# CREDWELL

Project	Alterations & Additions to Existing Restaurant 14 South Steyne, Manly
Report	NCC Assessment Report
Reference	C20441-r3
Date	23 February 2021
Client	U+I Building Studios
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# **Document Control**

<b>Reference/Revision</b>	Date	Description	NCC Assessment Report
C20441-r3	23 Feb		Robert Briant
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		Prepared by	Bit
			Shane Barr
			Building Surveyor
		Reviewed by	Thach



#### 1 Introduction

#### 1.1 Building Location

The development being the subject of this Report is in relation to an existing two storey restaurant building at 14 South Steyne, Manly. The current building as a separate restaurant on both levels of the building located on the south Western side of South Steyne on the southern corner of Victoria Parade with the rear of the property fronting Dungowan Lane to the west.

# 1.2 Objectives

The purpose of this report is to provide an assessment against the National Construction Code 2019 Amendment 1 (NCC) addressing all relevant clauses therein to identify where the subject building achieves compliance and non-compliance, as well as provide appropriate Performance Solutions where available, which are required to be prepared under separate cover.

It is presumed the assumptions, content, and limitations of this report are reviewed, noted, and understood by the reader. Credwell Consulting are to be contacted to clarify any queries or assumptions made in relation to the contents of this report and further, Credwell Consulting take no responsibility for misinterpretation of any of the content herein.

# 1.3 Limitations

This report does not include, nor imply, any audit, assessment, or upgrading of:

- 1. The structural design of the building;
- 2. The capacity or design of any electrical, fire, hydraulic or mechanical services; and
- 3. The Disability (Access to Premises Building) Standards 2010 and the Disability Discrimination Act 1992 (Cth)

This report does not include, nor imply, any assessment of, or compliance with:

- 4. Any Development Consent conditions;
- 5. The Liquor Licencing Act 2007;
- 6. The Work Health and Safety Act 2011;
- 7. The Swimming Pools Act 1992;
- 8. Design, Construction and Fit-out of Food Premises AS 4674 2004; and
- 9. Requirements of Authorities including, but not limited to, WorkCover, RMS, Council, Telecommunications Supply Authority, Electricity Supply Authority, Water Supply Authority, Gas Supply Authority and the like.

#### **Interpretations**

A number of matters within the NCC are known to be interpretive. Where these matters are encountered, interpretations have been used that are consistent with Credwell Consulting's understanding of standard industry practice.

#### **Dimensions and Tolerances**

In some instances, the NCC specifies minimum dimensions for construction. The assessment of plans and specifications includes a review of such minimum dimensions that are relevant to the project, but Credwell Consulting does not guarantee that all



relevant minimum dimensions have been assessed where they are not clearly and explicitly denoted/marked on the architectural drawings.

The relevant designer(s) and builder(s) should confirm that all minimum dimensions are achievable on site prior to works and consideration/attention should be given to construction tolerances impacted by wall set outs, applied finishes, and skirtings to corridors and bathrooms. For example, tiling bed thickness on walls and floors can adversely impact critical minimum dimensions relating to access for people with disabilities, stair and corridor widths, and balustrade heights.

#### 1.4 Reviewed Documentation

This report is based on documentation referenced in Annexure A.



Figure 1 – 14 South Steyne, Manly (from Sixmaps)



#### 2 Building Description

For the purposes of the NCC, the building is described as follows:

#### 2.1 Classification

Class	Use	Area
Class 6	Restaurant	Ground & First Floor

Note:

2.2 Rise in Storeys

The building has a rise in storeys of two (2).

2.3 Type of Construction

Given the classification of the top floor and the rise in storeys the building is to be of Type C Construction.

2.4 Effective heightThe effective height has been calculated to be approximately 3.0 m, being less than 12m.

#### 2.5 Fire Compartments

The following fire compartments have been assumed:

1. Whole of the building is a single fire compartment.

#### 2.6 Required Exits

The following have been considered as the exits from the building:

- 1. Ground floor door to the north eastern side.
- 2. Ground floor central door to the north western side.
- 3. Internal central stair from Level 1.
- 4. External stair from Level 1 to the west.

#### 2.7 Climate Zone

The building is located within Climate Zone 5, being within the Northern Beaches local government area.



# 3 Fire Safety Measures

Given the assessment in this report, the following fire safety measures are required to be installed in the building. This list is subject to minor change if Performance Solutions are proposed, or other options are taken during the Construction Certificate (CC) and/or construction stages.

	Fire Safety Measure	Standard of Performance
1	Emorgoney lighting	NCC2019 Clauses E4.2 and E4.4
1.		AS2293.1-2018
2	Evit signs	NCC2019 Clauses E4.5, E4.6 and E4.8
Ζ.		AS2293.1-2018
2	Fire deers	NCC2019 Clause D2.8
5.	File doors	AS1905.1-2005
		NCC clause C3.15 and Specification C3.15
4	Fire seals protecting openings in fire-	AS 1530.4-2014
4.	resisting components of the building*	AS 4072.1-2005
		Manufacturer's Specification
F	Lightweight construction (enclosure under	NCC2019 Clause C1.8
5.	stairs)	AS1530.4-2005
c	Portable fire extinguishers	NCC2019 Clause E1.6
0.	Portable fire extinguishers	AS2444-2001
7	Paths of travel	NCC2019 Parts D1 and D2
1.		EP&A Reg Clause 186

\*Only required for service penetrations in the enclosure under the internal stairs or in rear wall



# 4 Fire Resistance Levels

The following fire resistance levels (FRLs) are required for the various elements of the building. Where the table below refers to a fire source feature (FSF), this is as defined in the NCC as the far boundary of a road, river, lake or the like adjoining the allotment, or a side or rear boundary of the allotment, or an external wall of another building on the allotment which is not a Class 10 building.

Building Element – Type C Construction	Class 2, 3 or 4	Class 5, 7a or 9	Class 6	Class 7b or 8
External Walls				
<ul> <li>Less than 1.5m from a FSF</li> </ul>	90/90/90	90/90/90	90/90/90	90/90/90
- 1.5 - 3m from a FSF	-/-/-	60/60/60	60/60/60	60/60/60
- 3m or more from a FSF	-/-/-	-/-/-	-/-/-	-/-/-
External Columns (not incorporated into an				
external wall)				
<ul> <li>Less than 1.5m from a FSF</li> </ul>	90/-/-	90/-/-	90/-/-	90/-/-
- 1.5 - 3m from a FSF	-/-/-	60/-/-	60/-/-	60/-/-
- 3m or more from a FSF	-/-/-	-/-/-	-/-/-	-/-/-
Common Walls and Fire Walls	90/90/90	90/90/90	90/90/90	90/90/90
Internal Walls - Fire resisting stair shafts –	60/60/60	60/60/60	60/60/60	60/60/60
Internal Walls – Bounding public corridors, public lobbies and the like -	60/60/60	-/-/-	-/-/-	-/-/-
Internal Walls – Between or bounding sole- occupancy units	60/60/60	-/-/-	-/-/-	-/-/-
Roofs	-/-/-	-/-/-	-/-/-	-/-/-

# 5 Disability (Access to Premises – Building) Standards 2010

The Disability (Access to Premises – Building) Standards 2010 (Premises Standards) is a standard created under the DDA which includes construction standards which generally mirror the accessibility requirements of the NCC.

Clause 2.1 of the Premises Standards apply to new buildings and new building work as per the legislation stated in italic font below, however, given the mirrored requirements of both the NCC and the Premises Standard, compliance with the NCC provides compliance with the Premises Standards.

- 2.1 Buildings to which Standards apply
  - (1) Subject to subsection (2), these Standards apply to the following:
    - (a) a new building, to the extent that the building is:
      - (i) a specified Class 1b building; or
      - (ii) a Class 2 building that has accommodation available for short-term rent; or
      - (iii) a Class 3, 5, 6, 7, 8, 9 or 10 building;
    - (b) a new part, and any affected part, of a building, if the building is:
      - (i) a specified Class 1b building; or
      - (ii) a Class 2 building that:
        - (A) is a new building; and
        - (B) has accommodation available for short-term rent; or
      - (iii) a Class 3, 5, 6, 7, 8, 9 or 10 building;
    - (c) an existing public transport building that is still in use on the target date mentioned in an item in the table in section 3.1.

As per Clause 2.1(5) of the Premises Standards, an affected part is:

- (5) An affected part is:
  - (a) the principal pedestrian entrance of an existing building that contains a new part; and
  - (b) any part of an existing building, that contains a new part, that is necessary to provide a continuous accessible path of travel from the entrance to the new part.

Therefore, the principal pedestrian entrance to the areas of work proposed is deemed to be the entrance on South Steyne, leading to the first floor via flights of stairs. Consequently, this entrance and associated stairway, including landings and accessway, are to be made accessible. As this is new work it is discussed in Part 7 of this report.



# 6 Existing Building

As an existing building, Council has discretion as to the level of upgrading required under Clause 93 and 94 of the Environmental Planning and Assessment Regulation 2000 (EPAA Reg) at the Development Application Stage.

It is expected that works will be required to allow the continued use to be approved as a Construction Certificate. In that case Clause 143C of the EPAA Reg requires the certifier to inspect the building and review fire safety.

Given the extent of the proposed works we understand that the building will be fully upgraded.



# 7 Matters for Further Consideration

#### 7.1 Assessment

The reviewed documentation referenced in Annexure A of this report has been assessed against the Deemed-to-Satisfy (DtS) provisions of the NCC. This assessment has identified the following areas where compliance with the NCC will require further consideration.

Annexure B of this report provides a detailed assessment of the proposal against each of the relevant DtS provisions of the NCC.

#### 7.2 Possible Performance Solutions

There are no items that relate to areas where a Performance Solution may be available to justify a deviation from the DtS requirements of the NCC.

#### 7.3 Access and Egress Issues – Part D1 and D2

A single step of 170 mm is proposed to be provided on the first floor.

Single steps are not regulated under the NCC but the Guide to NCC Volume One sates 'More than one riser is considered necessary for a person to observe and adjust to a change in level'. A ramp is not to be the provided but a contrasting nosing, handrails and tactile indicators are to be provided to address this issue.

#### 7.4 Specification

The following matters are to be addressed by Design Certifications of a Specification issued by the architect or relevant design consultant at the CC or CDC Stage of the development.

#### **Architectural Design Certification**

- The building elements of the proposed works have been designed to have the FRL relevant in accordance with NCC2019 Clause C1.1 and Specification C1.1 Table 5 for Type C Construction.
- 2. Materials, floor and wall linings/coverings, surface finishes and air-handling ductwork used in the works will comply with the fire hazard properties in accordance with NCC2019 Clause C1.10 and Specification C1.10.
- 3. The dimensions of exits and paths of travel to exits will be provided in accordance with NCC2019 Clause D1.6.
- 4. The non-fire-isolated exits will be in accordance with NCC2019 Clause D1.9.
- 5. The discharge points of exits will be in accordance with NCC2019 Clause D1.10.
- 6. Number of persons accommodated in a storey, room or mezzanine must be determined with the consideration of Table D1.13 and NCC2019 Clause D1.13.
- 7. The construction of EDB'S will be in accordance with NCC2019 Clause D2.7 with the enclosure bounded by a non-combustible or fire protective covering and smoke seals provided around the perimeter of the doors at each level.
- 8. The enclosing walls and ceiling under the non-fire-isolated stairway will achieve an FRL of 60/60/60, and a self-closing -/60/30 fire door, in accordance with NCC2019 Clause D2.8.
- 9. New pedestrian ramps will comply with AS1428.1-2009 and NCC2019 Clause D2.10 and Part D3. The floor surface of a ramp must have a slip-resistance classification complying with Table D2.14 when tested in accordance with AS4586-2013.



- 10. Stair geometry to the new stairways will be in accordance with NCC2019 Clause D2.13. Stair treads are to either have a surface with a slip-resistance classification or a nosing strip with a slip-resistance classification both complying with Table D2.14 when tested in accordance with AS4586-2013.
- 11. Landings will be provided in accordance with NCC2019 Clause D2.14. Landings are to have either a surface or a strip at the edge of a landing (where the edge leads to a flight below) with a slip-resistance classification complying with Table D2.14 when tested in accordance with AS4586-2013.
- 12. Door thresholds are to be provided in accordance with NCC2019 Clause D2.15 and NSW Clause D2.15.
- 13. The handrails and balustrades to stairs and throughout the building will be in accordance with NCC2019 Clause D2.16 and D2.17.
- 14. The door latching mechanisms to the proposed exit doors will be in accordance with NCC2019 Clause D2.21.
- 15. The new works will be accessible in accordance with NCC2019 Part D3 and with AS1428.1-2009, with particular note to door circulation spaces, access way widths, turning spaces and floor coverings.
- 16. Braille and tactile signage will be in accordance with NCC2019 Clause D3.6 and specification D3.6.
- 17. Tactile ground surface indicators will be provided in accordance with NCC2019 Clause D3.8 and AS1428.4.1-2009.
- 18. On an access way, where there is no chair rail, handrail, or transom, all frameless or fully glazed doors, sidelights and any glazing capable of being mistaken for a doorway or opening, will be clearly marked in accordance with AS1428.1-2009 and comply with NCC2019 Clause D3.12.
- 19. Waterproofing of all wet areas within building will be carried out in accordance with NCC2019 Clause F1.7 and AS3740-2010 and Table 1.7.
- 20. Damp proofing of the proposed structure will be carried out in accordance with NCC2019 Clauses F1.9 and F1.10.
- 21. All new glazing to be installed throughout the development will be in accordance with NCC2019 Clause F1.13 and AS1288-2006 and AS2047-2014.
- 22. Accessible sanitary facilities will be provided in the building in accordance with NCC2019 Clause F2.4, Table F2.4 (a) and AS1428.1-2009.
- 23. The construction of the sanitary facilities will be in accordance with NCC2019 Clause F2.5.
- 24. Ceiling heights to the new areas will be in accordance with NCC2019 Clause F3.1.
- 25. The sanitary compartments will either be provided with mechanical exhaust ventilation or an airlock in accordance with NCC2019 Clause F4.9.
- 26. Essential fire or other safety measures must be maintained and certified on an ongoing basis, in accordance with the provisions of the Environmental Planning and Assessment Regulation, 2000.
- 27. The building will be sealed in accordance with NCC2019 Part J3.
- 28. Energy Monitoring for Facilities will be provided in accordance with NCC2019 Clause J8.3.



