'Section J REPORT

NCC 2022 Building Code of Australia, Volume 1, 'Deemed-To-Satisfy' Compliance - Section J Report (NSW Version)

Proposed Alterations & Additions to an Existing Ski Club

At:
12 Banjo Drive
THREDBO

Department of Planning
Housing and Infrastructure

Issued under the Environmental Planning and Assessment Act 1979

Approved Application No 24/17507

Granted on the 26/2/2025

Signed Z Derbyshire

Sheet No 8 of 29

Prepared for High Noon Ski Club

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1 EXECUTIVE SUMMARY

This Report has been prepared by suitably qualified and experienced personnel and shows compliance with the NCC 2022 Building Code of Australia (BCA), Vol. 1, 'Deemed to Satisfy' (DTS) Provisions for Section J.

The Report further describes and refers to parts of the BCA, which leads to the conclusion that the subject building alterations and additions if constructed with the recommendations contained in this report will meet the DTS Provisions of Section J of the BCA.

Plans depict the alterations and additions are only at the lower floor level and comprise an extension to the existing non-conditioned storeroom.

The remainder of the lower level floor plan and the ground floor area remain and will not be altered. As such it would be unreasonable to require the building to be upgraded so as to be compliant with Section J.

2 PURPOSE OF REPORT

The purpose of this report is to:

A. Complete a DTS compliance assessment in reference to Section J of the BCA in respect of the subject building alterations and additions.

B. Advise of any areas of non-compliance of the building alterations and additions in respect to the DTS provisions of Section J of the BCA.

C. Provide a Report covering compliance of the building alterations and additions with the relevant provisions of the BCA in respect to the DTS provisions contained in Section J.

3 PROPERTY

The premises, the subject to this Report is known as 12 Banjo Drive, Thredbo.

4 BASIS OF ASSESSMENT

The assessment has been carried out using:

A. Drawing Nos: 353-02 to -06 Rev.J, dated 12th Sept'2024, drawn by T Z Design.

B. The NCC 2022 Building Code of Australia (BCA), Vol. 1.

C. Advice from the Applicant.

The referenced plans indicate that the additions at the lower level are non-conditioned areas. As such Parts J4, J5, J6D3, J8 and J9 will not apply to the additions.

5 ASSESSMENT

5.1 Building Class & Climate Zone

The building has a Class 3 classification as determined by Part A6 of NCC 2022 Building Code of Australia, Vol. 1.

The climate zone designated in the ABCB map referred to in the definitions under NCC 2022 is Climate Zone 8.

5.2 Definitions Pursuant to Schedule 1 of the NCC 2022 BCA

'*Conditioned Space*' means a space within a building including a ceiling or under floor supply air plenum or return air plenum where the environment is likely by the intended use of the space to have its temperature controlled by air-conditioning.

'*Envelope*' means the parts of a building's fabric that separate a conditioned space or habitable room from

a) The exterior of the building, or

b) A Non-conditioned space including:

(i) The floor of a rooftop plant room, lift machine room or the like, and

(ii) The floor above a carpark or warehouse, and

(iii) The common wall with a carpark, warehouse or the like.

5.3 Description of Development

The proposed work involves the construction of alterations and additions to an existing 2 storey Ski Lodge. The plans show the existing lower level storage area to be enlarged and a very minor additions to the existing WC to create a bathroom.

6 PART J4 – BUILDING FABRIC FOR CONDITIONED AREAS

Not applicable to this application.

6.1 Roof & Ceiling Construction Part J4D4

Not applicable to this application.

6.2 Roof Lights J4D5

Not applicable to this application.

6.3 Walls & Glazing - Part J4D6

Not applicable to this application.

6.4 Floors Part J4D7

Not applicable to this application.

7 BUILDING SEALING PART J5

Not applicable to this application.

8 AIR-CONDITIONING AND VENTILATION SYSTEM – PART J6

8.1 Introduction

This Part contains '*deemed to Satisfy*' provisions for compliance with part J1. It sets out the provisions for the efficiency and control of air-conditioning, space heating and ventilation equipment, the efficiency, sealing and insulation requirements for ductwork systems containing fans and for the efficiency and insulation of pipework and pump systems.

8.2 J6D2 Application of Part

(1) The '*deemed to satisfy*' provisions of this part do not apply to a Class 8 electricity network substation.

(2) J6D10 does not apply to a Class 2 building or a Class 4 part of a building.

8.3 J6D3- Air-Conditioning System Control

Not applicable to this application.

8.4 J6D4 - Mechanical Ventilation System Control To Additions Only

(1) **General** – Any new 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, except in periods when evaporative cooling is being used:

(i) where specified in Table J6D4, have

(A) an energy reclaiming system that preconditions outdoor air at a minimum sensible heat transfer effectiveness of 60%; or

(B) demand control ventilation in accordance with AS1668.2 if appropriate to the application; and

(ii) not exceed the minimum outdoor air quantity required by Part F6, by more than 20%, except where;

(A) additional unconditioned outside air is supplied for free cooling or

(B) additional mechanical ventilation is needed to balance the required exhaust or process exhaust; or

(C) an energy reclaiming system preconditions all the outside air, and

(c) for an airflow of more than 1000 L/s, have a variable speed fan unless the downstream airflow is required by Part F6 to be constant.

