3.4

- (b) Package *air-conditioning* equipment with a capacity of not less than 65 kW_r, including a split unit and a heat pump, must have a minimum energy efficiency ratio when cooling complying with **Table 2b** when tested in accordance with AS/NZS 3823.1.2 at test condition T1.

Table 2b MINIMUM ENERGY EFFICIENCY RATIO FOR PACKAGED AIR-CONDITIONING EQUIPMENT

Equipment	Minimum energy efficiency ratio (Wr/Winput power)	
65 kW _r to 95 kW _r capacity	More than 95 kW _r capacity	
Air-conditioner — cooling	2.70	2.80
Heat pump — cooling	2.60	2.70



Attachment "G" Conditioned Space





Attachment “H” Simulation Inputs

Weather file	AUS NSW Mascot Airport RMY Sydney Airport was used as the most appropriate Weather file.
External Shading	As per Drawings Supplied
Conditioned space temperature range	18° CDB to 26° CDB for 98% of plant operation times As per Table 2b, Specification JV
Occupancy and Operation Profiles	
Heat Gain per occupant	130 Watts / person (plus hot meals, 30 W/person)
Internal gains from appliances	As per table 2h, Specification JV
Ventilation	Modeled as mechanical ventilation in accordance with Part F4
Infiltration rate	1.5 Air changes /hour to conditioned areas of building
Domestic Hot Water	Omitted from the calculations of both the proposed building and reference building as per JV3 (e)

	Reference Building	Proposed Building
Roof Total R Value	R4.2	R4.2
Roof Surface Solar absorptance	0.7	0.6
Roof Thermal Break	N/A	N/A
External Wall Total R Value – concrete/double brick	N/A	N/A
External wall – lightweight	R2.8	R2.8
Internal Wall Total R Value	R1.8	R1.8
Suspended Retail Floor	R2.0	N/A
External Wall Surface Solar absorptance	0.6	0.6
External Wall Thermal Break	N/A	N/A
Lighting Load	DTS Part J6	DTS Part J6
Air - Conditioning	DTS Part J5	DTS Part J5



Attachment “I” Simulation Outputs / Results

	Total Energy [kWh]	Energy Per Conditioned Building Area [kWh/m2]	Net Conditioned Building Area	Unconditioned Building Area	Lighting	Heating	Cooling
Reference Building	55457.73	128.34	432.10	257.58	12103.15	3385.95	18728.16
Proposed Building	54803.99	126.83	432.10	257.58	12103.15	3593.08	17872.53
Savings in energy	653.74	1.51					

The energy loads stated in the above table are generated using design conditions and assumptions specified by Verification Method JV3 (BCA Section J, 2015), and will not reflect the actual operation of the building. This is in order to compare only the performance of the building fabric and services against the minimum DTS requirements of Section J. As such data listed should not be taken as predictive of realistic energy consumption.



Attachment “J” Disclaimer

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