#### **Electrical Services Design Certification**

- 29. Emergency lighting will be installed throughout the development in accordance with NCC2019 Clauses E4.2, E4.4 and AS2293.1-2005.
- 30. Exit signage will be installed in accordance with NCC2019 Clauses E4.5, E4.7, E4.8 and AS/NZS2293.1-2018.
- 31. Artificial lighting will be installed throughout the development in accordance with NCC2019 Clause F4.4 and AS/NZS1680.0-2009.
- 32. Lighting power and controls will be installed in accordance with NCC2019 Part J6.

#### **Hydraulic Services Design Certification**

- 33. Storm water drainage will be provided in accordance with NCC2019 Clause F1.1 and AS3500.3-2018.
- 34. Portable fire extinguishers will be installed in accordance with NCC2019 Clause E1.6 and AS2444-2001.
- 35. The heated water supply systems will be designed and installed to NCC Volume 3 Plumbing code and NCC2019 Clause J7.2.

#### **Mechanical Services Design Certification**

- 36. Where not naturally ventilated the building will be mechanically ventilated in accordance with NCC2019 Clause F4.5 and AS1668.2-2012 and AS/NZS3666.1-2011.
- 37. The air conditioning and ventilation systems will be designed and installed in accordance with NCC2019 Part J5.

#### **Structural Engineers Design Certification**

- 38. The material and forms of construction for the proposed works will be in accordance with NCC2019 Clauses B1.2, B1.4 and B1.6 as follows:
  - Dead and live loads AS/NZS1170.1-2002
  - Wind loads AS/NZS1170.2-2011
  - Masonry AS3700-2018
  - Concrete Construction AS3600-2018
  - Steel Construction AS4100-1998
  - Aluminium Construction AS/NZS1664.1-1997 or AS/NZS1664.2-1997
  - ABCB Standard for Construction of Building in Flood Hazard Areas
- 39. Upon completion of the works, a structural engineer will be able to certify that the local failure will be in accordance with NCC2019 Clause D2.2 for the fire isolated stairs.

#### **NSW Specification Design Certification**

40. Insulation will be in accordance with AS/NZS4859.1-2018 and will be installed as required by NCC2019 NSW Part J1.



# 8 Statement of Compliance

The architectural design documentation as referred to in Annexure A of this report has been assessed against the relevant provisions of the NCC and it is considered that the documentation complies or is capable of complying with the NCC as outlined in Annexure B.

# Annexure A – Reviewed Documentation

This report has been based on the documentation listed below:

Architectural Details prepared by Turner Project reference 20035			
Drawing Number	Revision	Title	
DA00	А	Cover Sheet	
DA01	А	Site Analysis/Context Plan	
E01	А	Existing/Demo Floor Plans	
DA10	В	Proposed Ground Floor Plan	
DA11	В	Proposed First Floor Plan	
DA12	Α	Proposed Roof Plan	
DA30	А	Proposed Elevations	
DA31	А	Proposed Elevations	
DA40	А	3D Views	
DA41	Α	3D Views	
DA42	Α	3D Views	
DA43	Α	3D Views	
DA50	А	Materials & Finishes	
DA60	А	Proposed Signage	

#### Annexure B – Detailed Assessment

Outlined below is a detailed assessment of the proposal against the DtS provisions of the NCC.

All relevant DtS Clauses applicable to the proposal have been reference, Clauses not are not relevant have been deleted.

The following abbreviations have been used in the tables below:

PS	-	A Performance Solution is proposed to achieve compliance with this Clause.
CRA	-	"Compliance Readily Achievable" – it is considered that whilst there is insufficient information currently provided to determine strict compliance with the DtS provisions of the NCC the proposed design is capable of comply subject to noting the requirements of the Clause.
		Additional information or documentation is necessary to confirm compliance. This may be in the form of additional drawing, a specification or design certification. See Part 7.6 for a proposed specification.
Complies	-	The proposal shows compliance with the DtS Clause.
DNC	-	The design does not comply with the DtS Clause.
FI	-	Further information is required for assessment of the proposal relative to the DtS Clause.
N/A	-	The DtS Clause is not applicable at this stage to this design.
Noted	-	The DtS Clause provides information not requiring specific assessment of the proposed design.



SECTION	N B - STRUCTURE		
Clause		Comments	Assessment
Part B1	L – Structural Provision	IS	
B1.0	DtS Provisions	Information only.	Noted
B1.1	Resistance to actions	Resistance to actions must be in accordance with this Clause. Structural Engineer to certify.	CRA
B1.2	Determination of individual actions	The magnitude of individual actions must be determined in accordance with this Clause.	CRA
B1.4	Determination of structural resistance of materials and forms of construction	The structural resistance of materials and forms of construction must be determined in accordance with this Clause. Structural Engineer to certify.	CRA
B1.5	Structural software	Structural software used in computer aided design of a building or structure must comply with the ABCB Protocol for Structural Software in accordance with this Clause. Structural Engineer to certify.	CRA

SECTION	I C – FIRE RESISTANCE				
Clause		Comments			Assessment
Part C1	- Fire Resistance and	Stability			
C1.0	DtS Provisions	Information only.			Noted
C1.1	Type of construction required	The building is to b	e of Type C Construction.		CRA
C1.2	Calculation of rise in storeys	The rise in storey of the building is 2. The rise in storey is the sum of storeys at any part of the external wall of the building and any storey within the roof space.			Noted
C1.6	Class 4 parts of buildings	N/A			N/A
C1.8	Lightweight construction	Lightweight construction clause and as necessity of the second se	uction used to achieve an FRL is to sary Specification C1.8.	comply with this	CRA
C1.10	Fire hazard properties	Fire hazard propert Specification C1.10	ties of all materials to comply witl ).	n this Clause and	CRA
C1.11	Performance of external walls in fire	Does not apply to b	orick or block walls.		N/A
Part C2	- Compartmentation	and Separation			
C2.0	DtS Provisions	Information only.			Noted
C2.1	Application of Part	Information only.			Noted
C2.2	General floor area and volume limitations	Class 6 M M	1aximum Floor Area 1aximum Volume	2,000 m2 12,000 m3	Complies
C2.9	Separation of classifications in different storeys	N/A			N/A
C2.12	Separation of equipment	Equipment includir sustaining emerger central smoke cont exceeding 24 volts be fire separated fr with this Clause (no	ng lift motor rooms, emergency gency equipment operating in emergency determined plan, boilers or battery areas and a capacity exceeding 10 amprom the remainder of the building ot expected to be installed).	enerators gency mode, with a voltage ere hours are to ; in accordance	CRA
C2.13	Electricity supply system	If the main switch r emergency mode, the building with co 120/120/120 (not e Where emergency switchboards in the supply to the emer emergency equipm	room sustains emergency equipm the room is to be separated from onstruction having a FRL of not le expected to be installed). equipment is required in a buildir e electrical installation, which sus gency equipment, must be constru- nent switchgear is separated from	ent operating in the remainder of ss than ng, all tain the electricity ructed so that non-emergency	CRA



Clause		Comments	Assessment
		equipment switchgear by metal partitions designed to minimise the	
		spread of a fault from the non-emergency equipment switchgear.	
Part C3	– Protection of Openi	ngs	
C3.0	DtS Provisions	Information only.	Noted
C3.1	Application of Part	Information only.	Noted
C3.2	openings in external walls	(and Laneway). The openings in the south-western façade are greater than 3.0 m from the adjoining boundary (measured at 3.11 m).	Complies
C3.3	Separation of external walls and associated openings in different fire compartments	All one fire compartment	N/A
C3.11	Bounding construction: Class 2 and 3 buildings and Class 4 parts	N/A.	N/A
C3.12	Openings in floors and ceilings for services	See Clause C3.15	N/A
C3.15	Openings for service installations	Service penetrations through fire rated building elements are to be sealed in accordance with a tested system and manufacturer specifications in accordance with this Clause. This will only apply to the enclosure under the internal stairs.	CRA
C3.16	Construction joints	Construction joints in fire rated building elements are to be appropriately treated to maintain the integrity and insulation of the element in which they are located.	N/A
C3.17	Columns protected with lightweight construction to achieve an FRL	Any columns protected with lightweight fire rated materials to achieve a required FRL are to comply with this Clause.	N/A
Specific	cation C1.1 – Fire Resis	ting Construction	
1	Scope	This Specification contains the requirements for fire resisting construction of building elements.	Noted
2	General Requirements	-	-
2.1	Exposure to FSF	The building is exposed to FSF to the boundaries of neighbouring properties. As the building is on the south eastern boundary all walls within 3.0 m require an FRL of 90/90/90 when tested from the outside. Bricks in the existing wall will comply.	CRA
2.2	Fire protection for support of another part	Where a part of a building required to have a FRL depends on direct vertical or lateral support from another part to maintain its FRL. That supporting part must have a FRL not less than that required by other provisions as set out in this Clause.	CRA
2.3	Lintels	A lintel must have the FRL required for the part of the building in which it is situated unless it does not contribute to the support of a fire door, fire window or fire shutter and it otherwise complies with this Clause.	N/A
2.4	Method of attachment reduce the fire-resistance of building element	The fire-resistance of a building element is not to be impacted by the method of attaching or installing a finish, lining, ancillary element or a service installation in accordance with this Clause	N/A
2.5	General concessions	N/A	N/A
5	Type C Construction	-	-
5.1	Fire resistance of building elements	The building elements are to have FRLs as determined by this Clause. See Part 4 of the Report. It is noted that FRLs for external walls need only be measured from the external side of the wall.	Complies
Specific	cation C1.10 – Fire Haz	ard Properties	
1	Scope	This Specification sets out requirements in relation to the fire hazard properties of linings, materials and assemblies in buildings.	Noted



Clause		Comments	Assessment
2	Application	Linings, materials and assemblies must comply with the appropriate provisions described in Table 1 of this Clause.	Noted
3	Floor linings and floor coverings	Fire hazard properties of the floor linings and floor coverings are to comply with this Clause.	CRA
4	Wall and ceiling linings	Fire hazard properties of the wall and ceiling linings are to comply with this Clause.	CRA
5	Air-handling ductwork	Fire hazard properties of the air-handling ductwork are to comply with this Clause.	CRA
6	Lift cars	Fire hazard properties of the lift cars are to comply with this Clause.	N/A
7	Other materials	Fire hazard properties of other materials not covered in Clauses 3, 4, 5 or 6 above are to comply with this Clause.	CRA

SECTION D – ACCESS AND EGRESS					
Clause Comments As					
Part D1 – Provisions for Escape					
D1.0	DtS Provisions	Information only.	Noted		
D1.1	Application of Part	Information only.	Noted		
D1.2	Number of exits required	One exit is required from each storey.	Complies		
D1.3	When fire-isolated stairways and ramps are required	Class 5, 6, 7 or 8 buildings — Every stairway or ramp serving as a required exit must be fire-isolated unless it connects, passes through or passes by not more than 2 consecutive storeys and one extra storey of any classification may be included if—	N/A		
D1.4	Exit travel distances	Maximum of 20 m to an exit.	Complies		
D1.5	Distance between alternative exits	Alternate exits not required.	Complies		
D1.6	Dimensions of exits and paths of travel to exits	Exits are to be a minimum width of 1m.	CRA		
D1.9	Travel by non-fire- isolated stairways or ramps	Maximum distance of 80 m in Type C Construction (Class 6).	Complies		
D1.10	Discharge from exits	Bollards required at exit doors if they ma.	CRA		
D1.13	Number of persons accommodated	1 m <sup>2</sup> per person for restaurant, 10 m <sup>2</sup> per person for kitchen or count seats (154 seats including outside).	Noted		
D1.14	Measurement of distances	Information only.	Noted		
D1.15	Method of measurement	Information only.	Noted		
D1.16	Plant rooms, lift machine rooms, electricity network substations: Concession	All plant on floor levels or external.	CRA		
Part D2	Part D2 – Construction of Exits				
D2.0	DtS Provisions	Information only.	Noted		
D2.1	Application of Part	Information only.	Noted		
D2.3	Non-fire-isolated stairways and ramps	Applies only if over a RIS of 2.	N/A		
D2.7	Installations in exits and paths of travel	Installations such as electrical distribution boards if in corridors must be enclosed in non-combustible construction with smoke seals.	CRA		
D2.8	Enclosure of space under stairs and ramps	Enclosures under non-fire isolated stairs to be FRL 60/60/60 with an FRL door of -/60/30.	CRA		