Table J6D4 Required outdoor air treatment

Climate zone	Outdoor air flow (L/s)	Required measure
1	>500	Modulating control
2	-	No required measure
3	>1000	Modulating control
4 and 6	>500	Modulating control or energy reclaiming system
5	>1000	Modulating control or energy reclaiming system
7 and 8	>250	Modulating control or energy reclaiming system

(2) **Exhaust systems** — An exhaust system with an air flow rate of more than 1000 L/s must be capable of stopping the motor when the system is not needed, except for an exhaust system in a sole-occupancy unit in a Class 2, 3 or 9c building.

(3) **Carpark Exhaust Systems**

Not applicable to this application.

(4) **Time switches**

(a) A time switch must be provided to a mechanical ventilation system with an air flow rate of more than 1000 L/s.

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

(c) The requirements of (i) and (ii) do not apply to;

(i) a mechanical ventilation system that serves;

(A) only one sole-occupancy unit in a Class 2, 3 or 9c building, or

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

(ii) a building where mechanical ventilation is needed for 24 hour occupancy.

8.5 J6D5 – Fan & Duct Systems

(1) Fans, ductwork and duct components that form part of an air-conditioning system or mechanical ventilation system must

(a) separately comply with (2), (3), (4) and (5); or

(b) achieve a fan motor input power per unit of flowrate lower than the fan motor input power per unit of flowrate achieved when applying (2), (3), (4) and (5) together.

(2) **Fans**

(a) Fans in systems that have a static pressure of not more than 200 Pa must have an efficiency at the full load operating point not less than the efficiency calculated with the following formula:

$$\eta_{min} = 0.13 \times \ln(p) - 0.3$$

where;

(b) In the formula at (a)

(i) η_{min} = the minimum required system static efficiency for installation type A or C or the minimum required system total efficiency for installation type B or D; and

(ii) p = the static pressure of the system (Pa); and

(iii) in = natural logarithm.

(c) Fans in systems that have a static pressure above 200 Pa must have an efficiency at the full load operating point not less than the efficiency calculated with the following formula:

$$\eta_{min} = 0.85 \times (a \times \ln(P) - b + N) /100$$

where;

(d) In the formula at (c)

(i) η_{min} = the minimum required system static efficiency for installation type A or C or the minimum required system total efficiency for installation type B or D; and

(ii) P = the motor input power of the fan (kW); and

(iii) N = the minimum performance grade obtained from Table J6D5a; and

(iv) a = regression coefficient a, obtained from Table J6D5b; and

(v) b = regression coefficient b, obtained from Table J6D5c; and

(vi) ln = natural logarithm.

(e) The requirements of (a), (b),(c) and (d) do not apply to fans that need to be explosion proof.

Table J6D5a Minimum Fan Performance Grade

Fan type	Installation type A or C	Installation type B or D
Axial — as a component of an air handling unit or fan coil unit	46.0	51.5
Axial — other	42.0	61.0
Mixed flow – as a component of an air handling unit or fan coil unit	46.0	51.5
Mixed flow – other	52.5	65.0
Centrifugal forward-curved	46.0	51.5
Centrifugal radial bladed	46.0	51.5
Centrifugal backward-curved	64.0	64.0

Note to Table J6D5a:

1. **Installation type A** means an arrangement where the fan is installed with free inlet and outlet conditions.

2. **Installation type B** means an arrangement where the fan is installed with a free inlet and a duct at its outlet.
3. **Installation type C** means an arrangement where the fan is installed with a duct fitted to its inlet and with free outlet conditions.
4. **Installation type D** means an arrangement where the fan is installed with a duct fitted to its inlet and outlet.

Table J6D5b Fan Regression Coefficient a

Fan type	Fan motor input power < 10 kW	Fan motor input power ≥ 10 kW
Axial	2.74	0.78
Mixed flow	4.56	1.1
Centrifugal forward-curved	2.74	0.78
Centrifugal radial bladed	2.74	0.78
Centrifugal backward-curved	4.56	1.1

Table J6D5c Fan Regression Coefficient b

Fan type	Fan motor input power < 10 kW	Fan motor input power ≥ 10 kW
Axial	6.33	1.88
Mixed flow	10.5	2.6
Centrifugal forward-curved	6.33	1.88
Centrifugal radial bladed	6.33	1.88
Centrifugal backward-curved	10.5	2.6

(3) **Ductwork**

(a) The pressure drop in the index run across all straight sections of rigid ductwork and all sections of flexible ductwork must not exceed 1 Pa/m when averaged over the entire length of straight rigid duct and flexible duct. The pressure drop of flexible ductwork sections may be calculated as if the flexible ductwork is laid straight.

