Part J BCA Report

Project name:

Proposed mixed use commercial development

29-33 Pittwater Road, Manly, 2095

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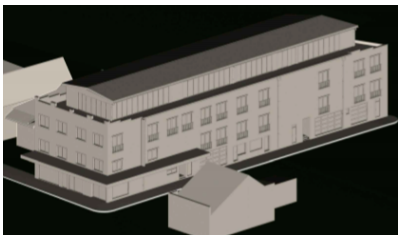

Content

SUMMARY OF SOLUTIONS TO COMPLY WITH SECTION J PERFORMANCE REQUIREMETS

The following table is a summary of the requirements for compliance with the Section J.

Part J1 - Building Fabric **Building Element** **ROOF:**	Required	Additional Insulation
Metal Roof	R4.2 (downwards) *for surface solar absorptance value >0.6	R3.66 (downwards)
Concrete Roof	R3.70 (downwards) *for surface solar absorptance value 0.4-0.6	R3.24 (downwards)
Ceiling Insulation Assumption ***Fireproof covers to be use above the down-lights and prevent any loss of insulation (If IC rated down lights are used then, there is no loss of insulation)** ***The reduced insulation must be compensated with additional insulation according the Table J1.3b** ***Where the insulation goes in the air space and the R-value of the air space is lost, the R value of the**		

required insulation should be increased for the lost R-value ***General note: The construction diagrams are applicable only to the new building element or the building elements that have been altered or modified**		
External WALLS Full brick Brick Veneer Lightweight walls **Internal walls against the unconditioned spaces**	 R2.30 R2.80 R2.80 R1.80	 R1.56 R2.32 R2.38
FLOOR */ floors above the open air and above the all other unconditioned spaces on the ground floor/* **Suspended concrete floors**	 R2.0	 R 1.75

- *(for details see the main assessment and the construction diagrams)*
- ***Note: Where the insulation goes in the air space and the R-value of the air space is lost the R value of the required insulation should be increased for the lost R-value***

Part J2 -Glazing	U-value maximum	SHGC maximum
WINDOWS **All new windows**	 **4.50**	 **0.46**

- *(for details and where shading devices are used- see the glazing calculators)*
- ***Note: Where the glazing calculator shows "Device" an external shading device to be provided***

Part J3 - Building Sealing Building Element	Comment
Doors and open-able windows or the like forming part of the envelope of a conditioned space **All External doors leading to a condition space**	Weather seals to be installed on all doors and open able windows (other than aluminium), of the envelope of the conditioned space. *(for exceptions see the detailed assessment).* All doors leading to a conditioned space must have an airlock, /self-closing device/ *(for exceptions see the detailed assessment).*
New Exhaust Fans	Must have self-closing dampers.
Roofs, Walls & Floor	Minimise air leakage by enclosed or internal lining systems that is close fitted at the ceiling, the wall and the floor junctions. Also to be

	sealed by caulking, skirting, architraves, cornices or the like.
Roofs Lights	The roof light /when serving the conditioned space/ must be sealed, or capable of being sealed The roof lights must be constructed with : an imperforate ceiling diffuser, a weatherproof seal or a manual or mechanical shutter system *(for exceptions see the detailed assessment).*
Part J5 - Air Conditioning and Ventilation Systems Building Element	Comment
New Air Conditioning Certification	Required if the size of the air-conditioner is greater than **35kWr.**
New A/C System **New ventilation System**	Must have the ability to be inactive when the area is not occupied. *(for exceptions see the detailed assessment)* The outdoor air economy cycles to be provided for the air-conditioning system when the capacity is more than 35 kWr *(for exceptions see the detailed assessment)* The controls are required to deactivate the mechanical ventilation system when the area is not occupied The fans of a mechanical ventilation system must comply with Specification J5.2a.
Time Switch	A time switch complying with **Specification J6** must be provided to control— • an *air-conditioning* system of more than 10 kWr; • a heater of more than 10 kW heating used for air-conditioning • 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 /*for exclusions see detailed report/*

New Ductwork	Must be insulated to a minimum **R-value** of **R1.20** within a conditioned space, **R3.0** in direct sunlight, and **R2.0** in other locations or R1.0, for flexible ductwork (Flexible ductwork of a maximum length of 3m at each outlet must achieve a minimum material R-Value of 1.0.) The flexible ductwork must also comply with fire hazard properties set out in AS 4254-2012 Parts 1 and 2
Class 3 – A/C Energy efficiency requirement	The A/C (Class 3 building) must not operate when any external door of the sole-occupancy unit that opens to a balcony or the like, is open for more than one minute.

Part J6 - Artificial Lighting and Power **Building Element**	Comment
New Lighting	Must not exceed the "maximum lighting wattage" in the lighting calculations table in **Lighting Calculators**
Artificial Lighting Switch	Must be located in a visible position in the room being switched or located in an adjacent room where the lighting being switched can be seen. An artificial lighting switch or other control device must not operate lighting for an area of more than 250 m^2
Artificial Lighting **Class 3 Building- Artificial Lighting requirement** **Artificial lighting in a natural lighting zone**	A time switch or an occupant sensing device such as a security key card reader or a motion detector in accordance with Spec J6 must control 95% of artificial lighting in a building or storey of a building of more than 250m2 and which can turn it off out-of-hours *(for exceptions see the detailed assessment)*. An occupant activated device, such as a room security device or a motion detector, must be provided for each sole-occupancy unit in class 3 building 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. *(for exceptions see the detailed assessment)*
Interior Decorative & Display Lighting	Controlled separately from other artificial lighting by a manual switch for each area. Controlled by a time switch where display lighting exceeds 1kW. *(for exceptions see the detailed assessment)*.
Window Display Lighting	Must be controlled separately from other display lights. *(for exceptions see the detailed assessment)*.
Artificial Lighting Perimeter	Must be controlled by a daylight sensor or programmable time switch control, use high efficiency lamps (min.60 Lumens/W) or a motion detector if the total load exceeds 100W and have a separate time switch, in accordance with Specification J6, when used for decorative purposes (*for exceptions see the detailed assessment)*.
Decorative External Lighting	Must have a separate time switch. *(for exceptions see the detailed assessment)*.

Boiling Water & Chilled Water Storage Units	Must be controlled by a time switch. *(for exceptions see the detailed assessment).*

Specification	Comment
Specification J6	All time switches, motion detectors, occupant sensing devices & daylight sensors must meet **Specification J6** standards.

Part J7 - Hot Water Supply **Building Element**	Comment
Heated water supply	All HWS must comply with NCC Volume Three B2.4 Water heater in a heated water supply system If there are any New Hot Water Taps - Must have a minimum WELS rating of 3 stars (9L/min) Compliance for a heated water supply system is verified when the annual greenhouse gas intensity of the water heater does not exceed 100 g CO2e/MJ of thermal energy load determined in accordance with AS/NZS 4234.
New Hot Water Taps	Must have a minimum rating of **3 stars**.

Part J8 - Access for Maintenance and Facilities for Monitoring **Maintenance /Monitoring**	Comment
Access	Must be provided to all plant, equipment and components that require maintenance.
Energy Monitoring	The building is of more than 500 m2. Therefore, it needs to have devices to record the consumption of gas and electricity. (monitoring system that keeps track of electricity and gas consumption) The building is of not more than 2500 m2 and therefore it does not need to have devices to record, individually the energy consumption of: the air-conditioning plant, artificial lighting, appliances power, central hot water supply , internal transport devices including lifts, escalators and travellators where there is more than one serving the building; and other ancillary plants

EVIDENCE OF COMPLIANCE CHECK LIST

The purpose of this checklist is to itemise the evidence that should be collected during the construction phase of the project that will demonstrate how the final building complies with the Energy Efficiency requirements of Section J of the BCA that were identified during the design phase.

Generally evidence should take the form of delivery receipts, photographs, or signed and dated statements from installers.

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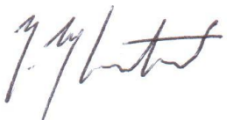

Part J BCA Report

Project name:

Proposed mixed use commercial development
29-33 Pittwater Road, Manly, 2095

1. DESCRIPTION

The proposed building is located at 29-33 Pittwater Road, Manly, 2095. It consists of a ground floor and 3 upper levels.
· a shop (pilates studio), commercial and parking at ground floor;
· commercial (gym premises) at first floor;
· serviced accommodation (18 rooms) on the second floor
· four commercial units on the third floor

2. PURPOSE OF THE ASSESSMENT

The purpose of this report is to assess the design proposal against the Deemed-to-Satisfy provisions of Section J of the BCA, and to clearly outline those areas where compliance has not been achieved. Deemed-to-Satisfy Solution as a Performance Solution is used to satisfy the Performance Requirements of the NCC-2016.
This Report addresses ONLY matters relevant to Section 'J' of Volume 1 of the BCA pertaining to the Class 3, Class 5, Class 6 and Class 9B portions of the building.
For completely new buildings the application of the BCA provisions is straightforward applying to all aspects of the construction but for existing buildings being altered, extended or refurbished, the BCA is generally only applicable to the new building work, that is, to those parts of the building directly being affected by the new building work

The proposed building improvement include:

Proposed Works-Ground Floor
· Existing stair in NE corner removed - new shop created.
· New stair on north side and Elec. room relocated.
· Existing stair in SE corner removed.
· Shopfront opening to Pittwater Road, re-opened.
· New passenger lift & uni-sex disabled toilet, south side.

· Revised parking and delivery arrangement - wider doors.
· Existing lift on north side re-commissioned.
· Commercial space re-planned with toilet relocated.
· OSD tank installed.
· Garbage room formed

Proposed Works-First Floor

· Existing stair in NE corner removed - store room created.
· New stair on north side to access existing Gym.
· Existing stair in SE corner removed.
· New passenger lift, south side.
· Existing lift on north side re-commissioned.
· Windows along North Elevation revised

Proposed Works-Second Floor

· Existing stair in NE corner removed - new stair built.
· Stairs up to 3rd Floor added / extended.
· Bed B9 & B10 revised for new passenger lift, south side.
· Existing lift on north side re-commissioned, lobby added.
· Bedroom B16 relocated to accommodate new lift lobby & laundry.
· Windows along North Elevation revised.

Proposed Works-Third Floor

· Existing roof removed, and new third floor level added.
· Four commercial suites and roof terrace built.
· OSD basin to be built as per Eng. details.
· New passenger lift, south side to access this level.
· Parapet along North Side re-built with extra railing to achieve 1.0m high railing

3. DEEMED-TO-SATISFY PROVISIONS (BCA)

This report is based on the Deemed-to-Satisfy Provisions of Section J of the National Construction Code (NCC) – 2016 Volume 1, incorporating the State variations where applicable. Please note that the version of the BCA applicable is the version applicable at the time of the Construction Certificate Application.
The intent of the report is to facilitate the efficient use of energy appropriate for Class 2 to 9 buildings (or part of the buildings) that are conditioned or likely to be conditioned.