Clause		Comments	Assessment	
D2.9	Width of required stairways and ramps	Required to be a clear width of 1.0 m. CRA		
D2.10	Pedestrian ramps	Slip classification to be to Table D2.14.	CRA	
D2.13	Goings and risers	Stair geometry and treads slip resistance must comply with this Clause (NB: checker plate is not considered non-slip)	DNC / CRA	
D2.14	Landings	To B10 if dry and a maximum gradient of 1:50.	CRA	
D2.15	Thresholds	A threshold ramp or step ramp is required at exit doors.	CRA	
D2.16	Barriers to prevent	Barriers (balustrades) are to comply with this Clause.	CRA	
D2.17	Handrails	Handrails are to comply with this Clause. Stairs to Victoria Parade and the rear on the ground floor require handrails.	CRA	
D2.18	Fixed platforms, walkways, stairways and ladders	Where used must comply with AS1657, such as to the plant platform.	Noted	
D2.19	Doorways and doors	Limitations on sliding, roller, power operated etc doors	Complies	
D2.20	Swinging doors	To swing in the direction of egress if a floor area of over 200 m2.	Complies	
D2.21	Operation of latch	Lever action door handles between 900 to 1,1100 m above the floor if	CRA	
D2 24	Protection of	Windows to the bedrooms of the Class 2 and 3 parts are to be	N/A	
D2.24	openable windows	provided with window locks in accordance with this Clause.	N/A	
Part D3	- Access for People w	rith a Disability		
D3.0	DtS Provisions	Information only.	Noted	
D3.1	General building access requirements	Access required to all areas normally used by the occupants.	CRA	
D3.2	Access to buildings	Access to comply with AS1428.1 – 2009 from the boundary, other buildings on the site required to be accessible and accessible parking	n the boundary, other CRA	
D3.3	Part of buildings to be accessible	Access to comply with AS1428.1 – 2009 with passing spaces and turning spaces on the ground floor. As the fist floor is less than 200 m <sup>2</sup> no access is required to this level. The handrail extensions are to be provided to the top of the internal stair		
D3.4	Exemptions	Exemptions permitted if inappropriate or on safety grounds – possible to commercial kitchen.	Noted	
D3.5	Accessible carparking	Parking not provided onsite.	N/A	
D3.6	Signage	Braille and tactile signage is to be provided in accordance with this Clause and Specification D3.6, throughout the building. Signage will need to be located to achieve compliance. Signs with single lines of characters must have: a) the line of tactile (braille) characters not less than 1250 mm and not higher than 1350 mm above the floor; and b) be located on the latch side of the door 50-300mm from the architrave. Where this is not possible and only when this is not possible the sign may be placed on the door itself. Where illuminated exit signage is provided to an exit door a braille and tactile sign complying with this Clause is to be provided stating "Exit" and the level number and/or/or both descriptor, for example "Basement Level, Carpark".	CRA	
D3.7	Hearing augmentation	Required in auditoriums, conference room, or the like, ticket booths, reception areas, areas where the public is screened off from the service provider and in class 9b buildings.	N/A	
D3.8	Tactile indicators	approaching a stairway, ramp or overhead obstruction. Tactiles are to comply with this Clause and AS/NZS1428.4.1-2009.	CRA	
D3.12	Glazing on an accessway	On an access way, where there is no chair rail, handrail or transom, all frameless or fully glazed doors, sidelights and any glazing capable of being mistaken for a doorway or opening, must be clearly marked in accordance with AS/NZS1428.4.1-2009.	CRA	



Clause		Comments	Assessment	
Specification D3.6 – Braille and Tactile Signs				
1	Scope	This Specification sets out the requirements for the design and installation of braille and tactile signage as required by Clause D3.6.		
2	Location of braille and tactile signs	Braille and tactile signage are to be located in accordance with this Clause which sets out signage heights, locations and details of braille and tactile exit signage.	CRA	
3	Braille and tactile sign specification	Braille and tactile signage is to have characters in accordance with this Clause.	CRA	
4	Luminance Contrast	The luminance contrast of the signage is to comply with this Clause.	CRA	
5	Lighting	Braille and tactile signage must be illuminated to ensure the luminance contrast requirements are met at all times during which the sign is required to be read.	CRA	
6	Braille	The braille characters are to comply with Clause.	CRA	

SECTION E – SERVICES AND EQUIPMENT				
Clause		Comments	Assessment	
Part E1	– Fire Fighting Equipm	hent	1	
E1.0	DtS Provisions	Information only.	Noted	
E1.3 Fire hydrants		Coverage from street hydrants is available but not required due to floor area.	Noted	
E1.4	Fire hose reels	No hose reels not required due to floor area.	N/A	
E1.5	Sprinklers	Not required.	N/A	
E1.6	Portable fire extinguishers	The building is to be provided with portable fire extinguishers.	CRA	
E1.9	Fire precautions during construction	In a building under construction not less than one fire extinguisher to suit Class A, B and C fires and electrical fires must be provided at all times on each storey adjacent to each required exit or temporary stairway or exit. After the building has reached an effective height of 12m the fire hydrant and hose reels are to be operational in at least every storey covered by a roof or floor, except the 2 uppermost storeys. The fire hydrant booster connections must also be installed.	Noted	
E1.10	Provisions for special hazards	No special hazards expected.	N/A	
Part E2	– Smoke Hazard Man	agement		
E2.0	DtS Provisions	Information only.	Noted	
E2.1	Application of Part	Information only.	Noted	
E2.2	General requirements	Not required for a RIS of 2.	N/A	
E2.3	Provision for special hazards	ial No special hazards expected.		
Specific	cation E2.2a – Smoke I	Detection and Alarm Systems	-	
1	Scope	This Specification describes the installation and operation of automatic smoke detection and alarm systems.	Noted	
2	Type of System	Not required for a RIS of 2.	N/A	
3	Smoke alarm system	N/A	N/A	
4	Smoke detection system	N/A	N/A	
5	Combined smoke alarm and smoke detection system	N/A	N/A	
6	Smoke detection for smoke control system	N/A	N/A	
7	Building occupant warning system	N/A	N/A	
8	System monitoring	N/A	N/A	
Part E4	– Emergency Lighting,	, Exit Signs and Warning Systems		
E4.0	DtS Provisions	Information only.	Noted	



Clause		Comments	Assessment
E4.2	Emergency lighting requirements	The building is to be provided with emergency lighting in accordance with this Clause (NB: These are not shown on the electrical plans).	CRA
E4.3	Measurement of distance	Information only.	Noted
E4.4	Design and operation of emergency lighting	The emergency lighting system is to comply with AS2293.1-2018.	CRA
E4.5	Exit signs	The building is to be provided with exit signs in accordance with this Clause (NB: These are not shown on the electrical plans).	CRA
E4.6	Direction signs	The building is to be provided with directional exit signs in accordance with this Clause (NB: These are not shown on the electrical plans).	CRA
E4.7	Class 2 and 3 buildings and Class 4 parts: Exemptions	N/A	N/A
E4.8	Design and operation of exit signs	The exit lighting system is to comply with AS2293.1-2018.	CRA
E4.9	Emergency warning and intercom systems	N/A	N/A
Specific	cation E4.8 – Photolum	ninescent Exit Signs	
1	Scope	This Specification contains the requirements for photoluminescent exit signs	Noted
2	Application	A photoluminescent exit sign must comply with Section 6 and Appendix D of AS2293.1-2005, except as varied by this Specification.	Noted
3	Illumination	If photoluminescent is proposed it is to comply with this Clause.	CRA
4	Pictorial elements	If photoluminescent is proposed it is to comply with this Clause.	CRA
5	Viewing distance	If photoluminescent is proposed it is to comply with this Clause.	CRA
6	Smoke control systems	If photoluminescent is proposed it is to comply with this Clause.	CRA

SECTION F – HEALTH AND AMENITY				
Clause		Comments	Assessment	
Part F1 – Damp and Weatherproofing				
F1.0	DtS Provisions	Information only.	Noted	
F1.1	Stormwater drainage	Stormwater drainage is to comply with AS/NZS3500.3-2015.	CRA	
F1.4	External above ground membranes	Waterproofing membranes for external above ground use, such as balconies and roofs, must comply with AS4654.1-2012 and AS4654.2-2012.	CRA	
F1.5	Roof coverings	A roof must be covered with materials set out in this Clause in accordance with the relevant standard also set out in this Clause.	CRA	
F1.6	Sarking	Sarking type materials used for weatherproofing of roofs and walls must comply with AS4200.1-1994 and AS4200.2-1994.	CRA	
F1.7	Waterproofing of wet areas in buildings	Waterproofing of wet areas in buildings must comply with this Clause, and AS3740-2010.	CRA	
F1.9	Damp-proofing	Damp-proofing is to be provided in accordance with this Clause. Where a damp-proof course is provided the material must comply with AS/NZS2904-1995 or impervious termite shields in accordance with AS3660.1-2014.	CRA	
F1.10	Damp-proofing of floors on the ground	Damp-proofing of floors on the ground is to be in accordance with this Clause. Where required the vapour barrier is to comply with AS2870- 2011.	CRA	
F1.12	Sub-floor ventilation	Where provided sub-floor ventilation is to be in accordance with this Clause.	CRA	
F1.13 Glazed assemblies		Glazed assemblies in external walls or roofs are to comply with AS2047-2014 or AS1288-2006 as required by this Clause and NCC Clause B1.4.	CRA	
Part F2	- Sanitary and Other I	Facilities		
F2.0	DtS Provisions	Information only.	Noted	
F2.1	Facilities in residential buildings	N/A	N/A	



Clause		Comments		
F2.2	Calculation of number of occupants and	The number of persons accommodated must be calculated according to D1.13 if it cannot be more accurately determined by other means		
	facilities Facilities in Class 3 to			
F2.3	9 buildings	Facilities cater for patrons in the building and staff.	Complies	
F2.4	Accessible sanitary facilities	Provided as required.	Complies	
F2.5	Construction of sanitary compartments	Clear space of 1.2 m required if the sanitary compartment door opens inwards.	Complies	
F2.6	Interpretation: Urinals and washbasins	Urinals may be counted individually or per 600 mm and basins individually or per tap.	N/A	
F2.7	Microbial (legionella) control	This Clause is deleted from the NCC in NSW, as the installation of hot water, warm water and cooling water systems is regulated in the Public Health Regulation 2012.	Noted	
Part F3	– Room Heights			
F3.0	DtS Provisions	Information only.	Noted	
F3.1	Height of rooms and	Minimum of 2.4 m ceiling heights required generally.	Complies	
Davit E4	other spaces	-	·	
Part F4	- Light and Ventilation	n Information only	Natad	
F4.0	DtS Provisions	Information only.	Noted	
F4.1	light	Natural lighting is not required for Class 5 buildings.	N/A	
F4.2	Methods and extent of natural light	N/A	N/A	
F4.3	Natural light borrowed from adjoining room	N/A	N/A	
F4.4	Artificial lighting	Artificial lighting is required to AS/NZS 1680.0 in stairways, passageways and ramps and if natural lighting the F4.2 is not provided.	0 in stairways, ng the F4.2 is not CRA	
F4.5	Ventilation of rooms	Either natural or artificial ventilation is required.	Noted	
F4.6	Natural ventilation	Doors will not provide sufficient natural ventilation.	Noted	
F4.7	Ventilation borrowed from adjoining room	Not used	N/A	
F4.8	Restriction on location of sanitary compartments	Door opens to a hallway that contains a kitchenette.	See F4.9	
F4.9	Airlocks	The sanitary compartment must be provided with mechanical exhaust ventilation and the doorway to the room adequately screened from view.	Complies	
F4.12	Kitchen local exhaust ventilation	Where a commercial kitchen has a cooking apparatus that has a total maximum electrical power input exceeding 8kW or a total gas power input exceeding 29mJ/h	N/A	
Part F5	<ul> <li>Sound Transmission</li> </ul>	and Insulation		
F5.0	DtS Provisions	Information only.	Noted	
F5.1	Application of Part	This Part applies to Class 2, 3 and 9c buildings.	Noted	
F5.2	Determination of airborne sound	A form of construction required to have an airborne sound insulation rating must comply with this Clause. Acoustic engineer to certify at the	N/A	
F5.3	Determination of impact sound insulation ratings	Building elements required to have an impact sound insulation rating is to comply with this Clause. Acoustic engineer to certify at the CC Stage.	N/A	
F5.5	Sound insulation rating of walls	Walls are to be sound insulated in accordance with this Clause. Acoustic engineer to certify at the CC Stage.	N/A	
F5.6	Sound insulation rating of internal services	Ducts and waste or water supply pipes that passes through more than one SOU must be separated by construction with an $R_w + C_{tr}$ (airborne) in accordance with this Clause. Acoustic engineer to certify at the CC Stage	N/A	



Clause		Comments	Assessment	
F5.7	Sound insulation of pumps	A flexible coupling must be used at the point of connection between the service pipes in a building and any circulating or other pump. Acoustic engineer to certify at the CC Stage.	N/A	
Specifi	ication F5.2 – Sound Ins	sulation for Building Elements		
1	Scope	This Specification contains details of common forms of construction and their weighted sound reduction index.	Noted	
2	Construction DtS	Information only.	Noted	
Specifi	ication F5.5 – Impact So	ound – Test of Equivalence		
1	Scope	This Specification describes a method of test to determine the comparative resistance of walls to the transmission of impact sound	Noted	
2	Construction to be tested	Information only.	Noted	
3	Method	Information only.	Noted	
Part Fe	6 – Condensation mana	agement		
F6.0	DtS Provisions	Compliance with Performance Requirement FP6.1 is satisfied by complying with Deemed-to-Satisfy Provisions F6.1 to F6.4	Noted	
F6.1	Application of part	Only applies to a sole occupancy unit in a Class 2 building and a Class 4 part of a building.	N/A	
F6.2	Pliable building membrane	N/A	N/A	
F6.3	Flow rate and discharge of exhaust systems	N/A	N/A	
F6.4	Ventilation of roof spaces	N/A	N/A	

#### SECTION J – ENERGY EFFICIENCY

Please note that from 1st May 2020, NCC 2019 must be applied in all Section J Reports.