(b) Flexible ductwork must not account for more than 6 m in length in any duct run.

(c) The upstream connection to ductwork bends, elbows and tees in the index run must have an equivalent diameter to the connected duct.

(d) Turning vanes must be included in all rigid ductwork elbows of 90° or more acute than 90° in the index run except where—

(i) the inclusion of turning vanes presents a fouling risk; or

(ii) a long radius bend in accordance with AS 4254.2 is used.

(4) **Ductwork components in the index run**

(a) The pressure drop across a coil must not exceed the value specified in Table J6D5d.

Table J6D5d Maximum coil pressure drop

Number of Rows	Maximum Pressure Drop (Pa)
1	30
2	50
4	90
6	130
8	175
10	220

(b) A high efficiency particulate arrestance (HEPA) air filter must not exceed the higher of—

(i) a pressure drop of 200 Pa when clean; or

(ii) the filter design pressure drop when clean at an air velocity of 1.5 m/s.

(c) Any other air filter must not exceed;

(i) the pressure drop specified in Table J6D5e when clean; or

(ii) the filter design pressure drop when clean at an air velocity of 2.5 m/s.

Table J6D5e Maximum Clean Filter Pressure Drop

Filter Minimum Efficiency Reporting Value	Maximum Pressure Drop (Pa)
9	55
11	65
13	95
14	110

(d) The pressure drop across intake louvres must not exceed the higher of
  (i) for single stage louvres, 30 Pa; and
  (ii) for two stage louvres, 60 Pa; and
  (iii) for acoustic louvres, 50 Pa; and
  (iv) for other non-weatherproof louvres, 30 P

(e) The pressure drop across a variable air volume box, with the damper in the fully open position, must not exceed
  (i) for units with electric reheat, 100 Pa; and
  (ii) for other units, 25 Pa not including coil pressure losses.

(f) Rooftop cowls must not exceed a pressure drop of 30 Pa.

(g) Attenuators must not exceed a pressure drop of 40 Pa.

(h) Fire dampers must not exceed a pressure drop of 15 Pa when open.

(i) Balancing and control dampers in the index run must not exceed a pressure drop of 25 Pa when in the fully open position.

(j) Supply air diffusers and grilles must not exceed a pressure drop of 40 Pa.

(k) Exhaust grilles must not exceed a pressure drop of 30 Pa.

(l) Transfer ducts must not exceed a pressure drop of 12 Pa.

(m) Door grilles must not exceed a pressure drop of 12 Pa.

(n) Active chilled beams must not exceed a pressure drop of 150 Pa.

(5) The requirements of (1), (2), (3) and (4) do not apply to;
  (a) fans in unducted air-conditioning systems with a supply air capacity of less than 1000 L/s; and
  (b) smoke spill fans, except where also used for air-conditioning or ventilation; and
  (c) the power for process-related components; and
  (d) kitchen exhaust systems.

8.6 J6D6 - Ductwork insulation

(1) Ductwork and fittings in an air-conditioning system must be provided with insulation;
  (a) complying with AS/NZS 4859.1; and
  (b) having an insulation R-Value greater than or equal to—
    (i) for flexible ductwork, 1.0; or
    (ii) for cushion boxes, that of the connecting ductwork; or
    (iii) that specified in Table J6D6.

(2) Insulation must
  (a) be protected against the effects of weather and sunlight; and
  (b) be installed so that it—
    (i) abuts adjoining insulation to form a continuous barrier; and
    (ii) maintains its position and thickness, other than at flanges and supports; and
  (c) when conveying cooled air;
    (i) be protected by a vapour barrier on the outside of the insulation; and

(ii) where the vapour barrier is a membrane, be installed so that adjoining sheets of the membrane;

(A) overlap by at least 50mm; and

(B) are bonded or taped together.

(3) The requirements of (1) do not apply to—

(a) ductwork and fittings located within the only or last room served by the system; or

(b) fittings that form part of the interface with the conditioned space; or

(c) return air ductwork in, or passing through, a conditioned space; or

(d) ductwork for outdoor air and exhaust air associated with an air-conditioning system; or

(e) the floor of an in-situ air-handling unit; or

(f) packaged air conditioners, split systems, and variable refrigerant flow air-conditioning equipment complying with MEPS; or

(g) flexible fan connections.

(4) For the purposes of (1), (2) and (3), fittings—

(a) include non-active components of a ductwork system such as cushion boxes; and

(b) exclude active components such as air-handling unit components.