4. PERFORMANCE REQUIREMENTS

Performance Requirements specify the minimum level of performance that all buildings must have. They must have, to the degree necessary, features that facilitate the efficient use of energy appropriate to the function and use of the building and its services, the internal environment, heating and cooling, and the building fabric. This also includes relevant materials, components, design factors, and construction methods.
Deemed-to-Satisfy Solution as a Performance Solution is used to satisfy the Performance Requirements in this report. The requirements JP1 and JP3 are satisfied by complying

with: J0.1 to J0.3, J1.1 to J1.6, J2.1 to J2.5, J3.1 to J3.7, J5.1 to J5.4, J6.1 to J6.6, J7.1 to J7.4 and J8.1 to J8.3.

5. PROJECT LIMITATIONS

This report does not include nor imply any detailed assessment for design, compliance or upgrading for -
(a) Sections B, C, D, E, F, G, H, and I of the BCA;

(b) The structural adequacy or design of the building;

(c) The inherent derived fire-resistance ratings of any proposed structural elements of the building (unless specifically referred to); and

(d) The design basis and/or operating capabilities of any proposed electrical, mechanical or hydraulic fire protection services.

This report does not include, or imply compliance with:
(a) The National Construction Code - Plumbing Code of Australia Volume 3

(b) The Disability Discrimination Act 1992, including the Disability (Access to Premises – Buildings) Standards 2010;

(c) Demolition Standards not referred to by the BCA;

(d) Occupational Health and Safety Act;

6. ASSESSMENT DATA

The following Architectural Plans for the proposed 29-33 Pittwater Road, Manly, 2095 are supplied for assessment according the Section J of the BCA:

- Site Plan
- Floor Plans
- Elevations
- Shadow diagrams

7. ASSUMPTIONS

Assumptions made in the preparation of this report are listed below:

1. The North point marked as True North is taken from the Site plan
2. The building classifications: Class 3, Class 5, Class 6, Class 7a and Class 9b, take more than 5% of the floor area. Therefore, they will be addressed independently in the report.
3. The toilets of the serviced apartments are a non-conditioned space
4. The lobbies, circulation areas, storages, waste rooms, carparks and the plant rooms are non-conditioned spaces
5. The unconditioned spaces are provided with ventilation of more than 1.5 air changes per hour

8. BUILDING CHARACTERISTICS

The significant spaces in the proposed design have been classified in accordance with the requirements of Clause A3.2 of the BCA and are summarized in the table below. Floor areas have been calculated from the plan.

Ground Floor

Shop 1	96.8	m2
WC- Shop 1	5.2	m2
Shop 2	28.9	m2
Staircase (Exit)	10.4	m2
WC -Com Space	7.8	m2
Comm. Cpace	96.4	m2
Entry (East)	16.6	m2
Gr floor - Carpark	156	m2
Delivery & Exist.Parking 3&4	102	m2
Existing Parking 1&2	52.4	m2
Garbage room	10.1	m2
Fire Stairs (GF)	11.45	m2
Entry (West)	13.6	m2

First Floor

Staff Room 1 (Gym)	14.7	m2
Staff Room 2 (Gym)	9.6	m2
Staircase (Gym entry)	12.3	m2
Plant room (FF)	13.6	m2
Male changing room (Gym)	23.28	m2
Female changing room (Gym)	38.6	m2
Fire Stairs (GF)	11.45	m2
Gym 1	360	m2
Gym 2	123.5	m2
Stairs infilled room	18.1	m2

Second Floor

Bed 1	25	m2

Bathroom (Bed 1)	3.3	m2
Bed 2	16.8	m2
Bathroom (Bed 2)	2.9	m2
Bed 3	23.5	m2
Bathroom (Bed 3)	2.9	m2
Bed 4	23.5	m2
Bathroom (Bed 4)	2.9	m2
Bed 5	16.3	m2
Bathroom (Bed 5)	2.9	m2
Bed 6	16.8	m2
Bathroom (Bed 6)	2.9	m2
Bed 7	16.8	m2
Bathroom (Bed 7)	2.9	m2
Bed 8	16.3	m2
Bathroom (Bed 8)	2.9	m2
Bed 9	18.2	m2
Bathroom (Bed 9)	3.3	m2
Bed 10-Manager	22.7	m2
Bathroom (Bed 10)	5.2	m2
Bed 11	25.9	m2
Bathroom (Bed 11)	2.9	m2
Bed 12	23.2	m2
Bathroom (Bed 12)	2.9	m2
Bed 13	21	m2
Bathroom (Bed 13)	3	m2
Bed 14	19.2	m2
Bathroom (Bed 14)	2.9	m2
Bed 15	19.2	m2
Bathroom (Bed 15)	2.9	m2
Bed 16	15.2	m2
Bathroom (Bed 16)	2.9	m2
Bed 17	20.5	m2
Bathroom (Bed 17)	2.9	m2
Bed 18	30.1	m2
Bathroom (Bed 18)	2.9	m2
Laundry (SF)	14.5	m2
Corridor (SF)	52.9	m2
Exit (SF)	11.7	m2
Fire Stairs (SF)	21.2	m2
Stairs- Entry (SF)	20	m2

Third Floor

Commercial 1	71	m2
Bathroom (Com 1)	2.2	m2
Commercial 2	71	m2
Bathroom (Com 2)	2.2	m2
Commercial 3	65	m2
Bathroom (Com 3)	2.2	m2
Commercial 4	73	m2
Bathroom (Com 4)	2.2	m2
HWY	43	m2
Stairs HWY1	18	m2
Stairs HWY2	9	m2

9. BUILDING CLASSIFICATION

According the BCA Part A3 (CLASSIFICATION OF BUILDINGS AND STRUCTURES), the major classification of the building is Class 3.

Class 3: a residential building, other than a building of Class 1 or 2, which is a common place of long term or transient living for a number of unrelated persons, including—
(a) a boarding house, guest house, hostel, lodging house or backpackers accommodation; or
(b) a residential part of a hotel or motel; or
(c) a residential part of a school; or
(d) accommodation for the aged, children or people with a disability; or
(e) a residential part of a health-care building which accommodates members of staff; or
(f) a residential part of a detention centre.

Class 5: an office building used for professional or commercial purposes, excluding buildings of Class 6, 7, 8 or 9

Class 6: a shop or other building for the sale of goods by retail or the supply of services direct to the public, including—
(a) an eating room, café, restaurant, milk or soft-drink bar; or
(b) a dining room, bar area that is not an assembly building, shop or kiosk part of a hotel or motel; or
(c) a hairdresser's or barber's shop, public laundry, or undertaker's establishment; or
(d) market or sale room, showroom, or service station.

Class 7a — a carpark

Class 9b buildings are typically buildings considered assembly buildings. These typically include public halls, theatres & churches; schools; clubs, nightclubs, and sporting complexes; and transport buildings such as train stations, and airports

10. CLIMATE ZONE

The proposed project is located at: 29-33 Pittwater Road, Manly, 2095. In accordance with Figure A1.1 and Table A1.1 of the BCA, the development is in the Climate Zone 5.

Building Code of Australia

This report is based on the Deemed-to-Satisfy Solutions of Section J of the National Construction Code Series Volume 1 - Building Code of Australia, NCC 2016 incorporating the State variations where applicable. Deemed-to-Satisfy Solution as a Performance Solution is used to satisfy the Performance Requirements of the NCC 2016.

This Section of the report presents a clause-by-clause assessment of the proposed design against the DtS Solutions of NSW Subsection J of the BCA. The performance requirements JP1 and JP3 are satisfied by complying with: J0.1 to J0.3, J1.1 to J1.6, J2.1 to J2.5, J3.1 to J3.7, J5.1 to J5.4, J6.1 to J6.6, J7.1 to J7.4 and J8.1 to J8.3.

PART J1 – BUILDING FABRIC

Clause	Description	Status	Comments
J1.1	**Application of Part** The Deemed-to-Satisfy Provisions of this Part apply to building elements forming the envelope of a Class 2 to 9 building.	**Applicable**	The intent of this part is to facilitate the efficient use of energy for the building (or part of the building) that is conditioned or likely to be conditioned
J1.2	**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	**Applicable**	The insulation used to insulate the building fabric must comply with AS/NZS 4859.1.The products must be valid and tested in accordance with AS/NZS 4859.1 SubclauseJ1.2 (a) requires any mandatory insulation, when installed in a building, to form a consistent and continuous barrier other than at supporting members. Wall insulation should be closely fitted within a

	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**.	**Applicable** **Applicable** **Applicable**	wall frame to achieve the desired overall level. When installing a reflective insulation an air space is needed. Because the presence of an airspace at the reflective surface is critical. Without this airspace, the reflection will not occur. The depth of the insulation is critical because of the need to retain the air pockets within the material. If the insulation is compressed, it will reduce its capacity to achieve the tested R-Value. The insulation used in the building must be of negligible fire hazard by complying with the non-combustibility, flammability, and spread of flame and smoke development requirements of this Clause. The performance of the insulation used should be validated by test reports and these reports should form part of the building approval documentation. The properties must be in accordance with the **Specification J1.2**.
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	**Applicable**	A roof or ceiling that is part of the envelope (with surface solar absorptance value >0.6, must achieve the Total R Value of R4.2

	achieve the *Total R-Value* specified in **Table J1.3a** for the direction of heat flow. For compliance with **Table J1.3a**, roof and ceiling construction is deemed to have the thermal properties listed in **Specification J1.3**.		The construction diagrams are attached giving one possible option how to meet the requirements.
	(b) For compliance with **Table J1.3a**, roof and ceiling construction is deemed to have the thermal properties listed in **Specification J1.3**.	**Applicable**	
	(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**.	**Applicable**	Any reduction in the ceiling insulation (around down-lights or exhaust fans) must be compensated in accordance with the **Table J1.3b**. If IC rated down lights are used then there will be no loss of the insulation.
	(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	**Not Applicable**	A thermal break may be provided by materials such as 20 mm thick timber or 12 mm thick expanded polystyrene strips, plywood or bulk insulation. The material used as a thermal break must separate the metal purlins or metal battens from the metal sheet roofing and achieve an R-Value of not less than 0.2. Reflective insulation alone is not suitable for use as a thermal break because it requires an adjoining airspace to achieve the specified R-Value
	(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.	**Not Applicable**	
J1.4	**Roof lights** *Roof lights*, including any associated shaft and diffuser, that form 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—	**Not Applicable**	The plans don't show roof lights for the conditioned spaces
	(a) if the *roof lights* are not *required*	**Not Applicable**	

	for compliance with **Part F4**, comply with **Table J1.4**; or (b) if the *roof lights* are *required* for compliance with Part **F4**— (i) have an area not more than 150% of the minimum area *required* by **F4.6**; and (ii) have transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of not more than— (A) 0.29 SHGC; and (B)2.9 Total U-Value.	**Not Applicable**	
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 (b) Any wall, other than an *external wall*, that is part of the *envelope* must achieve the *Total R-Value* in **Table J1.5b**. (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	**Applicable** **Applicable** **Not Applicable**	For Climate zone 5 According the Table J1.5a the total R value of **R2.8** is required. The total R value is reduced by 0.5 where the surface density exceeds 220 kg/m2. This clause is applicable only to the new or modified walls (The construction details are attached for additional insulation required) According the Table J1.5b AN ENVELOPE WALL OTHER THAN AN EXTERNAL WALL – MINIMUM TOTAL R-VALUE of **R1.8** is required They are the walls around the unconditioned spaces (Such as toilets, the service rooms the circulation rooms etc.) If there are such walls a thermal break of min R0.2 must be provided between the external cladding and the metal frame