The current transition period for NCC 2016 will no longer apply after this date. We would highly recommend that you speak to us regarding this and identify which version of the NCC is applicable for this development.

Please find below some generic information regarding the impacts of the changes to Section J for NCC 2019, this list is not exhaustive:

- NCC 2019 a rapid roller door must be installed to conditioned spaces.
- Glazing & building fabric now treated together holistically in a façade calculation rather than considered separately. Increase in the stringency of the façade overall.
- Façades to achieve set total U-value rather than a total R-value.
- New separate spandrel calculations required where necessary.
- Increase in the consideration of thermal bridging in construction. For example, the total R-value of a wall will be reduced when using metal framing instead of timber. If metal with cladding the type of thermal break is considered if it is a strip break (james hardie) or a membrane (insulbreak). Framing type and stud spacing if timber should be noted on architectural plans.
- Roof colour cannot be more than a SA of 0.45. This will mean the roof colour must be light, for example Surfmist is sufficiently light.
- The requirement for ground floor insulation is calculated based off a new area/perimeter ratio calculation.
- Reduced wattages allowed for lighting and the consideration of the CRI of those lights. LED's will be required on good control.
- Increased provisions within JV3 for modelling thermal comfort of the occupants. This is called a PMV calculation.
- Economy Cycle is required for mechanical plant dependent on air volumetric flow rather than system sizing.
- Outdoor air flows into buildings likely to require modulation control or energy reclaiming measures.



- New fan & pump calculations required to ensure they are efficient and consider pressure drops across their index runs.
- Energy meters to be interlinked to BMS where it can be stored for analysis.
- New stringency for efficient use of lifts in buildings.

A separate Section J Report is to be obtained to confirm compliance with this Section.

Please contact Credwell Energy on 02 9281 8555 or info@credwell.com.au for further information.



# **CRED**WELL

Project	14 South Steyne	
	Manly, NSW, 2095	
Report	Section J Report	
Reference	E20178-SJ-r1	
Date	8/03/2021	
Client	Stephen Hayes C/O U + I Building Studio	
Contact	ines@buildingstudio.com	



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# **Document Control**

<b>Reference/Revision</b>	Date	Description	Section J Energy Efficiency Assessment
			Padraig Healy
		Prepared by	Director
E20178-Draft SJ-r1	8/03/2021		Padraus Healig



#### 1 Introduction

#### 1.1 Building Location

The building, the subject of this report is located at 14 South Steyne, Manly.

#### 1.2 Objectives

The purpose of this report is to provide DTS compliance with Section J of the NCC 2019.

#### 1.3 Limitations

This report does not include, nor imply, any audit, assessment or upgrading of:

- 1. Sections B, C, D, E, F, G, H, and I of the NCC;
- 2. The structural design of the building;
- 3. The capacity or design of any electrical, fire, hydraulic or mechanical services; and
- 4. The Disability (Access to Premises Building) Standards 2010 and the Disability Discrimination Act 1992 (Cth);
- 5. Volume 3 of the NCC The Plumbing Code.
- 6. This report does not include, nor imply, any assessment of or compliance with:
- 7. Any Development Consent conditions;
- 8. The Liquor Licencing Act 1997;
- 9. The Work Health and Safety Act 2011;
- 10. The Swimming Pools Act 1992; and

#### 1.4 Reviewed Documentation

This assessment is based on drawings:

Drawing Name	Number	Issue
Cover	DA00	В
Site Analysis/Context Plan	DA01	В
Existing/Demolition Plans	E01	В
Proposed Ground Floor Plan	DA10	В
Proposed First Floor Plan	DA11	В
Proposed Roof Plan	DA12	В
Sections	DA20	В
Proposed Elevations	DA30	В
Proposed Elevations	DA31	В
3D View - Victoria Parade	DA40	A
3D View - Victoria Parade	DA41	A
3D Views - Dungowan Lane/Victoria Lane	DA42	A
3D Views - South Steyne	DA53	A
Proposed materials & finishes	DA50	A
Proposed Façade Signages	DA60	А



# 2 Building Description

For the purposes of the NCC, the building is described as follows:

#### 2.1 Classification

Class	Use	Area
6	Restaurant	GF-L1

#### 2.2 Thermal Envelope

The thermal envelope of the building is described as follows and as per the marked-up floor plan in Annexure B.

#### 2.3 Climate Zone

The building is located within Climate Zone 5, being within the Northern Beaches Council.



# 3 Summary of Provisions to Comply

The following is the summary of provisions to comply with Section J.

#### 3.1 Part JO - Energy Efficiency

Compliance with energy efficiency can be met by:

Ceiling fans	Compliance
All types	N/A

Roof thermal break	Compliance
Existing metal roof	N/A
New metal roof	Roof blanket will provide required break

External Wall thermal break	Compliance
Existing double brick	N/A

# 3.2 Part J1 - Building Fabric

Compliance with building fabric can be met by:

Building fabric on envelope	Compliance
	Must be less than 0.45.
Roof solar absorptance	
	If possible, replace with light coloured roof & tiles.
	This may not be possible due to heritage restraints.
	The existing roof is to remain however it is proposed
	that the roof will be upgraded to meet NCC 2019 R-
	values.
New & existing tile roof with	Min total D value of D2 70 including thermal bridging
cathedral ceiling	
	Installing 125mm-140mm R3 5 ceiling insulation
	(See page 17-18 for thermal calculations)
New metal roof	Installing 55mm R1.30 reflective roof blanket and R2.0
	ceiling insulation.
	<b>Option 1</b> - Assuming minimum R-value of R1.02.
	No additional insulation required.
Cavity masonry	
	<b>Option 2</b> - Installing 35mm K18 insulated
	plasterboard.
Ground Floor	Existing slab on ground to remain - N/A
	<b>Option 1</b> : Assuming min R-value of R1.02 -
Clasing	I otal system U-value of 4.0 & SHGC of 0.65 or less
Glazing	<b>Ontion 2</b> : Accuming min B value of P1 90
	option 2. Assuming min K-value of K1.00 -
	Total system U-value of 4 85 & SHGC of 0 65 or less



Loss of ceiling insulation	Compliance
Total area of loss of ceiling insulation	Less than 0.5% of the ceiling area

# 3.3 Part J3 - Building Sealing

Compliance with building sealing can be met by:

Building Element	Compliance
	Must be sealed when forming part of the envelope or comply with AS 2047.
External doors and windows	A seal must be installed to restrict air infiltration. For the bottom edge of the door this must be a draft protection device and for other edges of windows or doors may be foam, rubber, fibrous seal or the like.
New external doors	Must be on a pivot or have self-closing devices. OR Must be connected to a reed switch which shuts off the A/C when the doors are open.
Walls, Floors	Minimise air leakage in roofs, walls and floor with internal lining systems that are close fitting at ceiling, wall and floor junctions or sealed by caulking, skirting, architraves, cornices or the like.

# 3.4 Part J5 - Air-Conditioning & Ventilation Systems

Compliance with Air conditioning and mechanical ventilation systems can be met by:

Building Element	Compliance
	Ability to be inactive when the area is not occupied.
	When serving more than one zone, thermostatically
	control temp of each zone.
	Does not control temp by mixing actively heated and
	cooled air.
	Limit reheating to not more than a 7.5K rise in
	temperature.
	When mechanical ventilation is provided an air-
	economy cycle is required if the total air flow rate
System Control	through any airside component is greater than or
System control	equal to 3,000 L/s in Climate Zone 5.
	Which contains more than one water heater, chiller
	or coil, must be capable of stopping the flow of water
	to those not operating.
	With airflow over 1000 L/s must have a VSD fan when
	air supplied is varied.
	Must have the ability to use direct signals from the
	control components responsible for the delivery of
	comfort conditions in the building to regulate the
	operation of the central plant.

# Air Conditioning Systems



Must have a control dead band of not less than 2
degrees Celsius, except where a smaller range is
required for specialised application.
Must be provided with balancing dampers and
balancing valves that ensure the max design air or
fluid flow is achieved but not exceeded by more than
15% above design at each component; or
group of components operating under a common
control in a system containing multiple components
as required to meet the needs of the system at its
max operating condition.
Must ensure that each independently operating
space of more than 1000m <sup>2</sup> and every separate floor
of the building has provision to terminate airflow
independently of the remainder of the system to
allow for different operating times.
Must have automatic variable temperature operation
of heated water and chilled water circuits.
When deactivated any motorised outside air and
return dampers must close.
When two or more air-conditioning systems serve the
same space, they must use control sequences that
prevent the systems from operating in opposing
heating and cooling modes.
A time switch must be provided to control an air
conditioning system of more than 2kWr and a heater
of more than 1kW(heating) used for air-conditioning.
This must provide the ability to switch off electric
power on variable pre-programmed times & days.

# Mechanical Ventilation Systems

Building Element	Compliance
	Ability to be inactive when the area is not occupied.
	When serving a conditioned space in Climate Zone
	5of greater than 1000 l/s must have modulation
	control like DCV as per AS 1668.2 or be an energy
	reclaiming system with a minimum sensible heat
	transfer effectiveness of 60%.
	Not exceed the min outdoor air quality required by
	Part F4 by more than 20% except if additional free
System Control	cooling is provided, additional mechanical vent is
	needed to balance the system or if an energy
	reclaiming system preconditions all the outdoor air.
	For an airflow of more than 1000 L/s have a variable
	speed fan unless the downstream airflow is required
	by Part F4 to be constant.
	An exhaust system with an air flow rate of more than
	1000L/s must be capable of stopping the motor when
	the system is not needed.



A time switch must be provided to a mechanical
ventilation system with an airflow rate of more than
1000 L/s. The time switch must be capable of
switching electric power on and off at variable pre-
programmed times and on variable pre-programmed
days. This does not apply if the mech ventilation
serves only one SOU.

#### Fan systems

Building Element	Compliance
Minimum required static efficiency (installation type A & C)	<ul> <li>Fans with a static pressure of 200 Pa or less must have a system static efficiency at their full load of not less than that in J5.4(b)(i).</li> <li>See J5.4 in detailed assessment for percentages based off different fan types.</li> <li>Fans with a static pressure over 200Pa must not have a min required system static efficiency lower than that specified from J5.4(b)(ii).</li> <li>See J5.4 in detailed assessment for percentages based off different fan types.</li> </ul>
Minimum required system total efficiency (installation type B & D)	Fans with a static pressure of 200 Pa or less must have a system total efficiency at their full load of not less than that in J5.4(b)(i). See J5.4 in detailed assessment for percentages based off different fan types. Fans with a static pressure over 200Pa must not have a min required system total efficiency lower that specified from J5.4(b)(ii). See J5.4 in detailed assessment for percentages based off different fan types.
Ductwork	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. Flexible ductwork must not account for more than 6m in length in any duct run. The upstream connection to ductwork bends, elbows and tees in the index run must have an equivalent diameter to the connected duct.



	Turning vanes must be included in all rigid ductwork elbows of 90 degrees or more in the index run except where the inclusion of turning vanes presents a fouling risk; or a long radius bend in accordance with AS 4254.2 is used.
Ductwork components in the Index run	Pressure drops across components on the index run must not exceed the values stated in J5.4(d) across coils, the values stated in J5.4(e) for filters and other pressure drops identified for each component type in J5.4.
Ductwork insulation	Ductwork and fittings in an A/C system must be provided with insulation complying with AS/NZS 4859.1. Insulation for flexible ductwork an R-value of R1.0. Insulation of min R-value R1.20 in a conditioned space, R3.0 when exposed to direct sunlight & R2.0 in all other locations. Ductwork insulation requirements do not apply to the only or last room served by the system or for packaged air conditioners, split systems and VRF equipment complying with MEPS.
Ductwork sealing	AS 4254 Part 1 details that all connections to flexible ductwork must be both air sealed with adhesive tape and fixed with drawbands or the like.