Table J6D6 Ductwork and fittings - Minimum insulation R-Value

Location of ductwork and fittings	Climate zone 1, 2, 3, 4, 5, 6 or 7	Climate zone 8
Within a conditioned space	1.2	2.0
Where exposed to direct sunlight	3.0	3.0
All other locations	2.0	3.0

8.7 J6D7 - Ductwork Sealing

Ductwork in an air-conditioning system with a capacity of 3000 L/s or greater, not located within the only or last room served by the system, must be sealed against air loss in accordance with the duct sealing requirements of AS 4254.1 and AS 4254.2 for the static pressure in the system.

8.8 J6D8 - Pump systems

(1) **General** — Pumps and pipework that form part of an air-conditioning system must either—

(a) separately comply with (1), (2) and (4); or

(b) achieve a pump motor power per unit of flowrate lower than the pump motor power per unit of flowrate achieved when applying (2), (3) and (4) together.

(2) **Circulator pumps** — A glandless impeller pump, with a rated hydraulic power output of less than 2.5 kW and that is used in closed loop systems must have an energy efficiency index (EEI) not more than 0.27 calculated in accordance with European Union Commission Regulation No. 622/2012.

(3) **Other pumps** — Pumps that are in accordance with Articles 1 and 2 of European Union Commission Regulation No. 547/2012 must have a minimum efficiency index (MEI) of 0.4 or more when calculated in accordance with European Union Commission Regulation No. 547/2012.

(4) **Pipework** — Straight segments of pipework along the index run, forming part of an air-conditioning system—

(a) in pipework systems that do not have branches and have the same flow rate throughout the entire pipe network, must achieve an average pressure drop of not more than—

(i) for constant speed systems, the values nominated in Table J6D8a; or

(ii) for variable speed systems, the values nominated in Table J6D8b; or

(b) in any other pipework system, must achieve an average pressure drop of not more than—

(i) for constant speed systems, the values nominated in Table J6D8c; or

(ii) for variable speed systems, the values nominated in Table J6D8d.

(5) the requirements of (4) do not apply—

(a) to valves and fittings; or

(b) where the smallest pipe size compliant with (4) results in a velocity of 0.7 m/s or less at design flow.

Table J6D8a Maximum Pipework Pressure Drop - Non-Distributive Constant Speed Systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	400
25	400	400
32	400	400
40	400	400
50	400	350
65	400	350
80	400	350
100	400	200
125	400	200
150 or more	400	200

Table J6D8b Maximum Pipework Pressure Drop - Non-Distributive Variable Speed Systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	400
25	400	400
32	400	400
40	400	400
50	400	400
65	400	400
80	400	400
100	400	300
125	400	300
150 or more	400	300

Table J6D8c Maximum Pipework Pressure Drop - Distributive Constant Speed Systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 2000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating between 2000 hours/annum & 5000 hours/annum (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	300	150
25	400	220	100
32	400	220	100
40	400	220	100
50	400	220	100
65	400	400	170
80	400	400	170
100	400	400	170

125	400	400	170
150 or more	400	400	170

Table J6D8d Maximum pipework pressure drop - Distributive variable speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	250
25	400	180
32	400	180
40	400	180
50	400	180
65	400	300
80	400	300
100	400	300
125	400	300
150 or more	400	300

8.9 J6D9 - Pipework Insulation

(1) Piping, vessels, heat exchangers and tanks containing heating or cooling fluid, where the fluid is held at a heated or cooled temperature, that are part of an air-conditioning system, other than in appliances covered by MEPS, must be provided with insulation—

(a) complying with AS/NZS 4859.1; and

(b) for piping of heating and cooling fluids, having an insulation R-Value in accordance with Table J6D9a; and

(c) for vessels, heat exchangers or tanks, having an insulation R-Value in accordance with Table J6D9b; and

(d) for refill or pressure relief piping, having an insulation R-Value equal to the required insulation R-Value of the connected pipe, vessel or tank within 500 mm of the connection.

(2) Insulation must—

(a) be protected against the effects of weather and sunlight; and

(b) be able to withstand the temperatures within the piping, vessel, heat exchanger or tank.

(3) 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.

(4) The requirements of (1) and (2) do not apply to piping, vessels or heat exchangers—

(a) located within the only or last room served by the system and downstream of the control device for the regulation of heating or cooling service to that room; or

(b) encased within a concrete slab or panel which is part of a heating or cooling system; or

(c) supplied as an integral part of a chiller, boiler or unitary air-conditioner complying with the requirements of J6D10, J6D11 and J6D12; or

(d) inside an air-handling unit, fan-coil unit, or the like.

(5) For the purposes of (1), (2), (3) and (4)—

(a) heating fluids include refrigerant, heated water, steam and condensate; and

(b) cooling fluids include refrigerant, chilled water, brines and glycol mixtures, but do not include condenser cooling water.