	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.		
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 or in-screed 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 or in-screed 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) The requirements of **(a)(ii)** and	**Applicable** **Applicable** **Applicable** **Not Applicable** **Not Applicable** **Not Applicable**	This building is other than a sole-occupancy unit of a Class 2 building or a Class 4 A suspended floor without an in-slab or in-screed heating or cooling system where the un-condition space will be ventilated by more than 1.5 air changes of outside air, requires R2.0 system value (Applicable for the floors above the open air, carparks and above all other unconditioned spaces on the ground floor)

	(c)(i) do not apply to an in-screed heating or cooling system used solely in a bathroom, amenity area or the like. (f) Floor construction is deemed to have the thermal properties listed in **Specification J1.6**.	**Applicable**	The construction diagram shows the requirements
PART J2 **J2.1**	GLAZING **Application of Part** **Application of Part** The *Deemed-to-Satisfy Provisions* of this Part apply to elements forming the *envelope* of a building other than a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building.	**Applicable**	The building is with a conditioned space and is classified as other than Class 2 or Class 4. The intent of this part is to facilitate the efficient use of energy appropriate for the building or parts of the building that are conditioned or likely to be conditioned. This part aims to reduce the air-conditioning energy consumption attributable to glazing. *This clause is applicable only to the new or replaced windows*
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*in the internal *fabric*. (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**. (c) The aggregate *air-conditioning* energy value must be calculated by adding the *air-conditioning* energy value through each *glazing* element in accordance with the following formula: A1[SHGC1(CAxSH1+CBxSC1)+CCx		**Glazing Calculator** The glazing design has been analyzed using the NCC 2014 Volume One Glazing Calculator (Published: 30 April 2014). The window sizes and the façade areas are measured from the plan. The window numbers used are as per the plans (According the room number). The glazing design, is only applicable to new or the altered windows

	U1] + A2[SHGC2(CAxSH2+CBxSC2)+CCx U2] + ... where— A1, 2, etc = the area of each *glazing* element; and CA, B and C = the energy constants A, B and C for the specific orientation from Table J2.4b; and SHGC1, 2, etc = the *Total System SHGC* of each *glazing* element; and shading multiplier for each *glazing* element obtained from **Table J2.4c**; and SC1, 2, etc = the cooling shading multiplier for each *glazing* element obtained from **Table J2.4d**; and U1, 2, etc = the *Total System U-Value* of each *glazing* element. (d) For the purposes of **(c)**— (i) where the *air-conditioning* energy value of a *glazing* element is calculated to be negative, it must be taken to be zero; and (ii) where *glazing* is in the internal *fabric*, the aggregate *air-conditioning* energy value must be calculated using— (A) the energy constants A, B and C for the south orientation sector in **Table J2.4b**; and (B) the shading multipliers in **Table J2.4e**.		
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 (i) is capable of restricting at least 80% of summer solar radiation; and (ii) if adjustable, is operated	**Applicable**	Shading is calculated as it is given on the plans. Where necessary devices are used.

	automatically in response to the level of solar radiation.		
PART J3	BUILDING SEALING		
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 building or space where the mechanical ventilation *required* by **Part F4** provides sufficient pressurisation to prevent infiltration.	**Applicable** **Not Applicable** **Not Applicable** **Not Applicable**	The building is with a conditioned space and is classified as other than Class 2 or Class 4.
J3.2	**Chimneys and flues** The chimney or flue of an open solid-fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue.	**Not Applicable**	No Chimneys and flues of an open solid-fuel burning appliance
J3.3	**Roof lights** (a) A *roof light* must be sealed, or capable of being sealed, when serving— (i) a *conditioned space*; or (ii) a *habitable room* in *climate zones* 4, 5, 6, 7 or 8. (b) A *roof light required* by **(a)** to be sealed, or capable of being sealed, must be constructed with— (i) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or (ii) a weatherproof seal; or (iii) a shutter system readily operated either manually, mechanically or electronically by the occupant.	**Not Applicable** **Not Applicable**	There are no roof lights, serving the conditioned space
J3.4	**Windows and doors**		Weather seals to be installed on

	(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 or 8.	**Applicable** **Applicable**	all doors and open able windows (other than aluminum, fire doors or security doors /used out of operating hours/), of the envelope of the conditioned space.
	(b) The requirements of **(a)** do not apply to— (i) a *window* complying with AS 2047; or	**Applicable**	All windows that are aluminum windows complying with AS 2047 are exempt from this clause. (Requirements of (a) don't apply to the these windows)
	(ii) a fire door or smoke door; or	**Applicable**	This clause also doesn't apply to the fire doors
	(iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.	**Not Applicable**	The roller shutter doors are exempt only if they are installed for the purpose of security
	(c) A seal *required* by **(a)**— (i) for the bottom edge of an external swing door, must be a draft protection device; and	**Applicable**	Ext. Doors must have a draft protection device on the bottom edge
	(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.	**Applicable**	Other edges seals may be compression type
	(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	**Applicable** **Applicable**	All entrances to the condition spaces require an airlock or a self-closing device (Self closing doors) The rooms with conditioned floor area of less than 50 m2 are exempt
	(ii) where a café, restaurant, open front shop or the like has— (A) a 3 m deep un-conditioned zone between the main entrance, including an open front, and the *conditioned space*; and (B) at all other entrances to the café, restaurant, open front shop or the like, *self-closing* doors.	**Applicable** **Not Applicable** **Applicable**	This clause is applicable if any of the commercial spaces are café, restaurant, open front shop This clause is applicable to the commercial space

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 or the like when serving— (a) a *conditioned space*; or (b) a*habitable room* in *climate zones* 4, 5, 6, 7 or 8.	**Applicable**	If there are any miscellaneous exhaust fans serving a conditioned space must be fitted with self-closing dampers or the like.
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, 5, 6, 7 or 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 or the like *required* for smoke hazard management.	**Applicable**	The fabric forming the envelope must be constructed to be capable of minimizing air leakage by using lining systems or caulking, skirting, architraves or the like, except for openings and grilles required for smoke hazard management.
J3.7	**Evaporative coolers** An evaporative cooler must be fitted with a self-closing damper or the like when serving— (a) a heated space; or (b) a*habitable room* or a public area of a building in *climate zones* 4, 5, 6, 7 or 8.	**Not Applicable**	The plans don't show any evaporative coolers installed but if there will be any then the evaporative cooler must be fitted with a self-closing damper
PART J4	*****		

PART J5	AIR-CONDITIONING AND VENTILATION SYSTEMS		**Because the A/C plans are not supplied in this section are assessed only the general solutions**
	Application of Part		
J5.1	The *Deemed-to-Satisfy Provisions* of this Part do not apply to a Class 8 *electricity network substation*.	**Applicable**	This clause sets minimum energy efficiency requirements for air-conditioning systems and its components.
J5.2	**Air-conditioning systems**		
	(a) Control — (i) An *air-conditioning* system— (A) must be capable of being deactivated when the building or part of a building served by that system is not occupied; and	**Applicable**	This Sub-clause requires controls to deactivate the air-conditioning unit when the area is not occupied. The operational arrangements should be designed on logical building areas and segments. (Zones) Accordingly, each sole occupancy unit should be able to be deactivated without compromising the needs of air-conditioning in the adjacent spaces. When the zones have different heating or cooling needs then the temperature in each zone should be thermostatically controlled. A suitable location of the temperature control devices may be in the ductwork supplying the different spaces or the air volume dampers. Additionally, all supply and return ductwork must be insulated and sealed in accordance with Specification J5.2b in order to minimise the amount of energy lost through the ductwork
	(B) when serving more than one *air-conditioning* zone or area with different heating or cooling needs, must— (aa) thermostatically control the temperature of each zone or area; and	**Applicable**	
	(bb) not control the temperature by mixing actively heated air and actively cooled air; and (cc) limit reheating to not more than— (AA) for a fixed supply air rate, a 7.5 K rise in temperature; and	**Applicable**	This Clause requires the temperature control of the air-conditioning system not to depend on mixing heated and cooled air streams that have been actively conditioned by the plant. This requirement allows

	(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		the air-conditioning system to use no more energy than is necessary
	(C) which provides the *required* mechanical ventilation, other than in process-related applications where humidity control is needed, must have an *outdoor air economy cycle*—	**Applicable**	The outdoor air economy cycles to be provided where it can cost-effectively provide free cooling, however the area needing humidity control for process applications is exempt.
	(aa) in *climate zones* 2 or 3, when the *air-conditioning* system capacity is more than 50 kWr; or (bb) in *climate zones* 4, 5, 6, 7 or 8, when the *air-conditioning* system capacity is more than 35 kWr; and	**Applicable**	The outdoor air economy cycles to be provided when the air-conditioning system capacity is more than 35 kWr;
	(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	**Applicable**	The water flow through major items such as boilers and chillers to be stopped when the item is not needed, usually by an automatic valve. This will reduce the amount of water being circulated and the pump energy needed, as well as thermal loss through the additional components like piping. This requirement is intended to reduce pump energy consumption to its minimum level.
	(E) except for a packaged *air-conditioning* system, must have a variable speed fan when its supply air quantity is capable of being varied; and	**Applicable**	A variable speed fan must be used when the supplied air quantity is capable of being varied. This is because a variable speed fan is a more energy efficient method of reducing energy consumption than throttling the air supply with dampers. A packaged air-conditioning system is exempt.
	(F) when serving a *sole-occupancy unit* in a Class 3 building, must not operate when any external door of the *sole-occupancy unit* that opens to a balcony or the like, is open for more than one minute.	**Applicable**	The A/C (Class 3 building) for the serviced apartments, must not operate when any external door of the sole-occupancy unit that opens to a balcony or the like, is open for more than one minute.