#### Pump systems

Building Element	Compliance
Circular Pumps - Energy Efficiency Index	Circulator pumps - A glandless impeller pump, with a
	rated hydraulic power output of less than 2.5kW 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.
Other Pumps - MEI	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
Pipework pressure drop	Must achieve the average pressure drop of not more
	than the values nominated in J5.7 (c).



Pipework insulation	All piping, vessels, heat exchangers and tanks must meet those requirements by AS/NZS 4859.1. Any components that are not covered by MEPS must meet the relevant values in J5.8.
	Insulation provided to piping must be protected by a vapour barrier on the outside of the insulation.

#### Space heating

Maximum electric heating capacity					
	W/m2 of				
Floor area of the	floor area				
conditioned space	in climate				
	zone 3	zone 4	zone 5	zone 6	zone 7
<= 500m2	50	60	55	65	70
> 500 m2	40	50	45	55	60

### **Refrigerant chillers**

Building Element	Compliance
Energy Efficiency Ratio's	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 as per the tables in J5.10 when determined in accordance with AHRI 551/591.

#### Unitary A/C

Building Element	Compliance
	Unitary A/C equipment including PAC, split
Energy Efficiency Ratio's	systems, and VRF systems must comply with MEPS
	and for a capacity greater than or equal to 65kWr
	must comply with the values in J5.11.

# Heat rejection equipment

Building Element	Compliance
Max fan input power	The motor rated power of a fan in a cooling tower, closed circuit cooler or evaporative condenser must not exceed the allowances in J5.12.


## 3.5 Part J6 - Artificial Lighting & Power

Compliance with lighting & power can be met by:

Building Element	Compliance
	Must not exceed the "maximum lighting wattage"
	in the lighting calculations table in Annexure C.
New Lighting	
	Light source with a CCT of 4500K and above are
	specified in this project.
	Must be in a visible position in the room being
	switched or located in an adjacent room where
Artificial Lighting Switch	the lighting being switched can be seen.
	For multiple functional spaces not operate
	lighting for an area more than $250 \text{ m}^2$ in a class 6
	building.
	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 (for exceptions see
Artificial Lighting	J6.3 in the detailed assessment).
	Lighting in a foyer, corridor and other circulation
	spaces of more than 250W and adjacent to
	windows must be controlled by a daylight sensor
	and dynamic lighting control device.
Interior Decorative & Display	Controlled separately from other artificial lighting
Lighting	by a manual switch for each area. Controlled by a
	Controlled by a daylight concer or time switch
	Controlled by a daylight sensor of time switch.
	100W have an average light source efficiency of
Artificial Lighting Perimeter	not less than 100 lumens/W or to be controlled by
	a motion detector (for exceptions see 16.5 in the
	detailed assessment).
Decorative External Lighting	Must have a separate time switch.
Boiling Water & Chilled Water	Must be controlled by a time switch
Storage Units	Must be controlled by a time switch.
	All time switches, motion detectors, occupant
Specification J6	sensing devices & daylight sensors must meet
	Specification J6 standards.
Heated water & chilled water	Power supply to a boiling water or chilled water
storage	storage unit must be controlled by a time switch in
	accordance with Specification J6.
	Lifts must be configured to ensure artificial lighting
Lifte	and ventiliation in the car are turned off when it is
LITTS	standby energy performance, the energy
	afficiency class as per ISO 25745-2
	endency class as per 150 25745-2.



## 3.6 Part J7 - Heated Water Supply and Swimming Pool & Spa Pool Plant

Compliance with heated water & pool plant can be met by:

Building Element	Compliance
	A heated water supply system for food
	preparation and sanitary purposes must be
Heated Water	designed and installed in accordance with Part B2
	of NCC Volume Three - Plumbing Code of
	Australia.

## 3.7 Part J8 - Facilities for Energy Monitoring

Compliance with energy monitoring can be met by:

Building Element	Compliance
Gas & Electricity	A building of 500m <sup>2</sup> or more will need to provide metering for gas & electricity to record the time- of-use consumption



### 4 Detailed Assessment

#### 4.1 Part JO - Energy Efficiency

### J0.0 - Deemed-to-Satisfy Provisions

- (a) To comply with the DTS requirements of Section J and thus the Performance Requirement of Section J (JP1) the following clauses must be applied:
  - (i) J0.2 to J0.5; and
  - (ii) J1.1 to J1.6; and
  - (iii) J3.1 to J3.7; and
  - (iv) J5.1 to J5.12; and
  - (v) J6.1 to J6.8; and
  - (vi) J7.1 to J7.4; and
  - (vii) J8.1 to J8.3.
- (b) Where a performance solution is proposed, the relevant performance requirements must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

#### J0.1 - Application of Section J

The Performance Requirement is satisfied by complying with -

- (a) for reducing the heating or cooling loads -
  - (i) of a SOU or a Class 4 (only dwelling in a building), J0.2 to J0.5 and;
  - (ii) for a Class 2-9 building Parts J1-J3; and
- (b) for A/C and ventilation, Part J5; and
- (c) for artificial lighting and power, Part J6; and
- (d) for heated water supply and swimming pool and spa pool plant, Part J7; and
- (e) for facilities for monitoring, Part J8.

J0.2 - Heating and cooling loads of SOU's of a Class 2 building or a Class 4 part

The SOU's of a Class 2 building or Class 4 part of a building must -

- (a) for reducing the heating and cooling loads -
  - (i) collectively achieve an average energy rating of not less than 6 stars\*, including the separate heating and cooling limits; and
  - (ii) individually achieve an energy rating if not less than 5 stars\*, including the separate heating and cooling load limits\*, and
  - (iii) use the appropriate NatHERS approved software.

### \*Note in NSW BASIX applies and therefore Part J0.2 is not applicable.

- (b) for general thermal construction, comply with J1.2; and
- (c) for thermal breaks, comply with J0.4 and J0.5; and
- (d) for floor edge insulation, comply with J1.6 (b) and J1.6 (c); and
- (e) for building sealing, comply with Part J3.



#### JO.3 - Ceiling fans

Ceiling fans required as part of compliance with J0.2(a), must -

- (a) be permanently installed; and
- (b) have a speed controller; and
- (c) serve the whole room, with the floor area that a single fan serves not exceeding -
  - (i) 15m<sup>2</sup> if it has a blade rotation diameter if not less than 900mm; and
  - (ii) 25m<sup>2</sup> if it has a blade rotation diameter of not less than 1200mm.

Compliance can be met by:

Ceiling fans	Compliance
All types	N/A for this job.

#### J0.4 - Roof thermal breaks

For compliance with J0.2(c), a roof that -

- (a) has a metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and
- (b) does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or battens,

must have a thermal break, consisting of a material with an R-value of not less than R0.2, installed at all points of contact between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.

#### Compliance can be met by:

Roof thermal break	Compliance
Metal roof	Existing roof to remain. N/A.

#### J0.5 - Wall thermal breaks

For compliance with J0.2(c), a wall that -

- (a) does not have a wall lining or has a wall lining that is fixed directly to the same metal frame; and
- (b) has a lightweight external cladding such as weatherboards, fibre-cement or metal sheeting fixed to a metal frame,

must have a thermal break, consisting of a material with an R-value of not less than R0.2, installed at all points of contact between the external cladding and the metal frame.

#### Compliance can be met by:

Wall thermal break	Compliance
Double Brick	N/A.



### 4.2 Part J1 - Building Fabric

#### J1.0 - Deemed-to-Satisfy Provisions

- (a) Where a DTS solution is proposed, the Performance Requirement is satisfied by complying with -
  - (i) J1.1 to J1.6; and
- (b) Where a performance solution is proposed, the relevant performance requirements must be determined in accordance with A2.2(3) and A2.4(3) as applicable.
- J1.1 Application of part

The DTS provisions of this part apply to building elements forming the envelope of a Class 2 to 9 building other than J1.2(e), J1.3, J1.4, J1.5 and J1.6(a).

#### J1.2 - Thermal construction - general

- (a) Insulation where it is required 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, 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 contribute to the thermal barrier; and
  - (iii) does not affect safe or effective operation of a service or fitting.
- (b) Where required, reflective insulation must be installed with -
  - (i) the necessary airspace to achieve the required R-value between a reflective side of the reflective insulation and the building lining or cladding; and
  - (ii) the reflective insulation must fit tight against any penetration, door or window opening; and
  - (iii) the reflective insulation must be adequately supported by framing members; and
  - (iv) each adjoining sheet of roll membrane overlapped 50mm or taped together.
- (c) Where required, bulk insulation must be installed so that -
  - (i) it maintains position and thickness, other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like; and
  - (ii) within a ceiling where there is no reflective or bulk insulation in the wall beneath, it overlaps the wall by 50mm or more.
- (d) All materials are deemed to have properties as per table 2a of Specification J1.2.
- (e) The required Total R-Value and Total System U-value, including allowance for thermal bridging must be calculated in accordance with AS/NZS 4859.2 for a roof or floor; determined in accordance with Spec J1.5a for wall-glazing construction or in accordance with Spec J1.6 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces.



The building envelope applicable to this report consists of any glazing-wall, floor or roof that separates a conditioned space or habitable room from the exterior of the building or a non-conditioned space. See Annexure B for the building envelope applicable to this building.

A conditioned space means a space within a building, including a ceiling or underfloor 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.

Air-conditioning for the purposes of Section J, means a service that actively heats or cools the air within a space, but does not include a service that directly:

- heats or cools hot or cold rooms, or
- maintains specialised conditions for equipment or processes, where this is the main purpose of the service.

#### J1.3 - Roof and ceiling construction

(a) In climate zone 5 a minimum total R-value of R3.70 for a downward direction of heat flow is required.

Some of the existing roof is to remain however it is proposed that the roof will be upgraded to meet NCC 2019 R-values.

In climate zone 5, the solar absorptance (SA) of the upper surface of a roof must be not more than 0.45. As the existing tile roof is to remain and due to heritage constraints, this is not applicable.

All nominal non-reflective and reflective airspaces are determined by Table 2b & 2c of Specification J1.2.

Not it is assumed that any downlights are LED's and must be fire or IC rated which will allow insulation to be placed over the top without a need for any clearance or space around the light.

For roof & ceiling systems in this climate zone, a total R-value of R3.70 can comply with insulation installed as per following tables(s).

Building Element – Existing tile roof	
Outside air-film	0.04
Existing tile roof with cathedral ceiling	0.02
Additional minimum between rafters	3.42
Plasterboard	0.06
Internal air-film	0.16
Total R-value	3.70

Compliance can be met by:

Existing Tile Poof	Installing 125mm-140mm R3.5 ceiling insulation
Existing The Root	between rafters



Building Element - New tile roof	R-value
Outside air-film	0.04
Tile roof with cathedral ceiling	0.02
Additional minimum ceiling insulation	3.42
Plasterboard	0.06
Internal air-film	0.16
Total R-value	3.70

Compliance can be met by:

Now tile roof	Installing 125mm-140mm R3.5 ceiling
New the root	insulation.

Building Element - New metal roof	R-value
Outside air-film	0.04
55mm reflective roof blanket	1.30
Reflective Cavity (0.9-0.05 E)	1.06
Additional minimum ceiling insulation	1.08
Plasterboard	0.06
Internal air-film	0.16
Total R-value	3.70

Compliance can be met by:

Now motal roof	Installing 55mm blanket and 125mm-140mm
New metal 1001	R2.0 ceiling insulation.



#### J1.4 - Roof Lights - N/A

- J1.5 Walls and glazing
  - (i) The Total System U-Value of wall-glazing construction must not be greater than -
    - (i) for a Class 6 building other than a ward area, a value of U2.0;
  - (ii) The Total System U-value of wall-glazing construction must be calculated in accordance with Spec J1.5a.

#### Note: For the total U-value calcs please refer to Annexure A.

- (iii) Wall components of a wall-glazing construction must achieve a minimum Total Rvalue of -
  - (i) Where the wall is less than 80% of the area of the wall-glazing construction, R1.0; or
  - (ii) Where the wall is 80% or more of the area of the wall-glazing construction, the value specified in the table below.

Compliance can be met by:

Climate zone	Class 6
5	R1.4

## Note: For the wall construction make-up and insulation requirements for this project please refer to Annexure A.

- (iv) The solar admittance of externally facing wall-glazing construction must not be greater than -
  - (i) For a Class 6 building, the values specified in the table below: and

Compliance can be met by:

Class 6				
Climate zone	Eastern SA	Northern SA	Southern SA	Western SA
5	0.13	0.13	0.13	0.13
6	0.13	0.13	0.13	0.13
7	0.13	0.13	0.13	0.13
8	0.2	0.2	0.42	0.36

- (v) The solar admittance of a wall-glazing construction must be calculated in accordance with Specification J1.5a.
- (vi) The Total System SHGC of display glazing must not be greater than 0.81 divided by the applicable shading factor specified in Clause 7 of Specification J1.5a.