Table J6D9a Piping — Minimum Insulation R-Value

Fluid temperature range	Minimum insulation R- Value - nominal	Minimum insulation R-Value - nominal	Minimum insulation R-Value - nominal	Minimum insulation R-Value - nominal

	pipe diameter ≤ 40 mm	pipe diameter > 40 mm and ≤ 80 mm	pipe diameter between > 80 mm and ≤ 150 mm	pipe diameter > 150 mm
Low temperature chilled - ≤ 2°C	1.3	1.7	2.0	2.7
Chilled - > 2°C but ≤ 20°C	1.0	1.5	2.0	2.0
Heated - > 30°C but ≤ 85°C	1.7	1.7	1.7	1.7
High Temperature heated - > 85°C	2.7	2.7	2.7	2.7

Note to Table J6D9a: The minimum required R-Value may be halved for piping penetrating a structural member.

Table J6D9b Vessels, heat exchangers and tanks — Minimum insulation R-Value

Fluid temperature range	Minimum insulation R-Value
Low temperature chilled — ≤ 2°C	2.7
Chilled — > 2°C but ≤ 20°C	1.8
Heated — > 30°C but ≤ 85°C	3.0
High temperature heated — > 85°C	3.0

8.10 J6D10 - Space Heating

(1) A heater used for air-conditioning or as part of an air-conditioning system must be—

- (a) a solar heater; or
- (b) a gas heater; or
- (c) a heat pump heater; or
- (d) a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or
- (e) an electric heater if—
  - (i) the heating capacity is not more than—
    - (A) 10 W/m2 of the floor area of the conditioned space in climate zone 1; or
    - (B) 40 W/m2 of the floor area of the conditioned space in climate zone 2; or
    - (C) the value specified in Table J6D10 where reticulated gas is not available at the allotment boundary; or
  - (ii) the annual energy consumption for heating is not more than 15 kWh/m2 of the floor area of the conditioned space in climate zones 1, 2, 3, 4 and 5; or
  - (iii) the in-duct heater complies with J6D3(1)b(iii); or
- (f) any combination of (a) to (e).

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

(3) A fixed heating or cooling appliance that moderates the temperature of an outdoor space must be configured to automatically shut down when—

- (a) there are no occupants in the space served; or
- (b) a period of one hour has elapsed since the last activation of the heater; or
- (c) the space served has reached the design temperature.

(4) A gas water heater, that is used as part of an air-conditioning system, must—

- (a) if rated to consume 500 MJ/hour of gas or less, achieve a minimum gross thermal efficiency of 86%; or

(b) if rated to consume more than 500 MJ/hour of gas, achieve a minimum gross thermal efficiency of 90%.

Table J6D10 Maximum electric heating capacity

Floor area of the conditioned space	W/m 2 of floor area in climate zone 3	W/m 2 of floor area in climate zone 4	W/m 2 of floor area in climate zone 5	W/m 2 of floor area in climate zone 6	W/m 2 of floor area in climate zone 7
≤ 500 m2	50	60	55	65	70
> 500 m2	40	50	45	55	60

An air-conditioning system refrigerant chiller must comply with MEPS and the full load operation energy efficiency ratio and integrated part load energy efficiency ratio in Table J6D11a or Table J6D11b when determined in accordance with AHRI 551/591.

Table J6D11a Minimum energy efficiency ratio for refrigerant chillers — Option 1

Chiller type	Full Load Operation ($W_r/W_{input\ power}$)	Integrated Part Load ($Wr/W_{input\ power}$)
Air-cooled chiller with a capacity ≤ 528 kWr	2.985	4.048
Air-cooled chiller with a capacity > 528 kWr	2.985	4.137
Water-cooled positive displacement chiller with a capacity ≤ 264 kWr	4.694	5.867
Water-cooled positive displacement chiller with a capacity > 264 kWr but ≤ 528 kWr	4.889	6.286
Water-cooled positive displacement chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.334	6.519
Water-cooled positive displacement 5.800 chiller with a capacity > 1055 kWr but ≤ 2110 kWr	5.800	6.770
Water-cooled positive displacement 6.286 chiller with a capacity > 2110 kWr	6.286	7.041
Water-cooled centrifugal chiller with a capacity ≤ 528 kWr	5.771	6.401
Water-cooled centrifugal chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.771	6.519
Water-cooled centrifugal chiller with a capacity > 1055 kWr but ≤ 1407 kWr	6.286	6.770
Water-cooled centrifugal chiller with a capacity > 1407 kWr	6.286	7.041

Table J6D11b Minimum energy efficiency ratio for refrigerant chillers — Option 2

Chiller type	Full Load Operation ($W_r/W_{input\ power}$)	Integrated Part Load ($W_r/W_{input\ power}$)
Air-cooled chiller with a capacity ≤ 528 kWr	2.866	4.669
Air-cooled chiller with a capacity > 528 kWr	2.866	4.758
Water-cooled positive displacement chiller with a capacity ≤ 264 kWr	4.513	7.041
Water-cooled positive displacement chiller with a capacity > 264 kWr but ≤ 528 kWr	4.694	7.184
Water-cooled positive displacement chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.177	8.001
Water-cooled positive displacement chiller with a capacity > 1055 kWr but ≤ 2110 kWr	5.633	8.586
Water-cooled positive displacement chiller with a capacity > 2110 kWr	6.018	9.264
Water-cooled centrifugal chiller with a capacity ≤ 528 kWr	5.065	8.001
Water-cooled centrifugal chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.544	8.001
Water-cooled centrifugal chiller with a capacity > 1055 kWr but ≤ 1407 kWr	5.917	9.027