	(ii) When an *air-conditioning* system is deactivated, any motorised outside air and return dampers must close. (iii) Compliance with **(i)** must not adversely affect— (A) smoke hazard management measures *required* by **Part E2**; and (B) Ventilation *required* by **Part E3** and **Part F4**.	**Applicable**	This clause requires any motorised outside air or return dampers to close when the system is deactivated. It does not require that the dampers be motorised, only that they close if motorised dampers are installed.
	(b) **Fans** — Fans of an *air-conditioning* system must comply with **Specification J5.2a**.	**Applicable**	This is a linking clause that requires fans that are part of an air-conditioning system to comply with Specification J5.2a
	(c) **Pumps** — (i) An *air-conditioning* system, where water is circulated by pumping at more than 2 L/s, must be designed so that the maximum *pump power* to the pump complies with **Table J5.2**.	**Applicable**	This aims to limit the overall energy consumption of the pumps used to circulate water at greater than 2 L/s in an air-conditioning system and the intention is for the pumps to circulate the required amount of water using no more energy than necessary. The maximum pump power values in the Table J5.2 are included to allow a cost effective balance to be met.
	(ii) An *air-conditioning* system pump that is rated at more than 3 kW of *pump power* and circulates water at more than 2 L/s must be capable of varying its speed in response to varying load.	**Applicable**	. This requires the pump speed, where the pump uses more than 3 kW of pump power, to be capable of being lowered to meet a change in duty. This will allow a lowering the pump's energy use.
	(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.	**Applicable**	This states the requirements for the spray water pumps of a closed circuit cooler or evaporative condenser where part of an air-conditioning system. Any relevant standard can be used to determine the performance and may be part of the tests for closed circuit coolers and evaporative condensers.
	(d) **Insulation** — (i) The ductwork of an *air-conditioning* system must be insulated and sealed in accordance	**Applicable**	This is a linking clause and specifies that the ductwork of an air-conditioning system must be sealed and insulated in accordance with **Specification**

	with **Specification J5.2b**.		**J5.2b**. *Table 3 DUCTWORK AND FITTINGS - MINIMUM MATERIAL R-VALUE Location of ductwork and fittings* / *Climate zone* / *1, 2, 3, 4, 5, 6 and 7* *Within a conditioned space* — *1.2* *Where exposed to direct sunlight* — *3.0* *All other locations* — *2.0* Or R1.0, for flexible ductwork with a length to an outlet or from an inlet of not more than 3 m. The Insulation must be protected against the effects of weather and sunlight; and be installed so that it: 1)abuts adjoining insulation to form a continuous barrier; and 2)maintains its position and thickness, other than at flanges and supports; and The ductwork insulation requirements do not apply to: 1)ductwork and fittings located within the only or last room served by the system; 2)fittings that form part of the interface with the *conditioned space*; 3)return air ductwork in, or passing through, a *conditioned space*; 4)ductwork for outside air and exhaust air associated with an *air-conditioning* system; 5)the floor of an in-situ air-handling unit; or packaged *air-conditioning* equipment complying with MEPS; or (vIi) flexible fan connections.

	(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**.	**Applicable**	This is a linking clause and requires piping, vessels, heat exchangers and tanks that contain heating and cooling fluids that are part of an air-conditioning system to be insulated to meet the requirements of 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**.	**Applicable**	This is a linking clause and specifies standalone heaters used for air-conditioning or heaters used as part of an air-conditioning system such as a boiler, must comply with the requirements of 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**.	**Applicable**	The plans don't show but if there are any refrigerant chillers as part of an air-conditioning system, as well as packaged air-conditioning equipment, must have an energy efficiency ratio in accordance 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 kWr; and (B) a heater of more than 10 $kW_{heating}$used for *air-conditioning*.	**Applicable**	This clause specifies the requirements for the time switch controlling the power supply to the air-conditioning systems. The intent is to reduce unnecessary energy consumption attributable to the system when it is not being used. Air-conditioning systems and heaters greater than 10 kW must be provided with a time switch in accordance with the Specification J6 that can activate and de-activate the respective system. The automatic nature of the switch removes dependency on actions by occupants or plant operators to turn off the equipment when

	(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.	**Applicable to Class 3**	they are not needed, thereby increasing energy savings A time switch complying with Specification J6 is not required if the air-conditioning system serves only one sole-occupancy unit in Class 3
J5.3	**Mechanical ventilation systems** (a) **Control —** (i) A mechanical ventilation system, including one that is part of an air-conditioning system, except where the mechanical system serves only one sole-occupancy unit in a Class 2 building or serves only a Class 4 part of a building, must— (A)be capable of being deactivated when the building or part of the building served by that system is not occupied; and (B)when serving a conditioned space— (aa) not exceed the minimum outdoor air quantity required by Part F4, where relevant, by more than 20%; and (bb) in other than climate zone 2, 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— (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. (ii) The requirements of (a)(i)(B)(aa) do not apply where— (A)additional unconditioned outside air is supplied for free cooling or to balance process exhaust; or (B)additional exhaust ventilation is	**Applicable** **Applicable**	BCA cannot mandate operational or administrative matters such as the pre-programmed times for time switches, nor would it be practical to do so. It can only require that time switches be installed. This Sub-clause requires controls to deactivate the mechanical ventilation system when the area is not occupied. This requires the mechanical ventilation system where the building or space has a high density of people and consequently a high rate of outdoor air required by **Part F4**, to have facilities to either reclaim energy from the building's exhaust or reduce the outdoor air rate to minimum required by **Part F4**. This must be done in proportion to the number of people in the building. This requirement does not apply to mechanical ventilation systems in climate zone 2 as it would not be cost effective in a climate where the outside air is so temperate.

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<td>needed to balance the required mechanical ventilation; or
(C)an energy reclaiming system preconditions all the outside air.
(iii) Compliance with (a)(i) must not adversely affect—
(A)smoke hazard management measures required by Part E2; and
(B)ventilation required by Part E3 and Part F4.

(b) Fans — Fans of a mechanical ventilation system covered by (a) must comply with Specification J5.2a.</td>
<td>Applicable</td>
<td>This Clause is a linking clause that requires mechanical ventilation system fans covered by J5.3(a)to comply with Specification J5.2a

If the air flow rate of the mechanical ventilation system is more than 1000 L/s, the system must have a fan motor power to air flow rate ratio in accordance with
<table>
<tr><th rowspan="2">Air-conditioning sensible heat load (W/m2 of the floor area of the conditioned space)</th><th colspan="2">Maximum fan motor power (W/m2 of the floor area of the conditioned space)</th></tr>
<tr><th>For an air-conditioningsystem serving not morethan 500 m2</th><th>For an air-conditioningsystem serving more than500 m2</th></tr>
<tr><td>Up to 100</td><td>5.3</td><td>8.3</td></tr>
<tr><td>101 to 150</td><td>9.5</td><td>13.5</td></tr>
<tr><td>151 to 200</td><td>13.7</td><td>18.3</td></tr>
<tr><td>201 to 300</td><td>22.2</td><td>28.0</td></tr>
<tr><td>301 to 400</td><td>30.7</td><td>37.0</td></tr>
<tr><td>More than 400</td><td colspan="2">See Note</td></tr>
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			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.
	(c) Time switches — (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. (ii)The requirements of (i) do not apply to—	**Applicable**	A time switch controlling the power supply to mechanical ventilation systems needs to be installed. The reason is to reduce the unnecessary energy consumption attributable to the system when it is not being used. If the mechanical ventilation system is with an air flow rate of more than 1000 L/s, then needs to be provided with time switches in accordance with Specification J6 which can activate and de-activate the respective system.
	(A)a mechanical ventilation 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 mechanical ventilation is needed for 24 hour occupancy.	**Not Applicable** **Not Applicable**	
J5.4	**Miscellaneous exhaust systems** (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, must—	**Applicable (if there are any**	This clause sets the requirements for miscellaneous exhaust system.

	(i) be capable of stopping the motor when the system is not needed; and (ii) have a variable speed fan or the like. (b) The requirements of **(a)** do not apply— (i) to a miscellaneous exhaust system in— (A) a *sole-occupancy unit* in a Class 2, 3 or 9c building; or (B) a Class 4 part of a building; or (ii) where additional exhaust ventilation is needed to balance the *required* outside air for ventilation.	**miscellaneous exhaust system)** **Applicable** **Not Applicable**	This Sub-clause requires controls to stop the motor when the area is not occupied. Alternatively a variable speed fan is required This clause show when clause (a) doesn't apply. The clause don't apply to Class 3 buildings.
PART J6	ARTIFICIAL LIGHTING AND POWER		
J6.1	**Application of Part J6.2, J6.3** and **J6.5(a)(ii)** do not apply to a Class 8 *electricity network substation*.	**Applicable**	The building is with a conditioned space and is classified as other than Class 2 or Class 4.
J6.2	**Artificial lighting** (a) Ina *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 the allowance of— (A) 5 W/m^2 within a *sole-occupancy unit*; and (B) 4 W/m^2 on a verandah, balcony or the like attached to a *sole-occupancy unit*; and (ii) the illumination power density allowance in (i) may be increased by dividing it by the illumination power density adjustment factor for a control device in Table J6.2b as applicable; 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) halogen lamps must be	**Not Applicable**	This is not Class 2 or Class 4 Building

	separately switched from fluorescent lamps. (b) In a building other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a 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	**Applicable** **Applicable**	Lighting (BCA) Calculator Version 2_30_Excel2007-Published: 30 April 2014 is used for illumination power load allowance (The calculation is attached to the report) All this cases described in (c) are exempted from the calculation (Emergency lighting, Signage and display lighting, A heater where the heater also emits light, such as

	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.		in bathrooms, Lighting for the permanent display and preservation of works of art other than for retail sale, purchase or auction)
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.	**Applicable**	This subclause (a) requires the electrical design for lighting in each room or space within a building to be operated separately from other rooms or spaces. In simple terms, the lighting in each space must be switched by its own light switch or group of switches. The Clause prevents the use of a master light switch to operate all lights in a number of rooms or areas.
	(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.	**Applicable**	An occupant activated device, such as a room security device or a motion detector, must be provided for each sole-occupancy unit in the class 3 building /Serviced appartments/
	(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	**Applicable**	The Electrical design according Subclause (c) should provide lighting switch be in a visible position in the room where the lighting is being switched or in an adjacent room that offers a view of 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 a building, 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	**Not Applicable** **Applicable** **Applicable** **Applicable** **Applicable** **Applicable** **Applicable** **Applicable**	switched. (As per **Specification J6)** An artificial lighting switch or other control device must not operate lighting for an area of more than 250 m^2 Sub clause (d) requires that 95% of the lighting in a building or storey of Class 5 to 9 which is larger than 250 $m2^2$ be controlled by devices which can turn it off out-of-hours. The devices can include a time switch, security card reader or a motion detector complying with in Specification J6. Artificial lighting in a natural lighting zone adjacent to windows must be separately controlled from the artificial lighting not in a natural lighting zone This clause sets out where the requirements of (a), (b), (c), (d) and (e) do not apply. The emergency lighting and the 24 hour required lighting doesn't need to be operated as per Subclause (a) (See