# Note: For the SHGC (glass type) requirements for this project please refer to Annexure A.



#### Specification J1.5a - Calculation of U-value

There are two methods to calculate the U-value required. In this report method 1, 2 has been used to calculate the Total System U-value.

(b) Method 1 - (Single Aspect) - For the purpose of this method, a wall-glazing construction only includes the walls and glazing facing a single aspect

OR

- (c) Method 2 (Multiple Aspects) For the purposes of this method, a wall-glazing construction includes the walls and glazing facing multiple aspects.
  - (i) The total System U-value of the wall component of a wall-glazing construction must be calculated as the inverse of the Total R-value, including allowance for thermal bridging, in accordance with -
    - (a) AS/NZS 4849.2; or
    - (b) Specification J1.5b for spandrel panels.
  - (ii) The Total System U-value of a wall-glazing construction must be calculated as the are-weighted average of the Total System U-Value of each of the components of the wall-glazing construction.
  - (iii) The total System U-value must not exceed the applicable value in the table above.

#### Specification J1.5a - Calculation of Solar Admittance

There are two methods to calculate the U-value required. In this report method 1, 2 has been used to calculate the Total System U-value.

(a) Method 1 - (Single Aspect) - The solar admittance of a wall-glazing construction must be calculated in accordance with the following formula:

$$SA = \frac{A_{W1} \times S_{W1} \times SHGC_{W1}}{A_{Wall}} + \frac{A_{W2} \times S_{W2} \times SHGC_{W2}}{A_{Wall}} + \cdots$$
where—
SA = the *wall-glazing construction solar admittance*; and
$$A_{W1}, A_{W2'} = the area of each glazing element; and
$$S_{W1}, S_{W2'} = the shading multiplier for each glazing element in accordance with Clause 7; and
SHGC_{W1}, W2' = the Total system SHGC of each glazing element; and
$$A_{Wall} = the total wall-glazing construction area.$$$$$$

(i) The solar admittance of the wall-glazing construction must not exceed the applicable value in the table above.

OR



(b) Method 2 - (Multiple Aspects) - The solar admittance of a wall-glazing construction must achieve a representative air-conditioning value less than that achieved by the reference solar admittance, when using the following formula:

 $E_{R} = A_{N}\alpha_{N}SA_{N} + A_{E}\alpha_{E}SA_{E} + A_{C}\alpha_{C}SA_{C} + A_{W}\alpha_{W}SA_{W}$ 

where	
$E_R$ = the	representative air-conditioning energy value; and
AN' E' S'	v = the area of the wall-glazing construction facing each aspect; and
α <sub>N' E' S' V</sub>	v = the solar admittance weighting coefficient of each aspect equal to—
(a)	where the glazing area on an aspect is less than 20% of the wall-glazing construction area, 0; and
(b)	the values in Table 6a and Table 6b; and
SA <sub>N' E' S</sub>	w = the wall-glazing construction solar admittance of each aspect—
(a)	equal to the applicable value in J1.5(b) in the reference case; and
(b)	calculated in accordance with Clause 5(a) in the proposed case.

N.B - Tables 6a or 6b can be located on page 393 of the NCC.

#### Shading

For the purpose of calculating solar admittance, the shading multiplier is -

- (a) For shading provided by an external permanent projection that extends horizontally on both sides of the glazing for the same projection distance P, as shown in Figure 7 below -
  - (i) the value in Table 7a for shading on the northern, eastern or western aspects; or
  - (ii) the value in Table 7b for shading on the southern aspect; or
  - N.B tables 7a or 7b can be located on page 393/394 of the NCC.
- (b) 0.35 for shading that is provided by an external shading device such as a shutter, blind, vertical or horizontal building screen with blades, battens or slats, which -
  - (i) is capable of restricting at least 80% of the summer solar radiation; and (ii) if adjustable, will operate automatically in response to the level of solar
  - radiation.



#### Figure 7 Permanent external shading - Measurement of P, G and H



J1.6 Floors - N/A



#### 4.3 Part J3 - Building Sealing

#### J3.0 - Deemed-to-Satisfy Provisions

- (a) Where a DTS solution is proposed, the Performance Requirement is satisfied by complying with -
  - (ii) J3.1 to J3.7; and
- (b) Where a performance solution is proposed, the relevant performance requirements must be determined in accordance with A2.2(3) and A2.4(3) as applicable.
- J3.1 Application of part

The DTS provisions of this part apply to elements forming the envelope of a Class 2 to 9 building, other than:

- (a) 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
- (b) a building or space where the mechanical ventilation required by Part F4 provides sufficient pressurisation to prevent infiltration.
- J3.2 Chimneys and flues N/A

J3.3 - Roof Lights - N/A

- J3.4 Windows and doors
  - (a) A seal to restrict air infiltration must be fitted to each edge of a door, openable window or the like forming part of the envelope of a conditioned space or the external fabric of a habitable room or public area in climate zone 5.
  - (b) This does not apply to a window complying with AS2047; a fire door, a smoke door or a roller shutter door, roller shutter grille or other security door or device installed only for out of hours security.
  - (c) If a seal is required, then it must be a draft protection device for the bottom edge of an external swing door. For the other edges of an openable window or external door a foam or rubber compression strip, fibrous seal or the like.
  - (d) An entrance to a building, if leading to a conditioned space must have an airlock, self-closing, revolving door or the like other than where the conditioned space has a floor area of more than 50m2.

OR

Otherwise the A/C must be interlocked by a reed switch to the doors which shuts off the A/C when the doors are opened.

(e) A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like. A rapid roller door means a door that opens and closes at a speed of not less than 0.5 m/s.

### J3.5 - Exhaust fans

(a) 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 conditioned space or a habitable room in climate zones 5.



### J3.6 - Construction of roofs, walls and floors

- (a) Ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like when forming the envelope or the external fabric of a habitable room or public area in climate zones 5 must be constructed to minimise air-leakage.; and
- (b) They must be enclosed with internal lining systems that are close fitting at ceiling, wall and floor junctions or sealed at junctions or penetrations by caulking, skirting, architraves, cornices or the like.
- (c) These requirements do not apply to openings, grilles or the like require for smoke hazard management.

### J3.7 - Evaporative coolers

- (a) An evaporative cooler must be fitted with a self-closing damper or the like when serving a heated space or a habitable room or a public area of a building in climate zones 5.
- 4.4 Part J4 N/A
- 4.5 Part J5 Air-conditioning and ventilation systems
  - J5.0 Deemed-to-Satisfy Provisions
    - (a) Where a DTS solution is proposed, the Performance Requirement is satisfied by complying with -
      - (i) J5.1 to J5.12; and
    - (b) Where a performance solution is proposed, the relevant performance requirements must be determined in accordance with A2.2(3) and A2.4(3) as applicable.
  - J5.1 Application of part

The DTS provisions of this Part do not apply to a Class 8 electricity network substation.

- J5.2 Air-conditioning system control
  - (a) An air-conditioning system -
    - (i) must be capable of being deactivated when the building or part of a building served by that system is not occupied; and
    - (ii) when serving more than one air-conditioning zone or area with different heating or cooling needs, must -
      - (a) thermostatically control the temperature of each zone or area; and
      - (b) not control the temperature by mixing actively heated air and actively cooled air; and
      - (c) limit reheating to not more than (aa) for a fixed supply air rate, a 7.5K rise in temperature; and
        (bb) for a variable supply air rate, a 7.5K rise in temperature at the nominal supply air rate but increased or decreased at the same rate that the supply air is respectively decreased or increased; and
    - (iii) which provides the required mechanical ventilation where dehumidification control is needed, must have an outdoor *air economy cycle* if the total air flow rate if any airside component of the air-conditioning system is greater than or equal to the figures in the table below.



Requirement for an outdoor air economy cycle		
Climate zone	Total air flow rate requiring an economy cycle (L/s)	
5	3000	

- (iv) which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating: and
- (v) with an airflow of more than 1000 L/s, must have a variable speed fan when its supply air quantity is capable of being varied: and
- (vi) must have the ability to use direct signals form the control components responsible for the delivery of comfort conditions in the building to regulate the operation of the central plant; and
- (vii) must have a control dead band of not less than 2 degrees Celsius, except where a smaller range is required for specialised application; and
- (viii) must be provided with balancing dampers and balancing valves that ensure the max design air or fluid flow is achieved but not exceeded by more than 15% above design at each -
  - (a) component; or
  - (b) group of components operating under a common control in a system containing multiple components,

as required to meet the needs of the system at its max operating condition; and

- (ix) must have automatic variable temperature operation of heated water and chilled water circuits; and
- (x) when deactivated, must close any motorised outdoor air or return air damper that is not otherwise being actively controlled.
- (b) When two or more air-conditioning systems serve the same space, they must use control sequences that prevent the systems form operating in opposing heating and cooling modes.
- (c) Time switches -
  - (i) A time switch must be provided to control an air conditioning system of more than 2kWr and a heater of more than 1kW(heating) used for air-conditioning.
  - (ii) The time switch must be capable of switching electric power on or off at variable pre-programmed times and on variable pre-programmed days.



### J5.3 - Mechanical ventilation system control

- (a) General A mechanical ventilation system, including one that is part of an airconditioning system must -
  - (i) be capable of being deactivated when the building or part of the building served by that system is not occupied; and
  - (ii) when serving a conditioned space, except in periods when evaporative cooling is being used -
    - (a) where specified in the table below, have (aa) an energy reclaiming system that preconditions outdoor air at a minimum sensible heat transfer effectiveness of 60%; or
      (bb)demand control ventilation in accordance with AS 1668.2 if appropriate to the application; and
    - (b) not exceed the minimum outdoor air quality required by Part F4 by more than 20%; except where -
      - (aa) additional unconditioned outdoor air is supplied for free cooling; or
         (bb) additional mechanical ventilation is needed to balance the required exhaust or process exhaust; or
      - (cc) an energy reclaiming system preconditions all the outdoor air; and
  - (iii) For an airflow of more than 1000 L/s, have a variable speed fan unless the downstream airflow is required by Part F4 to be constant.

Required outdoor air treatment		
Climate zone	Outdoor air flow (L/s)	Required measure
E	>1000	Modulation control or
5	>1000	energy reclaiming system

- (b) Exhaust systems An exhaust system with an air flow rate of more than 1000L/s must be capable of stopping the motor when the system is not needed, except for an exhaust system in a SOU unit in a Class 2,3 or 9c building.
- (c) Time switches -
  - (i) A time switch must be provided to a mechanical ventilation system with an airflow rate of more than 1000 L/s
  - (ii) The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.



## J5.4 - Fan systems

- (a) Fans, ductwork and duct components that form part of an air-conditioning system or mechanical ventilation system must -
  - (i) Separately comply with (b), (c), (d), and (e); or
  - (ii) Achieve a fan motor input power per unit flowrate lower than the fan motor input power per unit flowrate achieved when applying (b), (c), (d) and (e) together.
- (b) Fans -
  - (i) Fans in systems that have a static pressure on not more than 200Pa must have an efficiency at the full load operating point not less than the efficiency calculated with the following formula:

 $\eta_{min} = 13 \text{ x In}(p) - 30;$ 

where -  $\eta_{min}$  = 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

p = the static pressure of the system (Pa).

(ii) 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:

 $\eta_{min} = 0.85 \text{ x} (a \text{ x In}(P) - b + N) / 100$ 

where -  $\eta_{min}$  = 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

- P = the motor input power of the fan (kW); and
- N = the minimum performance grade obtained from the corresponding table below; and
- a = regression coefficient a, obtained from the corresponding table below; and
- b = regression coefficient b, obtained from the corresponding table below; and

In = natural logarithm

(iii) The requirements of (i) and (ii) do not apply to fans that need to be explosion proof.



- (c) Ductwork -
  - (i) 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.
  - (ii) Flexible ductwork must not account for more than 6m in length in any duct run.
  - (iii) The upstream connection to ductwork bends, elbows and tees in the index run must have an equivalent diameter to the connected duct.
  - (iv) Turning vanes must be included in all rigid ductwork elbows of 90 degrees or more in the index run except where -
    - (a) the inclusion of turning vanes presents a fouling risk; or
    - (b) a long radius bend in accordance with AS 4254.2 is used.
- (d) Ductwork components in the index run -

Maximum coil pressure drop			
Number of rows	Maximum pressure drop (Pa)		
1	30		
2	50		
4	90		
6	130		
8	175		
10	220		

(i) The pressure drop across a coil must not exceed the value specified below.

- (ii) A high efficiency particulate arrestance (HEPA) air filter must not exceed the higher of -
  - (a) a pressure drop of 200 Pa when clean; or
  - (b) the filter design pressure drop when clean at an air velocity of 1.5 m/s.
- (iii) Any other air filter must not exceed -
  - (a) the pressure drop specified in the table below when clean; or
  - (b) the filter design pressure drop when clean at an air velocity of 2.5 m/s.