Water-cooled centrifugal chiller with a capacity > 1407 kWr	6.018	9.264

8.11 J6D12 - Unitary Air-conditioning Equipment

Unitary air-conditioning equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must comply with MEPS and for a capacity greater than or equal to 65 kWr;

(a) where water cooled, have a minimum energy efficiency ratio of 4.0 $W_r/W_{\text{input power}}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power; or

(b) where air cooled, have a minimum energy efficiency ratio of 2.9 $W_r/W_{\text{input power}}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power.

8.12 J6D13 - Heat Rejection Equipment

(1) The motor rated power of a fan in a cooling tower, closed circuit cooler or evaporative condenser must not exceed the allowances in Table J6D13.

(2) The fan in an air-cooled condenser must have a motor rated power of not more than 42 W for each kW of heat rejected from the refrigerant, when determined in accordance with AHRI 460 except for;

(a) a refrigerant chiller in an air-conditioning system that complies with the energy efficiency ratios in J6D11; or

(b) packaged air-conditioners, split systems, and variable refrigerant flow air-conditioning equipment that complies with the energy efficiency ratios in J6D12.

Table J6D13 Maximum Fan Motor Power — Cooling Towers, Closed Circuit Coolers And Evaporative Condensers

Type	Cooling tower maximum fan motor input power (W/kW_{rej})	Closed circuit cooler maximum fan motor input power (W/kW_{rej})	Evaporative condenser maximum fan motor input power (W/kW_{rej})
Induced draft	10.4	16.9	11.0
Forced draft	19.5	Note	11.0

Note to Table J6D13: A closed circuit, forced draft cooling tower must not be used.

9 ARTIFICIAL LIGHTING & POWER – PART J7 – To Additions Only

9.1 Introduction To This Part

This part contains '*deemed to satisfy*' provisions for compliance with Part J1. It sets out provisions for the design and configuration of artificial lighting and power, boiling and chilled water units, lifts and escalators and moving walkways.

9.2 Application of Part J7D2

(1) The '*deemed to satisfy*' provisions of this part do not apply to a Class 2 building or a Class 4 part of a building

(2) J7D3, J7D4, and J7D6(1)(b) do not apply to a Class 8 – Electricity network substation.

9.3 Artificial Lighting J7D3

(1) This subclause does not apply in NSW

(2) In a Class 3 or a Class 5 to 9 building;

(a) for new 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 J7D3a; and

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

(c) where there are multiple lighting systems serving the same space, the design illumination power load for (b) is—

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

(ii) where a control system permits only one system to operate at a time—

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

(B) determined by the formula;

$$[H \times T/2 + P \times (100 - T/2)] / 100$$

Where:

(d) In the formula at (c)(ii)(B);

(i) H = the highest illumination power load; and

(ii) T = the time for which the maximum illumination power load will occur, expressed as a percentage; and

(iii) P = the predominant illumination power load.

(3) The requirements of (2) do not apply to the following:

(a) Emergency lighting provided in accordance with Part E4.

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

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

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

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

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

(g) 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.

(h) lighting installed solely to provide photo-synthetically active radiation for indoor plant growth on green walls and the like.

(4) For the purposes of Table J7D3b, the following control devices must comply with Specification 40:

(a) Lighting timers.

(b) Motion detectors.

(c) Daylight sensors and dynamic lighting control devices.

Table J7D3a Maximum Illumination Power Density

Space	Maximum Illumination Power Density (W/m^2)
Auditorium, church and public hall	**8**
Board room and conference room	**5**
Carpark - general	**2**
Carpark - entry zone (first 15 m of travel) during the daytime	**11.5**
Carpark - entry zone (next 4 m of travel) during the day	**2.5**
Carpark - entry zone (first 20 m of travel) during night time	**2.5**
Common rooms, spaces and corridors in a Class 2 building	**4.5**
Control room, switch room and the like - intermittent monitoring	**3**
Control room, switch room and the like - constant monitoring	**4.5**
Corridors	**5**