	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 building. (ii) A heater where the heater also emits light, such as in bathrooms.	**Not Applicable** **Not Applicable**	**Specification J6**.)
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.	**Applicable if there are any interior decorative and display lighting** **Applicable**	The provisions of this Clause cover decorative and display lighting inside the building, and window display lighting. The interior lighting, such as used for a foyer mural or art display, must be (i) be separately controlled from other artificial lighting, (ii) have separate manual switching for each area that operates during different periods, except where operating times coincide such as in a museum or art gallery, and (iii) have a separate time switch, in accordance with Specification J6, for display lighting uses more than 1 kW. Sub-Clause (b) requires window display lighting, usually on the perimeter of the building, to be controlled separately from other display lighting.
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 variable pre-programmed times and on variable pre-programmed days; and (ii) when the total perimeter lighting	**Applicable**	The provisions of this Clause cover external lighting around the perimeter of a building, which must (i) be controlled by a daylight sensor or programmable time switch control, (ii) use high efficiency lamps (min.60 Lumens/W) or a motion detector if the total load

	load exceeds 100 W— (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*.		exceeds 100W and (iii) have a separate time switch, in accordance with Specification J6, when used for decorative purposes. Sub clause J6.5(b) exempts emergency lighting required by Part E4 (See **Specification J6**.) LIGHTING AND POWER CONTROL DEVICES (BCA)
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**.	**Applicable if there are any boiling water or chilled water storage unit**	The power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification J6. The requirement does not apply to instantaneous heating units without storage that do not operate or lose heat when are not in use.
PART J7 **J7.2**	HEATED WATER SUPPLY AND SWIMMING POOL AND SPA POOL PLANT **Heated water supply** A heated water supply system for food preparation and sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three — Plumbing Code of Australia	**Applicable**	All HWS must comply with NCC Volume Three B2.4 Water heater in a heated water supply system If there are any New Hot Water Taps - Must have a minimum WELS rating of 3 stars (9L/min) Compliance for a heated water supply system is verified when the annual greenhouse gas intensity of the water heater

			does not exceed 100 g CO2e/MJ of thermal energy load determined in accordance with AS/NZS 4234.
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 **(i)** to **(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 unless 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.	**Not Applicable**	There are not any swimming pools shown on the plan
J7.4	**Spa pool heating and pumping** (a) Heating for a spa pool that shares a water recirculation system with a *swimming pool* must be by— (i) a solar heater; or (ii) a heater using reclaimed energy; or (iii) a gas heater; or (iv) a heat pump; or (v) a combination of **(i)** to **(iv)**. (b) Where some or all of the heating	**Not Applicable**	

	required by **(a)** is by a gas heater or a heat pump, the spa pool must have— (i) a cover; and (ii) a push button and 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 spa pool having a capacity of 680 L or more.		
PART J8	FACILITIES FOR ENERGY MONITORING		
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	**Applicable**	The building is classified as other than Class 2 or Class 4
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.	**Applicable**	The building is with a total area of more than 500 m2. Therefore it need to have a device to record the consumption of the gas and the electricity. (monitoring system that keeps track of electricity and gas consumption)
	(b) A building with a *floor area* of more than 2,500 m 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	**Applicable**	The building is with a total floor area of less than 2500m2. Therefore, it doesn't need to have devices to record individually the energy consumption of: air-conditioning plant, artificial lighting, appliance power, central hot water supply , internal transport devices including lifts, escalators and travellators where there is more than one serving the building;

	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.		and other ancillary plants

STATEMENT OF COMPLIANCE

The design documentation as referred to in this report has been assessed against the applicable provisions of Section J of the Building Code of Australia, (BCA) and it is considered that such documentation complies or is capable of complying (as outlined above) with that Code.

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

***Air-conditioning* sensible heat load (W/m^2 of the *floor area* of the *conditioned space*)**	**Maximum *fan motor power* (W/m^2 of the *floor area* of the *conditioned space*)**	
	For an *air-conditioning* system serving not more than 500 m^2	**For an *air-conditioning* 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/m^2, the maximum *fan motor power* must be determined—	
	(a)	in a building of not more than 500 m^2 *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 m^2 *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

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 *conditioned space*	1.2	1.6
Where exposed to direct sunlight	3.0	3.4
All other locations	2.0	2.4

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

Table 2b REFRIGERANT, STEAM AND CONDENSATE PIPING— MINIMUM MATERIAL R-VALUE

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

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

Floor area of the conditioned space	Climate zone				
	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 ($kW_{heating}$)	Minimum gross thermal efficiency (%)
Gas	Not more than 750	80
	More than 750	83
Oil	All capacities	80

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 kWr 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 part load
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 kWr, 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 ($W_r/W_{input\ power}$)	
	65 kWr to 95 kWr capacity	More than 95 kWr capacity
Air-conditioner — cooling	2.70	2.80
Heat pump — cooling	2.60	2.70

SPECIFICATION J6 - LIGHTING AND POWER CONTROL DEVICES

1. Scope

This Specification contains the requirements for lighting and power control devices including timers, time switches, motion detectors and daylight control devices.

2. Lighting timers

A lighting timer must—

(a) be located within 2 m 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 100 m^2 with a single push button timer; and

(ii) 95% of the lights in spaces of area more than 25 m^2; and

(d) be capable of maintaining the artificial lighting—

(i) for not less than 5Â minutes and not more than 15 minutes unless it is reset; and

(ii) without interruption if the timer is reset.

3. 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.

(c) 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.

(d) 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.

4. Motion detectors

(a) 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 1Â m 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 100 m^2; and

(B) 95% of the lights in spaces of area more than 25 m^2; 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.

(b) In a Class 5, 6, 7, 8, 9a or 9b 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) a person before they have entered 1 m into the space; and

(B) movement of 500 mm within the useable part of the space; and

(iii) not control more than—

(A) in other than a *carpark*, an area of 500 m^2 with a single sensor or group of parallel sensors; and

(B) 75% of the lights in spaces using high intensity discharge; and

(iv) be capable of maintaining the artificial lighting when activated—

(A) for a maximum of 30 minutes unless it is reset; and

(B) without interruption if the motion detector is reset by movement; and

(v) not be overridden by a manual switch to permanently leave the lights on.

(c) 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.

5. 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; and

(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.

Construction Diagrams

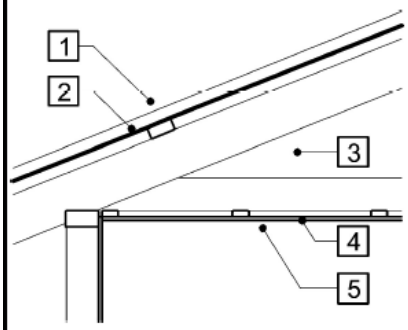
Project name:

Proposed mixed use commercial development

29-33 Pittwater Road, Manly, 2095

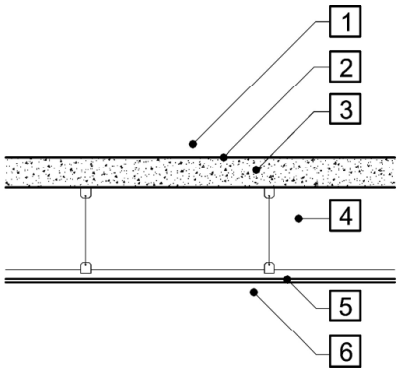
I) Metal ROOF

Metal Roof - Flat ceiling

Roof construction description	Item	Item description	*R-Value* Unventilated		*R-Value* Ventilated	
			Up	Down	Up	Down
(a) Roof – Horizontal ceiling – Metal cladding 	1.	Outdoor air film (7 m/s)	0.04	0.04	0.04	0.04
	2.	Metal cladding	0.00	0.00	0.00	0.00
	3.	Roof airspace (non-reflective)	0.18	0.28	0.00	0.46
	4.	Plasterboard, gypsum (10 mm, 880 kg/m^3)	0.06	0.06	0.06	0.06
	5.	Indoor air film (still air)	0.11	0.16	0.11	0.16
		Total R-Value	0.39	0.54	0.21	0.72

Required total R value 4.2 -Additional insulation of R3.66

II) Concrete roof (Roof Terrace)

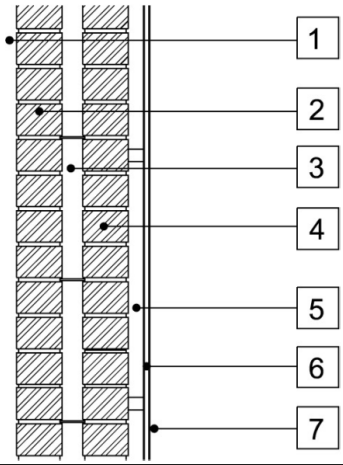
Roof construction description	Item	Item description	*R-Value* Unventilated	
			Up	Down
(g) 100 mm solid concrete roof to 5° – 10 mm plaster, suspended ceiling – Applied external waterproof membrane 	**1.**	Outdoor air film (7 m/s)	0.04	0.04
	2.	Waterproof membrane, rubber synthetic (4 mm, 961 kg/m^3)	0.03	0.03
	3.	Solid concrete, (100 mm, 2400 kg/m^3)	0.07	0.07
	4.	Ceiling airspace (100 mm to 300 mm, non-reflective)	0.15	0.22
	5.	Plasterboard, gypsum (10 mm, 880 kg/m^3)	0.06	0.06
	6.	Indoor air film (still air)	0.11	0.16
		Total R-Value	0.46	0.58

Required total R value 3.7 -Additional insulation of R3.24

***Note:** Any reduction in the ceiling insulation (around down-lights or exhaust fans) must be compensated in accordance with the Table J1.3b