Maximum clean filter pressure drop			
Filter minimum efficiency	Filter minimum efficiency		
reporting value	Maximum pressure drop (Pa)		
9	55		
11	65		
13	95		
14	110		



- (iv) The pressure drop across intake louvres must not exceed the higher of -
  - (a) for single stage louvres, 30 Pa; and
  - (b) for two stage louvres, 60 Pa; and
  - (c) for acoustic louvres, 50 Pa; and
  - (d) for other non-weatherproof louvres, 30 Pa.
- (v) The pressure drop across a variable air volume box, with the damper in the fully open position, must not exceed –

   (a) for units with electric reheat, 100 Pa; and
  - (b) for other units, 25 Pa not including coil pressure losses
- (vi) Rooftop cowls must not exceed a pressure drop of 30 Pa.
- (vii) Attenuators must not exceed a pressure drop of 40 Pa.
- (viii) Fire dampers must not exceed a pressure drop of 15 Pa when open.
- (ix) Balancing and control dampers in the index run must not exceed a pressure drop of 25 Pa when in the fully open position.
- (x) Supply air diffusers and grilles must not exceed a pressure drop of 40 Pa.
- (xi) Exhaust grilles must not exceed a pressure drop of 30 Pa.
- (xii) Transfer ducts must not exceed a pressure drop of 12 Pa.
- (xiii) Door grilles must not exceed a pressure drop of 12 Pa.
- (xiv) Active chilled beams must not exceed a pressure drop of 150 Pa.
- (e) The requirements of (a), (b), (c), and (d) do not apply to -
  - (i) fans in unducted air-conditioning systems with a supply air capacity of less than 1000 L/S; and
  - (ii) smoke spill fans, except where also used for air-conditioning or ventilation; and(iii) the power for process-related components; and(iv) kitchen exhaust systems.

### J5.5 - Ductwork insulation

- (a) Ductwork and fittings in an A/C system must be provided with insulation -
  - (i) complying with AS/NZS 4859.1; and
  - (ii) having an insulation R-value greater than or equal to -
    - (a) for flexible ductwork, 1.0; or
    - (b) for cushion boxes, that of the connecting ductwork; or
    - (c) that specified in the table below.
- (b) Insulation must -
  - (i) be protected against the effects of weather and sunlight; and
  - (ii) be installed so that it -
    - (a) abuts adjoining 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 at least 50mm; 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.
  - (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 outdoor air and exhaust air associated with the air-conditioning system; or
  - (v) the floor of an in-situ AHU; or
  - (vi) PAC, split systems, and VRF A/C equipment complying with MEPS; or
  - (vii) flexible fan connections.
- (d) For the purposes of (a), (b) and (c), fittings -
  - (i) include non-active components of a ductwork system such as cushion boxes; and
  - (ii) exclude active components such as AHU components.

Ductwork and fittings - Minimum R-Value			
Location	Climate zone 1-7	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	

## J5.6 - Ductwork sealing

Ductwork in an air-conditioning system with a capacity of 3,000 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.

AS 4254 Part 1 details that all connections to flexible ductwork must be both air sealed with adhesive tape and fixed with drawbands or the like.

### J5.7 - Pump Systems

- (a) General Pumps and pipework that form part of an air-conditioning system must either -
  - (i) separately comply with (b), (c) and (d); or
  - (ii) achieve a pump motor power per unit flowrate lower than the pump motor power per unit flowrate achieved when applying (b), (c) and (d) together.
- (b) Circulator pumps A glandless impeller pump, with a rated hydraulic power output of less than 2.5kW 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.
- (c) 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.



- (d) Pipework Straight segments of pipework along the index run, forming part of an A/C system -
  - (i) 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 -
    - (a) for constant speed systems, the values nominated in the corresponding table below.
    - (b) for variable speed systems, the value nominated in the corresponding table below.
  - (ii) in any other pipework system must achieve an average pressure drop of not more than -
    - (a) for constant speed systems, the values nominated in the corresponding table below.
    - (b) for variable speed systems, the value nominated in the corresponding table below.
- (e) The requirements of (d) do not apply to valves and fittings or where the smallest pipe size compliant with (d) results in a velocity of 0.7 m/s or less at design flow.

Maximum pipework pressure drop – Non distributive constant speed systems			
Nominal pipe diameter	Max pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Max 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	

Maximum pipework pressure drop – Non distributive variable speed systems			
Nominal pipe diameter	Max pressure drop in systems operating	Max pressure drop in systems operating more	
	less (Pa/m)	(Pa/m)	
Not more than 20	400	(1 4) (1)	
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	



Maximum pipework pressure drop - Distributive constant speed systems			
Nominal pipe diameter	Max pressure drop in systems operating 2000 hours/annum or less (Pa/m)	Max pressure drop in systems operating between 2000-5000 hours/annum (Pa/m)	Max 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	300	170
125	400	300	170
150 or more	400	400	170

Nominal pipe diameter	Max pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Max 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

### J5.8 - Pipework insulation

- (a) 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 A/C system, other than in appliances covered by MEPS, must be provided with insulation
  - (i) complying with AS/NZS 4859.1; and
  - (ii) for piping of heating and cooling fluids, having an insulation R-value in accordance with the relevant table below.
  - (iii) for vessels, heat exchangers or tanks, having an insulation R-value in accordance with the corresponding table below; and
  - (iv) 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 500mm of the connection.



- (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 fluid 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, vessels or heat exchangers -
  - 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
  - (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 chiller, boiler or unitary A/C complying with the requirements of J5.9, J5.10 and J5.11; or
  - (iv) inside an AHU, FCU, or the like.
- (e) For the purposes of (a), (b), (c), and (d) -
  - (i) heating fluids include refrigerant, heated water, steam and condensate; and
  - (ii) cooling fluids include refrigerant, chilled water, brines and glycol mixtures, but do not include condenser cooling water.

Piping - Minimum insulation R-value				
Fluid temperature range	Minimum insulation R- value nominal pipe diameter <= 40mm	Minimum insulation R- value nominal pipe diameter >40-80mm	Minimum insulation R- value nominal pipe diameter >80-150mm	Minimum insulation R- value nominal pipe diameter >150mm
Low temp chilled <= 2 degrees C	1.3	1.7	2.0	2.7
Chilled > 2-20 degrees C	1.0	1.5	2.0	2.0
Heated - >30- 85 degrees C	1.7	1.7	1.7	1.7
High temp heated > 85 degrees C	2.7	2.7	2.7	2.7

N.B - The minimum required R-value can be halved for piping penetrating a structural member.

Vessels, heat exchangers and tanks - Minimum R-Value			
Fluid temperature range	Minimum insulation R-value		
Low temp chilled <= 2 degrees C	2.7		
Chilled > 2-20 degrees C	1.8		
Heated - >30-85 degrees C	3.0		
High temp heated > 85 degrees C	3.0		



### J5.9 - Space heating

(a) A heater used for A/C or as part of an A/C system must be either a solar heater, a gas heater, a heat pump heater, a heater using reclaimed energy or an electric heater if the heating capacity is not more than value specified in the table below.

Maximum electric heating capacity					
Floor area of	W/m2 of	W/m2 of	W/m2 of	W/m2 of	W/m2 of
the	floor area				
conditioned	in climate				
space	zone 3	zone 4	zone 5	zone 6	zone 7
<= 500m2	50	60	55	65	70
> 500 m2	40	50	45	55	60

## J5.10 - Refrigerant chillers

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 the tables below when determined in accordance with AHRI 551/591.

Minimum EER for refrigerant chillers - Option 1				
Chiller type	Full load operation	Integrated part load		
	(Wr/Winput power)	(Wr/Winput power)		
Air-cooled chiller with a capacity	2.985	4.048		
Air cooled chiller with a capacity				
> 528 kWr	2.985	4.137		
Water cooled positive				
displacement chiller with a	4.694	5.867		
capacity <= 264 kWr				
Water cooled positive				
displacement chiller with a	4.889	6.286		
capacity > 264 - 528 kWr				
Water cooled positive				
displacement chiller with a	5.334	6.519		
capacity > 528-1055 kWr				
Water cooled positive				
displacement chiller with a	5.8	6.77		
capacity > 1055-2100 kWr				
Water cooled positive				
displacement chiller with a	6.286	7.041		
capacity > 2100 kWr				
Water cooled centrifugal chiller	5 771	6 401		
with a capacity < 528 kWr	5.771	0.401		
Water cooled centrifugal chiller	5 771	6 510		
with a capacity > 528-1055 kWr	5.771	0.313		
Water cooled centrifugal chiller	6.286	6.77		
with a capacity > 1055-1407 kWr				
Water cooled centrifugal chiller	6 286	7 0/11		
with a capacity > 1407 kWr	0.200	/.041		



Minimum EER for refrigerant chillers - Option 2			
Chiller type	Full load operation (Wr/Winput power)	Integrated part load (Wr/Winput power)	
Air-cooled chiller with a capacity <= 528 kWr	2.886	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 - 528 kWr	4.694	7.184	
Water cooled positive displacement chiller with a capacity > 528-1055 kWr	5.177	8.001	
Water cooled positive displacement chiller with a capacity > 1055-2100 kWr	5.633	8.586	
Water cooled positive displacement chiller with a capacity > 2100 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 > 528-1055 kWr	5.544	8.001	
Water cooled centrifugal chiller with a capacity > 1055-1407 kWr	5.917	9.027	
Water cooled centrifugal chiller with a capacity > 1407 kWr	6.018	9.264	

### J5.11 - Unitary air-conditioning equipment

Unitary A/C equipment including PAC, split systems, and VRF systems must comply with MEPS and for a capacity greater than or equal to 65kWr -

- (a) Where water cooled, have a minimum EER of 4.0 (Wr/Winput 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 EER of 2.9 (Wr/Winput 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.



## J5.12 - Heat rejection equipment

- (a) The fan in an air-cooled condenser must have a motor rated power of not more than 42W for each kW of heat rejected form the refrigerant, when determined in accordance with AHRI 460 except for -
  - (i) A refrigerant chiller in an A/C system that complies with the EER's in the previous table; or
  - (ii) PAC, split systems, and VRF A/C equipment that complies with the EER's in the previous table.

Туре	Cooling tower maximum fan motor input power (W/kWrej)	Closed circuit cooler maximum fan motor input power (W/kWrej)	Evaporative condenser maximum fan motor input power (W/kWrej)
Induced draft	10.4	16.9	11.0
Forced draft	19.5	Note	11.0

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



- 4.6 Part J6 Artificial Lighting and Power
  - J6.0- Deemed-to-Satisfy Provisions
    - (a) Where a DTS solution is proposed, the Performance Requirement is satisfied by complying with -
      - (i) J6.1 to J6.8; and
    - (b) Where a performance solution is proposed, the relevant performance requirements must be determined in accordance with A2.2(3) and A2.4(3) as applicable.
  - J6.1 Application of part

J6.2, J6.3 and J6.5(a)(ii) do not apply to a Class 8 electricity network substation.

- J6.2 Artificial lighting
- (a) In a building other than a SOU 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 the table below; 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) where there are multiple lighting systems serving the same space, the design illumination power load for (ii) is -
    - (a) the total illumination power load of all systems; or
    - (b) where a control system permits only one system to operate at a time -
      - (aa) based on the highest illumination power load; or
      - (bb) determined by the formula  $(H \times T/2 + P \times (100 T/2)) / 100$
      - 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.

# N.B - Refer to Annexure C for the artificial lighting design illumination power loads for each area of the development.

- (b) The requirements of (a) and (b) do not apply to the following:
  - (i) Emergency lighting provided in accordance with Part E4.
  - (ii) Signage, display lighting within cabinets and display cases that are fixed in place.
  - (iii) Lighting for accommodation within the residential part of a detention centre.
  - (iv) A heater where the heater also emits light, such as in bathrooms.
  - (v) Lighting of a specialist process nature such as in a surgical 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.
  - (viii) Lighting installed solely to provide photosynthetically active radiation for indoor plant growth on green walls and the like.
- (c) For the purposes of the table below, lighting timers, motion detectors, daylight sensors and dynamic lighting control devices must comply with Specification J6.



Maximum illumination power density		
Space	Maximum illumination power	
Auditarium, abunah and muhlia hall	density (W/m2)	
Auditorium, church and public hall	8	
Board room and conference room	5	
Carpark – general	2	
Carpark – entry zone (first 15m of travel)	11.5	
during the daytime		
Carpark – entry zone (next 4m of travel)	2.5	
during the day		
Carpark – entry zone (first 20m of travel)	2.5	
during night-time		
Common rooms, spaces and corridors in a	3	
class 2 building		
Control room, switch room and the like –	3	
intermittent monitoring		
Control room, switch room and the like –	4.5	
constant monitoring	-	
Corridors	5	
Courtroom	4.5	
Dormitory of a Class 3 building for sleeping	3	
only	-	
Dormitory of a Class 3 building for sleeping	4	
and study		
Entry lobby from outside the building	9	
Healthcare – infants and children's wards	4	
and emergency department	· .	
Health-care – examination room	4.5	
Health-care – examination room in	6	
intensive care and high dependency ward		
Health-care – all other patient care areas	2 5	
including wards and corridors	2.5	
Kitchen and food preparation area	4	
Laboratory – artificially lit to an ambient	6	
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	4 5	
or 9c building	4.5	
Museum and gallery – circulation, cleaning	2 5	
and service lighting	2.5	
Office – artificially lit to an ambient level Of	4 5	
200 lx or more	4.5	
Office – artificially lit to an ambient level of	2 5	
less than 200 lx	2.5	
Plant room where an average of 160 lx		
vertical illuminance is required on a vertical	4	
panel such as in switch rooms		
Plant rooms with a horizontal illuminance	2	
target of 80 lx	2	



Restaurant, café, bar, hotel lounge and a	
space for the serving and consumption of	14
food or drinks	
Retail space including a museum and	14
gallery whose purpose is the sale of objects	14
School – GLA's and tutorial rooms	4.5
SOU of a Class 3 or 9c building	5
Storage	1.5
Service area, cleaners' room and the like	1.5
Toilet, locker room, staff room, rest room	2
and the like	3
Wholesale storage area with a vertical	
illuminance of 160 lx	4
Stairways, including fire-isolated stairways	2
Lift cars	3

Note: The maximum illumination power density may be increased by dividing it by the illumination power density factor in the corresponding tables below and where the control device is not installed to comply with J6.3.