Courtroom	**4.5**
Dormitory of a Class 3 building used for sleeping only	**3**
Dormitory of a Class 3 building used for sleeping and study	**4**
Entry lobby from outside the building	**9**
Health-care - infants' and children's wards and emergency department	**4**
Health-care - examination room	**4.5**
Health-care - examination room in intensive care and high dependency ward	**6**
Health-care - all other patient care areas including wards and corridors	**2.5**
Kitchen and food preparation area	**4**
Laboratory - artificially lit to an ambient level of 400 lx or more	**6**
Library - stack and shelving area	**2.5**
Library - reading room and general areas	**4.5**
Lounge area for communal use in a Class 3 or 9c building	**4.5**
Museum and gallery - circulation, cleaning and service lighting	**2.5**
Office - artificially lit to an ambient level of 200 lx or more	**4.5**
Office - artificially lit to an ambient level of less than 200 lx	**2.5**
Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms	**4**
Plant rooms with a horizontal illuminance target of 80 lx	**2**
Restaurant, café, bar, hotel lounge and a space for the serving and consumption of food or drinks	**14**
Retail space including a museum and gallery whose purpose is the sale of objects	**14**
School - general purpose learning areas and tutorial rooms	**4.5**
Sole-Occupancy unit of a Class 3 or 9c building	**5**
Storage	**1.5**
Service area, cleaner's room and the like	**1.5**
Toilet, locker room, staff room, rest room and the like	**3**
Wholesale storage area with a vertical illuminance target of 160 lx	**4**
Stairways, including fire-isolated stairways	**2**
Lift cars	**3**

Notes to Table J7D3a:

(1) In areas not listed above, the maximum illumination power density is
- (i) for an illuminance not more than 80 lx, 2 W/m2; and
- (ii) for an illuminance more than 80 lx and not more than 160 lx, 2.5 W/m2; and
- (iii) for an illuminance more than 160 lx and not more than 240 lx, 3 W/m2; and
- (iv) for an illuminance more than 240 lx and not more than 320 lx, 4.5 W/m2; and
- (vi) for an illuminance more than 320 lx and not more than 400 lx, 6 W/m2; and
- (vii) for an illuminance more than 400 lx and not more than 600 lx, 10 W/m2; and
- (viii) for an illuminance more than 600 lx and not more than 800 lx, 11.5 W/m2.

(2) For enclosed spaces with a Room Aspect Ratio of less than 1.5, the maximum illumination power density may be increased by dividing it by an adjustment factor for room aspect which is 0.5 + (Room Aspect Ratio/3).

(3) The Room Aspect Ratio of the enclosed space is determined by the formula A/(H x C), where—
- (i) A is the area of the enclosed space; and
- (ii) H is the height of the space measured from the floor to the highest part of the ceiling; and
- (iii) C is the perimeter of the enclosed space at floor level.

(4) In addition to 2, the maximum illumination power density may be increased by dividing it by the illumination power density adjustment factor in Table J7D3b and Table J7D3c and where the control device is not installed to comply with J6D4.

(5) Circulation spaces are included in the allowances listed in the Table.

Table J7D3b Illumination Power Density Adjustment Factor For a Control Device

Item [Notes 1 & 2]	Description	Illumination power density adjustment factor

Motion detector	In a toilet or change room, other than a public toilet, in a Class 6 building	0.4
Motion detector	Where a group of light fittings serving less than 100 m2 is controlled by one or more detectors	0.6
Motion detector	Where a group of light fittings serving 100 m2 or more is controlled by one or more detectors	0.7
Programmable dimming system Note 3	Where not less than 75% of the area of a space is controlled by programmable dimmers	0.85
Fixed dimming Notes 3 and 4	All fittings with fixed dimming	Whichever is greater of (a) 0.5; or (b) 0.2+0.8L where L = the illuminance turndown for the fixed dimming.
Lumen depreciation dimming Note 3	All fittings with lumen depreciation dimming	0.85
Two stage sensor - equipped lights with minimum power of 30 % of peak power or less	Fire stairs and other spaces not used for regular transit	0.4
Two stage sensor - equipped lights with minimum power of 30% of peak power or less	Transitory spaces in regular use or in a *carpark*	0.7
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent *windows* Notes 3 and 5	In a Class 5, 6, 7, 8 or 9b building or a Class 9a building, other than a *ward area,* where the lights are adjacent *windows,* other than *roof lights,* for a distance from the *window* equal to the depth of the floor to *window* head height	05 Note 3
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent *windows* Notes 3 and 5	Serving a Class 3 or 9c building, or a Class 9a *ward area,* where the lights are adjacent *windows,* other than *roof lights,* for a distance from the *window* equal to the depth of the floor to *window* head height	0.75 Note 3
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent *windows* Notes 3 and 5	In a Class 5, 6, 7, 8 or 9b building or a Class 9a building, other than a *ward area,* where the lights are adjacent *roof lights.*	0.6 Note 3
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent *windows* Note 3 and 5	In a Class 3 or 9c building, or a Class 9a *ward area,* where the lights are adjacent *roof lights*	0.8 Note 3

Notes to Table J7D3b:

1. A maximum of two illumination power density adjustment factors for a control device can be applied to an area.
2. Where more than one illumination power density adjustment factor (other than for room aspect) apply to an area, they are to be combined using the following formula:

   A x (B + [(1 - B) / 2]),
   where—
   a. A is the lowest applicable illumination power density adjustment factor; and
   b. B is the second lowest applicable illumination power density adjustment factor.
3. The adjustment factor does not apply to tungsten, halogen or other incandescent sources.
4. Includes luminaires with a pre-programmed function, which provides dimming from ON to OFF (one-stage dimming).
5. The illumination power density adjustment factor is only applied to lights controlled by daylight sensors between 8:00am and 7:00pm.