EXTERNAL WALLS

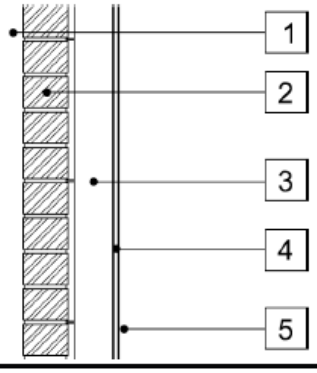
A) Double brick

(b) Cavity masonry – 20 mm to 50 mm cavity, 10 mm internal plaster on battens or furring channels 	1.	Outdoor air film (7 m/s)	0.04
	2.	Masonry (See Notes 3 and 4)	0.09
	3.	Masonry cavity (20 mm to 50 mm, non-reflective and unventilated)	0.17
	4.	Masonry (See Note 4)	0.09
	5.	Airspace (20 mm to 35 mm, non-reflective and unventilated)	0.17
	6.	Plasterboard, gypsum (10 mm, 880 kg/m^3)	0.06
	7.	Indoor air film (still air)	0.12
		Total R-Value	0.74

Required R2.3-Additional insulation of R1.56

B) Brick Veneer

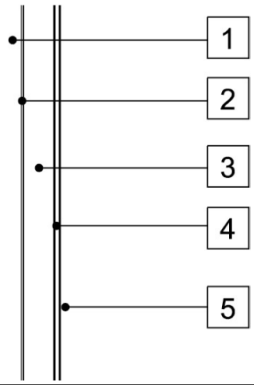
Figure 2 TYPICAL R-VALUES FOR WALL CONSTRUCTION

External wall construction description	Item	Item description	*R-Value*
(a) Masonry veneer – 25 mm to 50 mm cavity, 10 mm internal plaster on 90 mm stud frame 	1.	Outdoor air film (7 m/s)	0.04
	2.	Masonry (See Notes 3 and 4)	0.09
	3.	Cavity and airspace (115 to 140 mm, made up of 90 mm stud + 25 mm to 50 mm airspace non-reflective and unventilated)	0.17
	4.	Plasterboard, gypsum (10 mm, 880 kg/m^3)	0.06
	5.	Indoor air film (still air)	0.12
		Total R-Value	0.48

Required R2.8-Additional insulation of R2.32

C) Lightweight wall construction

(e) Timber wall – external 6 mm cement sheet cladding, 90 mm stud frame, 10 mm plaster



1.	Outdoor air film (7 m/s)	0.04
2.	Fibre-cement (6 mm, 1360 kg/m^3)	0.03
3.	Airspace (90 mm nonreflective and unventilated)	0.17
4.	Plasterboard, gypsum (10 mm, 880 kg/m^3)	0.06
5.	Indoor air film (still air)	0.12
	Total R-Value	0.42

Required R2.8-Additional insulation of R2.38

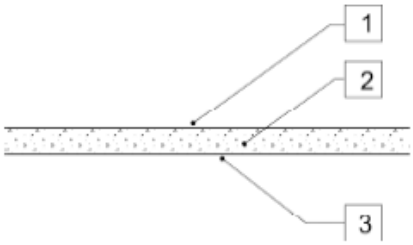
***Note : If the wall insulation goes in the air cavity, then the required additional insulation should be increased for the lost R value of the air cavity**

IV) FLOORS

** Applicable for the floors above the open air and above the carpark*

Deemed-to-Satisfy Provisions

Figure 2 TYPICAL R-VALUES FOR FLOOR CONSTRUCTION (for a floor without a floor heating system)— continued

Floor construction description	Item	Item description	R-Value	
			Up	Down
(c) Solid concrete suspended slab, ground floor 	1.	Indoor air film (still air)	0.11	0.16
	2.	Solid concrete (150 mm, 2400 kg/m^3)	0.10	0.10
	3.	Outdoor air film (7 m/s)	0.04	0.04
		Total R-Value	0.25	0.30

Required R2.0-Additional Insulation R1.75

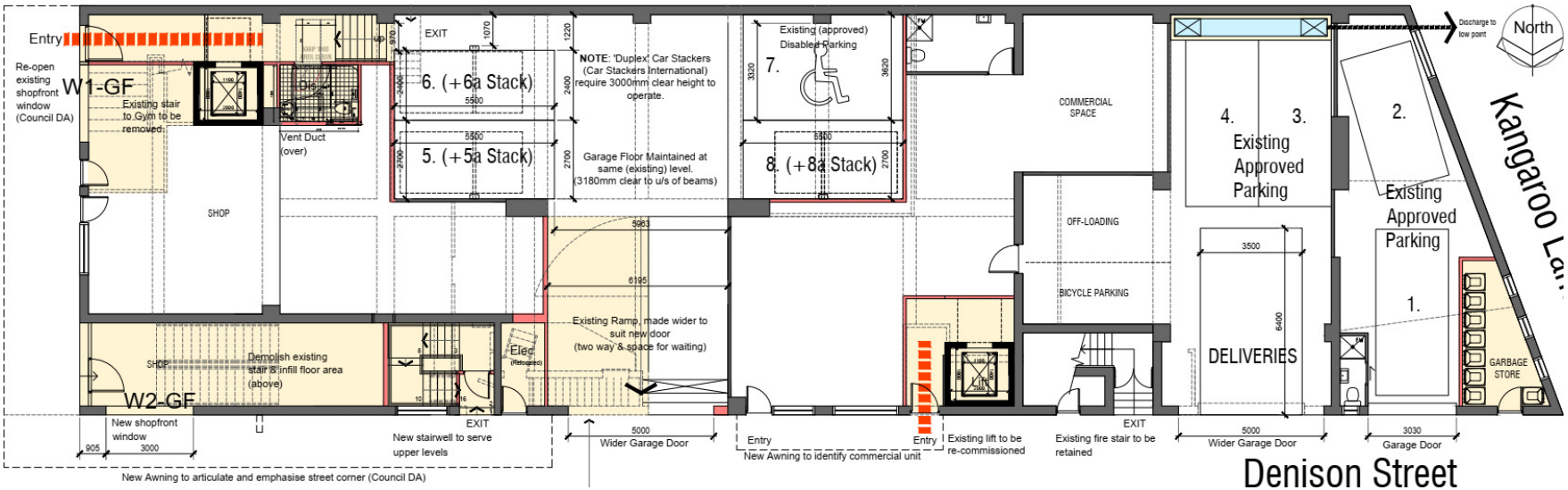
Note: Where the insulation goes in the air space and the R-value of the air space is lost the R value of the required insulation should be increased for the lost R-value

***General note: The construction diagrams are applicable only to the new building element or the building elements that have been altered or modified**

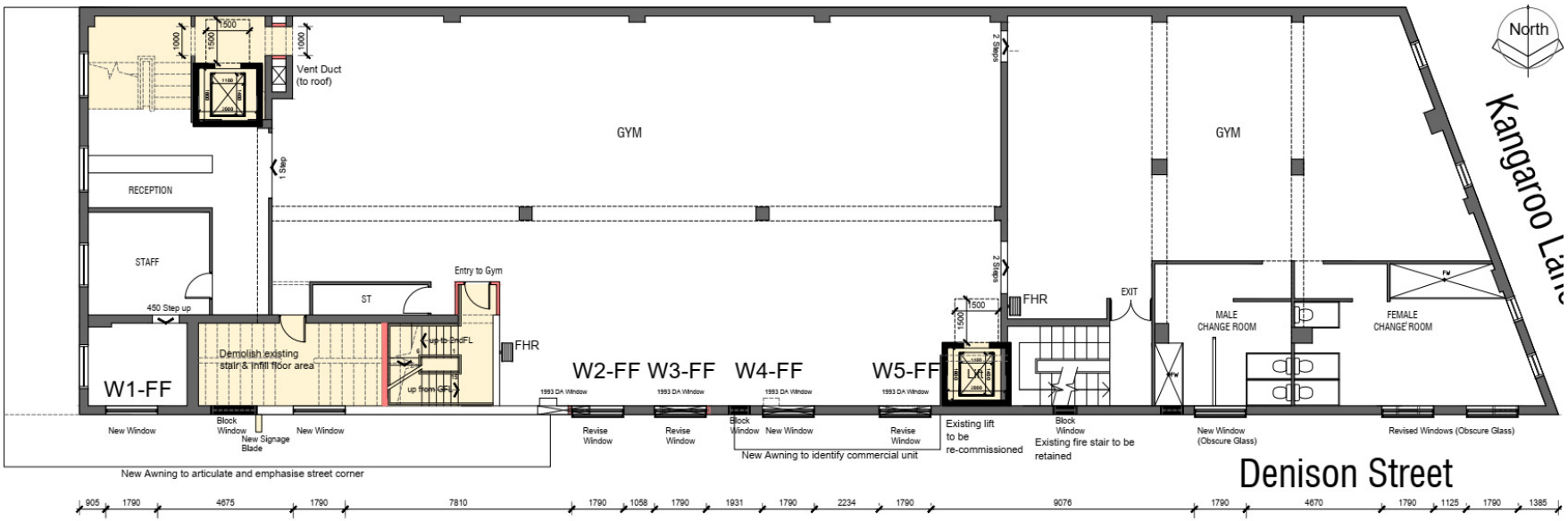
Assessor: Zoran Cvetkovski
BSc.(B.Eng.)

WINDOWS - 29-33 Pittwater Road, Manly, 2095

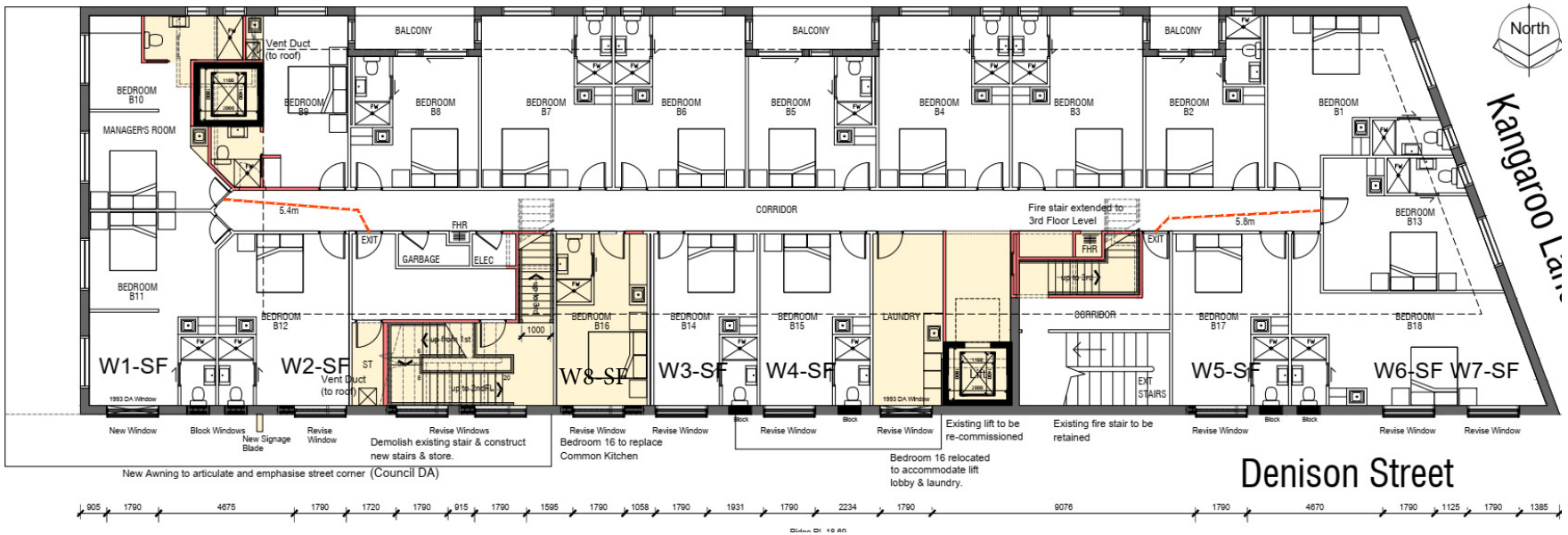
Ground Floor (GF)