Illumination power density adjustment factor for a control device				
Item	Description	Illumination density adjustment factor		
Motion detector	Motion detector In a toilet or change room in a Class 6 building			
Motion detector	Light fittings serving less than 100m2	0.60		
Motion detector	Light fittings serving 100m2 or more	0.70		
Programmable dimming system	Where not less than 75% of the space is controlled by programmable dimmers	0.85		
Fixed dimming	All fittings	Greater of; 0.5 or (0.2+0.8L) L=illuminance turndown for the fixed dimming		
Lumen depreciation dimming	All fittings	0.85		
Two stage sensor - equipped lights with min power of 30% of peak power or less	Fire stairs and other spaces not used for regular transit	0.40		
Two stage sensor - equipped lights with min power of 30% of peak power or less	Transitory spaces in regular use or in a carpark	0.70		
Daylight sensor and dynamic lighting	In a Class 5,6,7,8 or 9b building or a Class 9a building, other than a	0.50		



control device - dimmed or stepped switching of lights adjacent windows	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.	
Daylight sensor and dynamic lighting control device – dimmed or stepped switching of lights adjacent windows	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
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent windows	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.	0.60
Daylight sensor and dynamic lighting control device - dimmed or stepped switching of lights adjacent windows	In a Class 3 or 9c building or a Class 9a ward area where the lights are adjacent roof lights.	0.80

Illumination power density adjustment factor for light colour			
Light source	Description	Illumination density adjustment factor	
CRI >= 90	Where lighting with good colour rendering is used	0.90	
CCT <= 3500 K	Where lighting with a warm appearance is used	0.80	
CCT >= 4500 K	Where lighting with a cool appearance is used	1.10	

Notes: A maximum of two illumination power density adjustment factors for a control device can be applied to an area.



#### J6.3 - Interior artificial lighting and power control

- (a) All artificial lighting of a room or space must be individually operated by a switch, other control device, or a combination of both.
- (b) An artificial lighting switch or other control device in (a) must:
  - (i) If an artificial lighting switch, be located in a visible and easily accessed position in the room or space being switched or in an adjacent room or space form where 90% 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 250m<sup>2</sup> for a space of 2000m<sup>2</sup> or less or 1000m<sup>2</sup> for a space more than 2000m<sup>2</sup> if in a Class 6 building.
- (c) 95% of the light fittings in a building or storey of a building, of more than 250m<sup>2</sup> must be controlled by -
  - (i) a time switch in accordance with Specification J6; or
  - (ii) an occupant sensing device such as a security key card reader that registers a person entering and leaving the building or a motion detector in accordance with Specification J6.
- (d) In a Class 6 building of more than 250m<sup>2</sup>, 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 not less than 202; 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.
- (e) Artificial lighting in a fire-isolated stairway, fire isolated passageway or fireisolated ramp, must be controlled by a motion detector in accordance with Specification J6.
- (f) Artificial lighting in a foyer, corridor and other circulation spaces of more than 250W within a single zone and adjacent to windows must be controlled by a daylight sensor and dynamic lighting control device in accordance with Specification J6.
- (g) Artificial lighting for daytime travel in the first 19m of travel in a carpark entry zone must be controlled by a daylight sensor in accordance with Specification J6.
- (h) The requirements of (a), (b), (c), (d), (e), (f), (g) and (h) do not apply to the following:
  - (i) Emergency lighting in accordance with Part E4.
  - 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.



- J6.4 Interior decorative and display lighting N/A
- J6.5 Exterior artificial lighting
  - (a) Exterior artificial lighting attached to or directed at the façade of a building, must -
    - Be controlled by a daylight sensor or a time switch that is capable of switching on and off electric power to the system at variable preprogrammed times and on variable pre-programmed days; and
    - (ii) When the total lighting load exceeds 100W
      - (a) LED's must be used for 90% of the total lighting load; or
      - (b) controlled by a motion detector in accordance with Spec J6; or
      - (c) when used for decorative purposes, such as façade lighting or signage lighting, have a sperate switch in accordance with Spec J6.
  - (b) The requirements of (a)(ii) do not apply to emergency lighting in accordance with Part E4 and lighting around a detention centre.
- 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.

J6.7 - Lifts

Lifts must be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes, achieve the idle and standby energy performance, the energy efficiency class as per corresponding tables below.

If it is a dedicated goods lift, then it must achieve an energy efficiency class D in accordance with ISO 25745-2.

Lift idle and standby energy performance level			
Rated load	Idle and standby energy performance level in accordance with ISO 25745-2		
Less than or equal to 800kg	2		
801kg to less than or equal to 2000kg	3		
2001kg to less than or equal to 4000kg	4		
Greater than 4000kg	5		

Lift energy efficiency class				
Usage category in accordance with ISO	Energy efficiency class in accordance with ISO 25745-2			
1-4	С			
>5	D			

### J6.8 - Escalators and moving walkways

Escalators and moving walkways must have the ability to slow to between 0.2m/s and 0.05m/s when unused for more than 15 minutes.



- 4.7 Part J7 Heated water supply and swimming pool and spa pool plant
  - J7.0 Deemed-to-Satisfy Provisions
    - (a) Where a DTS solution is proposed, the Performance Requirement is satisfied by complying with -
      - (i) J7.1 to J7.4; and
    - (b) Where a performance solution is proposed, the relevant performance requirements must be determined in accordance with A2.2(3) and A2.4(3) as applicable.
  - J7.1 Application of part N/A
  - J7.2 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.

- J7.3 Swimming pool heating and pumping- N/A
- J7.4 Spa pool heating and pumping N/A

### 4.8 Part J8 - Facilities for Energy Monitoring

- J8.0 Deemed-to-Satisfy Provisions
  - (a) Where a DTS solution is proposed, the Performance Requirement is satisfied by complying with -
    - (i) 8.1 to J8.3; and
  - (b) Where a performance solution is proposed, the relevant performance requirements must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

#### J8.1 - Application of part

The DTS provisions of this Part do not apply -

- (a) within a SOU of a Class 2 building or a Class 4 part of a building; or
- (b) to a Class 8 electricity network substation
- J8.2 N/A

### J8.3 - Facilities for energy monitoring

(a) A building or SOU with a floor area of more than 500m<sup>2</sup> must have an energy meter configured to record the time-of-use consumption of gas and electricity.



## 5 Compliance

This assessment demonstrates that the project, as specified in the plans and in the recommendations in Section 3 of this report, complies with Section J of NCC2019.



#### Annexure A - Façade Calculations

#### **Option 1 - Min Wall R-value**





iect Details						
		North	East	South	₩est	
	Glazing Area (m²)	59.784	10.77		8.37	
	Glazing to Façade Ratio	35%	40%		22%	
	Glazing References	WD02-WD05 WD06 WD07 WD09 WD12.2- 12.3-16.2 WD13-14 WD15 WD17-18 WD11.3	WD01 WD11,1-12,1-16,1 WD08		WD10 WD20 WD12.4-16.3 WD19	
	Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)		DEFAULTS (GENERIC)	
	Glass Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)		DEFAULTS (GENERIC)	
	Frame Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)			
A	werage Glazing U-Value (\#/m².K)	4.00	4.00		4.00	
	Average Glazing SHGC	0.65	0.65	0.00	0.65	
	Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device	Horizontal Device	
	Wall Area (m²)	112.2713	16.34		29.115	
	Wall Tunes	Wall	Wall		Wall	
	Methodology	Wall				
		CB-R1.02	CB-R1.02			
	Wall Construction					
	₩all Construction ₩all Thickness	279	279		279	



#### Option 2 - Addition of 35mm Kingspan K18 internally




etails						
	North	East	South	West		
Glazing Area (m²)	59.784	10.77		8.37		
Glazing to Façade Ratio	35%	40%		22%		
Glazing References	WD02-WD05 WD06 WD07 WD09 WD12.2- 12.3-162 WD13-14 WD15 WD17-18 WD11.3	WD01 WD11.1-12.1-16.1 WD08		VD10 VD20 VD12.4-16.3 VD19		
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)		DEFAULTS (GENERIC)		
Glass Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)				
Frame Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)				
Average Glazing U-Value (W/m³.K)	4.85	4.85		4.85		
Average Glazing SHGC	0.65	0.65	0.00	0.65 Horizontal Device 23.115 Wall		
Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device			
₩all Area (m²)	112.2713	16.34				
Wall Types	Vall	Vall				
Methodology	Vall					
Wall Construction	CB-K18-35mm-Fi1.80	CB-K18-35mm-R1.80				
	295	295		295		
waii I nickness						



ABCB	B		Façad Wall Systems	e				National Construction Code			
Wall Systems								Cultura			
	Layer 1	Layer 2 (Air space)	Layer 3	Layer 4	Layer 5	Layer 6	Layer 7	1			
Ventilation	0	Unventilated	]								
Material	Clay brick - 3.25kg	Airspace - non-reflective unventilated	Clay brick - 3.25kg	K118 Kingspan	Gypsum plasterboard						
Thickness (mm)	110	40	110	25	10		I				
Conductivity (W/mK)	0.650		0.650	0.023	0.170						
Framing Material								l			
Metal Frame, Web <sup>G</sup> Thickness (mm)											
Metal Frame, Flange Width (mm)											
Framing Area %								1			
Thermal Break Material											
Thermal Break Thickness (mm)											
Thermal Break Overlap Area %											
Resistance (m².K/W)	0.17	0.00	0.34	1.09	0.06	0	0				
Wall Construction	CB-K18-35mm-R1.80	]	External Surface Resistance (moving air, more than 3m/s and not more than 7/ms wind speed)								
Internal Surface Resistance (still air, on a wall) 0.12											
		System R-Value (m <sup>2</sup> .K/W)									
	System U-Value (W/m².K) 0.55										





## Annexure B - Building Envelope







## Annexure C - Lighting Calculator

	Building name/description							(	Classification						
	14 South Steyne								Class 6						
	Number o	of rows p	preferred in tabl	e below	15	(as currently displayed)									
	Floor	Perimeter of	Floor to			Illuminance	Adjustment Factor One		Adjustment Factor Two		Light Colour Adjustment Factors		SATISFIES PART J6.2		
<b>S</b> 10	Description	of the space	the space	ceiling height	Design Illumination Power Load	Space	Designed Recommended Lux Level Lux Level These columns do not represent a requirement of the NCC and are suggestions only	Adjustment Factor One Adjustment Factors	Dimming Illuminance % Area Turndown	Adjustment Factor Two Adjustment Factors	Dimming Illuminance % Area Turndown	Light Colour Adjustment Factor One	Light Colour Adjustment Factor Two	System Illumination Power Load Allowance	Lighting System Share of % of Aggregate Allowance Used
1	BOH	21.7 m³	24 m	////2.8 m	143 V	Kitchen and food preparation area								143 W	3% of 100%
2	Corridor - GF	9.2 m³	15 m	2.8 m	81 W	Corridors Toilet looker room, staff room, rest								81 W	2% of 100%
3	WC - Male	7.0 m <sup>a</sup>	11m	2.8 m	36 V	room and the like Toilet, locker room, staff room, rest								36 W	1% of 100%
+ -	Acc - WC	7.0 m <sup>2</sup>	11m	2.8 m	37 W	room and the like Toilet, locker room, staff room, rest								37 W	1% of 100%
6	Bestaurant - GE	72.0 m <sup>3</sup>	#1m	4.0 m	1551 \/	room and the like Restaurant, café, bar, hotel lounge and a space for the serving and								1551 V	37% of 100%
Ļ	Trestaurant - Ci	12.0111	****		1001 W	consumption of food or drinks Restaurant, café, bar, hotel lounge								1001 1	
1	Rerstaurant - FF	85.0 m³	43 m	6.0 m	1951 W	and a space for the serving and consumption of food or drinks								1951 W	47% of 100%
8	Lounge - FF	7.2 m³	12 m	2.6 m	55 W	Class 3 building or Class 9c building								55 W	1% of 100%
3	Landing - FF	8.0 m³	13 m	2.6 m	69 V	Corridors								69 V	2% of 100%
10	Kitchen -FF	35.7 m*	36 m	2.6 m	227 \	Kitchen and food preparation area								227 W	5% of 100%
12															
13															
15															
Total 4183 W															
if inputs are valid															
HP CONTRAINE OUTCE AND USE LANCE IN INTEGE CONTROL CON															