Table J7D3c Illumination Power Density Adjustment Factor For Light Colour

Light source	Description	Illumination power density adjustment factor
CRI ≥ 90	Where lighting with good colour rendering is used	0.9
CCT ≤ 3500 K Note	Where lighting with a warm appearance is used	0.8
CCT ≥ 4500 K	Where lighting with a cool appearance is used	1.1

Note to Table J7D3c: Includes luminaires that can adjust their CCT to 3500 K or below.

9.3.1 J7D4 - Interior Artificial Lighting And Power Control

(1) All artificial lighting of a room or space must be individually operated by
  (a) a switch; or
  (b) other control device; or
  (c) a combination of (a) and (b).

(2) Not applicable to this application.

(3) An artificial lighting switch or other control device in (a) must—
  (a) if an artificial lighting switch, be located in a visible and easily accessed position
    (i) in the room or space being switched; or
    (ii) in an adjacent room or space from where 90% of the lighting being switched is visible.

(4) Not applicable to this application.

(5) Not applicable to this application.

(6) Not applicable to this application.

(7) Artificial lighting in a foyer, corridor and other circulation spaces—
  (a) of more than 250 W within a single zone; and
  (b) adjacent to windows,

  must be controlled by a daylight sensor and dynamic lighting control device in accordance with Specification 40.

(8) Not applicable to this application.

(9) The requirements of (1), (3) and (7) do not apply to the following:
  (a) Emergency lighting in accordance with Part E4.
  (b) Where artificial lighting is needed for 24 hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a detention centre.

(10) Not applicable to this application.

9.3.2 J7D5 - Interior Decorative And Display Lighting – New Work Only

(1) Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled—
  (a) separately from other artificial lighting; and
  (b) 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
  (c) by a time switch in accordance with Specification 40 where the display lighting exceeds 1 kW.

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

9.3.3 J7D6 Exterior Artificial Lighting – New External Lighting Only

(1) Exterior artificial lighting attached to or directed at the facade of a building, must—

(a) be controlled by—
(i) a daylight sensor; or
(ii) 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

(b) when the total lighting load exceeds 100 W—
(i) use LED luminaires for 90% of the total lighting load; or
(ii) be controlled by a motion detector in accordance with Specification 40; or
(iii) when used for decorative purposes, such as facade lighting or signage lighting, have a separate time switch in accordance with Specification 40.

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

(a) Emergency lighting in accordance with Part E4.
(b) Lighting around a detention centre.

9.3.4 J7D7 Boiling Water And Chilled Water Storage Units – New Unit Only

Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification 40.

9.3.5 J7D8 Lifts

Not applicable to this application.

9.3.6 J7D9 Escalators And Moving Walkways

Not applicable to this application.

9.3.7 Compliance for Lighting- To Additions Only

The maximum illumination power density for the storage addition shall be 1.5w/m^2 and for the new bathroom it shall be 3w/m^2.

10 HEATED WATER SUPPLY – PART J8

Not applicable to this application.

11 ENERGY MONITORING & ONSITE DISTRIBUTED ENERGY RESOURCES – J9

Not applicable to this application.

12 CONCLUSION

This report provides an assessment of the Deemed-To-Satisfy requirements of Section J of the NCC 2022 Building Code of Australia.

Should the recommendations contained in this report be adopted into the building alterations and additions during construction, the development will comply with the Deemed-To-Satisfy requirements of Section J.

NOTE: Summary of Recommendations

1. Any new mechanical ventilation system to the alterations and additions shall be designed by a suitably qualified Engineer and must comply with the requirements outlined in Heading 8.
2. Lighting and Power to the alterations and additions shall comply with the requirements outlined in Heading 9, while the maximum illumination power density for the storage addition shall be 1.5w/m^2 and for the new bathroom it shall be 3w/m^2.
3. Any new boiled water or chilled water storage units shall have its power supply controlled by a time switch in accordance with Spec. 40 (See Annexure 1)

MAX BRIGHTWELL

13 ANNEXURE 1 – Time Switches

(a) A time switch must be—

(i) capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days; and

(ii) configured so that the lights are switched off at any time the space is designated to be unoccupied.

(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, remote control 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 if 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 or remote control; and

(ii) a manual "off" switch.

(c) A time switch for external lighting must be—

(i) configured to limit 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) capable of being overridden by a manual switch, remote control or a security access system for a period of up to 8 hours, after which the time switch must resume control.

(d) A time switch for boiling water or 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.