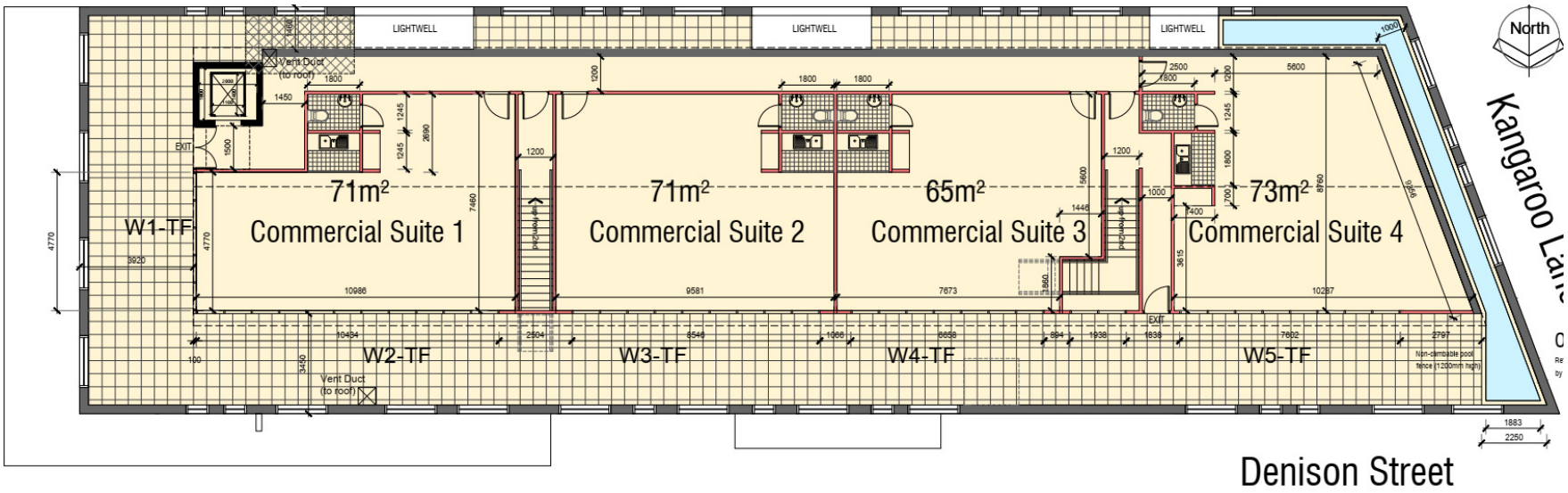
First Floor (FF)



Second Floor (SF)



Third Floor (TF)



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

Building name/description

Application: **shop display**

Climate zone: **5**

Storey: **Ground**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	28m²		9.1m²						
Option B									n/a

Glazing area (A) *6.55m² …… 5.62m²*

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

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS											SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance				P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)			P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	W1-GF	E		2.12	2.65		4.5	0.46			2.600	3.100	0.84	0.98	0.89	0.80	5.62	100% of 99%
2	W2-GF	N		2.18	3.00		4.5	0.46			1.800	2.700	0.67	0.52	0.97	0.77	6.55	100% of 37%
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

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if inputs are valid

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

Building name/description

Application: **other**

Climate zone: **5**

Storey: **First**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	61.9m²								
Option B									n/a

Glazing area (A) *18.8m²*

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

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS											SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element			Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)		Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	W1-FF		N		1.36	1.71		4.5	0.46					0.00	1.00	1.00	2.33	12% of 97%
2	W2-FF		N		2.30	1.79		4.5	0.46					0.00	1.00	1.00	4.12	22% of 97%
3	W3-FF		N		2.30	1.79		4.5	0.46					0.00	1.00	1.00	4.12	22% of 97%
4	W4-FF		N		2.30	1.79		4.5	0.46					0.00	1.00	1.00	4.12	22% of 97%
5	W5-FF		N		2.30	1.79		4.5	0.46					0.00	1.00	1.00	4.12	22% of 97%
6																		
7																		
8																		
9																		
10																		

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if inputs are valid

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

Building name/description

Application: **Class 3**

Climate zone: **5**

Storey: **Second**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	90.7m²								
Option B									n/a

Glazing area (A) 42.3m²

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

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS										SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	W1-SF	N		2.30	2.30		4.5	0.46		Device		2.00	0.00	0.00	0.19	5.29	13% of 20%
2	W2-SF	N		2.30	2.30		4.5	0.46		Device		2.00	0.00	0.00	0.19	5.29	13% of 20%
3	W3-SF	N		2.30	2.30		4.5	0.46		Device		2.00	0.00	0.00	0.19	5.29	13% of 20%
4	W4-SF	N		2.30	2.30		4.5	0.46		Device		2.00	0.00	0.00	0.19	5.29	13% of 20%
5	W5-SF	N		2.30	2.30		4.5	0.46		Device		2.00	0.00	0.00	0.19	5.29	13% of 20%
6	W6-SF	N		2.30	2.30		4.5	0.46		Device		2.00	0.00	0.00	0.19	5.29	13% of 20%
7	W7-SF	N		2.30	2.30		4.5	0.46		Device		2.00	0.00	0.00	0.19	5.29	13% of 20%
8	W8-SF	N		2.30	2.30		4.5	0.46		Device		2.00	0.00	0.00	0.19	5.29	13% of 20%
9																	
10																	

if inputs are valid

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

Building name/description

Application: **other**

Climate zone: **5**

Storey: **Third**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	104m²		12.9m²						
Option B									n/a
Glazing area (A)	*43.2m²*	.....	*6.2m²*						

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

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	W1-TF	E		1.30	4.77		4.5	0.46	Device		2.00	0.00	0.00	0.25	6.20	100% of 42%
2	W2-TF	N		1.30	10.43		4.5	0.46	0.570	1.560	0.37	0.26	0.97	0.80	13.56	31% of 100%
3	W3-TF	N		1.30	8.55		4.5	0.46	0.570	1.560	0.37	0.26	0.97	0.80	11.12	26% of 100%
4	W4-TF	N		1.30	6.65		4.5	0.46	0.570	1.560	0.37	0.26	0.97	0.80	8.65	20% of 100%
5	W5-TF	N		1.30	7.61		4.5	0.46	0.570	1.560	0.37	0.26	0.97	0.80	9.89	23% of 100%
6																
7																
8																
9																
10																

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if inputs are valid

Main Menu

LIGHTING CALCULATOR FOR USE WITH J6.2(b) VOLUME ONE (First issued with NCC 2014)

Multiple Lighting Systems Calculator | Help screen

Building name/description: 29-33 Pittwater Road, Manly, 2095- Ground Floor (Shops)

Classification: Class 6

Number of rows preferred in table below: 13 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design Illumination Power Load	Space	Adjustment Factor One				Adjustment Factor Two				OVERALL DESIGN PASSES	
							Adjustment Factor One	Dimming Percentages		Design Lumen Depreciation Factor	Adjustment Factor Two	Dimming Percentages		Design Lumen Depreciation Factor	System Illumination Power Load Allowance	Lighting System Share of % of Aggregate Allowance Used
							Adjustment	% Area	% of full power		Adjustment	% Area	% of full power			
1	Shop 1	96.8	52.3	2.75	1452	Retail space including a museum and gallery whose purpose is the sale of objects									2958 W	**23% of 58%**
2	WC- Shop 1	5.2	9.3	2.75	26	Toilet, locker room, staff room, rest room and the like									54 W	**0% of 58%**
3	Shop 2	28.9	26	2.75	433.5	Retail space including a museum and gallery whose purpose is the sale of objects									1010 W	**7% of 58%**
4	Staircase (Exit) - GF	10.4	13.1	2.75	83.2	Corridors									138 W	**1% of 58%**
5	WC -Com Space GF	7.8	11.9	2.75	39	Toilet, locker room, staff room, rest room and the like									81 W	**1% of 58%**
6	Comm. Cpace -GF	96.4	56.3	2.75	1446	Retail space including a museum and gallery whose purpose is the sale of objects									2987 W	**23% of 58%**
7	Entry (East) -GF	16.6	24.1	2.75	249	Entry lobby from outside the building									429 W	**4% of 58%**
8	Gr floor - Carpark (GF)	156	64.2	2.75	1092	Carpark - general									1185 W	**17% of 58%**
9	Delivery & Exist.Parking 3&4 (GF)	102	48	2.75	714	Carpark - general									805 W	**11% of 58%**
10	Existing Parking 1&2 (GF)	52.4	35.1	2.75	366.8	Carpark - general									462 W	**6% of 58%**
11	Garbage room (GF)	10.1	14.4	2.75	80.8	Storage with shelving no higher than 75% of the height of the aisle lighting									137 W	**1% of 58%**
12	Fire Stairs (GF)	11.45	14	2.75	91.6	Corridors									153 W	**1% of 58%**
13	Entry /West/ (GF)	13.6	14.8	2.75	204	Entry lobby from outside the building									334 W	**3% of 58%**
				Total	6278 W									***Total***	10733 W	

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LIGHTING CALCULATOR FOR USE WITH J6.2(b) VOLUME ONE (First issued with NCC 2014)

Multiple Lighting Systems Calculator | Help screen

Building name/description: 29-33 Pittwater Road, Manly, 2095- First Floor (GYM)

Classification: Class 9b

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

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design Illumination Power Load	Space	Adjustment Factor One				Adjustment Factor Two				OVERALL DESIGN PASSES	
							Adjustment Factor One	Dimming Percentages		Design Lumen Depreciation Factor	Adjustment Factor Two	Dimming Percentages		Design Lumen Depreciation Factor	System Illumination Power Load Allowance	Lighting System Share of % of Aggregate Allowance Used
							Adjustment	% Area	% of full power		Adjustment	% Area	% of full power			
1	Staff Room 1 (Gym)	14.7	15.4	3.3	132.3	Office - artificially lit to an ambient level of less than 200 lx									172 W	2% of 66%
2	Staff Room 2 (Gym)	9.6	12.5	3.3	86.4	Office - artificially lit to an ambient level of less than 200 lx									116 W	2% of 66%
3	Staircase (Gym entry)	12.3	15.7	3.3	110.7	Corridors									169 W	2% of 66%
4	Plant room (FF)	13.6	15	3.3	81.6	Plant room									115 W	1% of 66%
5	Male changing room (Gym)	23.28	19.3	3.3	209.52	Toilet, locker room, staff room, rest room and the like									226 W	4% of 66%
6	Female changing room (Gym)	38.6	25.8	3.3	347.4	Toilet, locker room, staff room, rest room and the like									357 W	6% of 66%
7	Fire Stairs (FF)	11.45	14	3.3	103.05	Corridors									159 W	2% of 66%
8	Gym 1	360	92	3.3	3240	An illuminance more than 320 lx to 400 lx									4800 W	58% of 66%
9	Gym 2	123.5	53	3.3	1111.5	An illuminance more than 320 lx to 400 lx									2003 W	20% of 66%
10	Stairs infilled room (GYM FF)	18.1	18.4	3.3	162.9	An illuminance more than 320 lx to 400 lx									362 W	3% of 66%
				Total	5585 W									***Total***	8479 W	

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LIGHTING CALCULATOR FOR USE WITH J6.2(b) VOLUME ONE (First issued with NCC 2014)

Multiple Lighting Systems Calculator | Help screen

Building name/description: 29-33 Pittwater Road, Manly, 2095- Second Floor (Serviced Appartments)

Classification: Class 3

Number of rows preferred in table below: 41 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design Illumination Power Load	Space	Adjustment Factor One				Adjustment Factor Two				OVERALL DESIGN PASSES	
							Adjustment Factor One	Dimming Percentages		Design Lumen Depreciation Factor	Adjustment Factor Two	Dimming Percentages		Design Lumen Depreciation Factor	System Illumination Power Load Allowance	Lighting System Share of % of Aggregate Allowance Used
							Adjustment	% Area	% of full power		Adjustment	% Area	% of full power			
1	Bed 1	25	22.5	3.68	200	Sole-occupancy unit of a Class 3 building									208 W	5% of 79%
2	Bathroom (Bed 1)	3.3	7.8	3.68	16.5	Toilet, locker room, staff room, rest room and the like									37 W	0% of 79%
3	Bed 2	16.8	17.2	3.68	134.4	Sole-occupancy unit of a Class 3 building									142 W	3% of 79%
4	Bathroom (Bed 2)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
5	Bed 3	23.5	21	3.68	188	Sole-occupancy unit of a Class 3 building									197 W	4% of 79%
6	Bathroom (Bed 3)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
7	Bed 4	23.5	21	3.68	188	Sole-occupancy unit of a Class 3 building									197 W	4% of 79%
8	Bathroom (Bed 4)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
9	Bed 5	16.3	17.8	3.68	130.4	Sole-occupancy unit of a Class 3 building									141 W	3% of 79%
10	Bathroom (Bed 5)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
11	Bed 6	16.8	17.2	3.68	134.4	Sole-occupancy unit of a Class 3 building									142 W	3% of 79%
12	Bathroom (Bed 6)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
13	Bed 7	16.8	17.2	3.68	134.4	Sole-occupancy unit of a Class 3 building									142 W	3% of 79%
14	Bathroom (Bed 7)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
15	Bed 8	16.3	17.8	3.68	130.4	Sole-occupancy unit of a Class 3 building									141 W	3% of 79%
16	Bathroom (Bed 8)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
17	Bed 9	18.2	18.9	3.68	145.6	Sole-occupancy unit of a Class 3 building									154 W	3% of 79%
18	Bathroom (Bed 9)	3.3	7.1	3.68	16.5	Toilet, locker room, staff room, rest room and the like									37 W	0% of 79%
19	Bed 10-Manager	22.7	22.2	3.68	181.6	Sole-occupancy unit of a Class 3 building									193 W	4% of 79%
20	Bathroom (Bed 10)	5.2	9.8	3.68	26	Toilet, locker room, staff room, rest room and the like									56 W	1% of 79%
21	Bed 11	25.9	22.3	3.68	207.2	Sole-occupancy unit of a Class 3 building									213 W	5% of 79%

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LIGHTING CALCULATOR FOR USE WITH J6.2(b) VOLUME ONE (First issued with NCC 2014)

Multiple Lighting Systems Calculator | Help screen

Building name/description: 29-33 Pittwater Road, Manly, 2095- Second Floor (Serviced Appartments)

Classification: Class 3

Number of rows preferred in table below: 41 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design Illumination Power Load	Space	Adjustment Factor One: Adjustment Factor One (Adjustment)	Adjustment Factor One: Dimming Percentages: % Area	Adjustment Factor One: Dimming Percentages: % of full power	Adjustment Factor One: Design Lumen Depreciation Factor	Adjustment Factor Two: Adjustment Factor Two (Adjustment)	Adjustment Factor Two: Dimming Percentages: % Area	Adjustment Factor Two: Dimming Percentages: % of full power	Adjustment Factor Two: Design Lumen Depreciation Factor	OVERALL DESIGN PASSES: System Illumination Power Load Allowance	OVERALL DESIGN PASSES: Lighting System Share of % of Aggregate Allowance Used
22	Bathroom (Bed 11)	2.9	7.2	3.68	23.2	Toilet, locker room, staff room, rest room and the like									31 W	1% of 79%
23	Bed 12	23.2	20.5	3.68	185.6	Sole-occupancy unit of a Class 3 building									193 W	4% of 79%
24	Bathroom (Bed 12)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
25	Bed 13	21	20.5	3.68	168	Sole-occupancy unit of a Class 3 building									178 W	4% of 79%
26	Bathroom (Bed 13)	3	7.6	3.68	15	Toilet, locker room, staff room, rest room and the like									33 W	0% of 79%
27	Bed 14	19.2	19.4	3.68	153.6	Sole-occupancy unit of a Class 3 building									163 W	4% of 79%
28	Bathroom (Bed 14)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
29	Bed 15	19.2	19.4	3.68	153.6	Sole-occupancy unit of a Class 3 building									163 W	4% of 79%
30	Bathroom (Bed 15)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
31	Bed 16	15.2	18	3.68	121.6	Sole-occupancy unit of a Class 3 building									131 W	3% of 79%
32	Bathroom (Bed 16)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
33	Bed 17	20.5	19.8	3.68	164	Sole-occupancy unit of a Class 3 building									175 W	4% of 79%
34	Bathroom (Bed 17)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
35	Bed 18	30.1	28.2	3.68	240.8	Sole-occupancy unit of a Class 3 building									252 W	6% of 79%
36	Bathroom (Bed 18)	2.9	7.2	3.68	14.5	Toilet, locker room, staff room, rest room and the like									31 W	0% of 79%
37	Laundry (SF)	14.5	16.8	3.68	116	Service area, cleaner's room and the like									126 W	3% of 79%
38	Corridor (SF)	52.9	78.2	3.68	423.2	Corridors									755 W	10% of 79%
39	Exit (SF)	11.7	17.2	3.68	93.6	Corridors									168 W	2% of 79%
40	Fire Stairs (SF)	21.2	22.2	3.68	169.6	Corridors									288 W	4% of 79%
41	Stairs- Entry (SF)	20	23	3.68	160	Corridors									276 W	4% of 79%
				Total	4210 W									***Total***	5335 W	

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LIGHTING CALCULATOR FOR USE WITH J6.2(b) VOLUME ONE (First issued with NCC 2014)

Multiple Lighting Systems Calculator | Help screen

Building name/description: 29-33 Pittwater Road, Manly, 2095- Second Floor (Serviced Appartments)

Classification: Class 3

Number of rows preferred in table below: 41 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design Illumination Power Load	Space	Adjustment Factor One				Adjustment Factor Two				OVERALL DESIGN PASSES	
							Adjustment Factor One	Dimming Percentages		Design Lumen Depreciation Factor	Adjustment Factor Two	Dimming Percentages		Design Lumen Depreciation Factor	System Illumination Power Load Allowance	Lighting System Share of % of Aggregate Allowance Used
							Adjustment	% Area	% of full power		Adjustment	% Area	% of full power			

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LIGHTING CALCULATOR FOR USE WITH J6.2(b) VOLUME ONE (First issued with NCC 2014)

Multiple Lighting Systems Calculator | Help screen

Building name/description: 29-33 Pittwater Road, Manly, 2095- Third Floor

Classification: Class 5

Number of rows preferred in table below: 11 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design Illumination Power Load	Space	Adjustment Factor One				Adjustment Factor Two				OVERALL DESIGN PASSES	
							Adjustment Factor One	Dimming Percentages		Design Lumen Depreciation Factor	Adjustment Factor Two	Dimming Percentages		Design Lumen Depreciation Factor	System Illumination Power Load Allowance	Lighting System Share of % of Aggregate Allowance Used
							Adjustment	% Area	% of full power		Adjustment	% Area	% of full power			
1	Commercial 1	71	36.8	2.7	639	Office - artificially lit to an ambient level of less than 200 lx									672 W	20% of 86%
2	Bathroom (Com 1)	2.2	6.1	2.7	11	Toilet, locker room, staff room, rest room and the like									24 W	0% of 86%
3	Commercial 2	71	36.8	2.7	639	Office - artificially lit to an ambient level of less than 200 lx									672 W	20% of 86%
4	Bathroom (Com 2)	2.2	6.1	2.7	11	Toilet, locker room, staff room, rest room and the like									24 W	0% of 86%
5	Commercial 3	65	33	2.7	585	Office - artificially lit to an ambient level of less than 200 lx									615 W	18% of 86%
6	Bathroom (Com 3)	2.2	6.1	2.7	11	Toilet, locker room, staff room, rest room and the like									24 W	0% of 86%
7	Commercial 4	73	39	2.7	657	Office - artificially lit to an ambient level of less than 200 lx									700 W	21% of 86%
8	Bathroom (Com 4)	2.2	6.1	2.7	11	Toilet, locker room, staff room, rest room and the like									24 W	0% of 86%
9	HWY	43	72	2.7	387	Corridors									604 W	12% of 86%
10	Stairs HWY1	18	23	2.7	162	Corridors									240 W	5% of 86%
11	Stairs HWY2	9	17	2.7	81	Corridors									126 W	3% of 86%

Total 3194 W

Total 3725 W

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