Building Code of Australia Report

Site 2 Sydney Olympic Park

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1. Executive Summary

Development Overview

The proposed development is a Mixed Use Development located at Site 2 Sydney Olympic Park, it is bounded by Australia Ave, Murray Rose Ave and Parkview Drive consisting of a hotel building and a commercial CLT construction building.

Compliance Summary

We have reviewed Development Application set of architectural design documents prepared by Fitzpatrick Partners (refer appendix A) for compliance with the current building assessment provisions, including (but not limited to) the following:

- Building Code of Australia 2019

The report is intended as an overview of the relevant provisions of the BCA for assistance only. Detailed drawings and associated review will still be required as the final design is developed.

Performance Solutions

The assessment of the design documentation has revealed that the following areas are required to be assessed against the relevant performance requirements of the BCA as they deviate from the deemed to satisfy provisions of the BCA

Fire Safety Items			
1	**Fire resistance Levels** It is anticipated the fire resistance levels within the building are proposed to be rationalised for the commercial and retails portions respectively. The proposed design shall consider the use of timber structure which will need to be verified against the performance provisions of the BCA.	C1.1, C2.7, C2.8, C2.9 Spec C1.1	CP1, CP2
2	**Fire resistance Levels** The proposed design shall consider the use of timber structural elements which will need to be verified against the performance provisions of the BCA.	Spec A1.1, C1.1, Spec C1.1, Spec C1.13	CP1, CP2
3	**Compartmentation** Due to the atrium connecting multiple levels, the maximum fire compartment size for type A construction is exceeded Further to the above, due to the curtain wall detail to slab edge a gap will occur at the outer slab edge to the façade line. A smoke flashing method is to be proposed and assessed in the fire engineering report	C2.2	CP1, CP2, EP2.2
4	**Corridor length** The corridor lengths in the building 2A hotel portions exceed the maximum allowable of 40m	C2.14	CP2, EP2.2
5	**Openings for service installations** Due to CLT constriction being used it is anticipated that tested fire rated systems will not be available for the service penetration and is to be addressed on a performance basis	C3.15, Spec C3.15	CP2, CP8

6	**Travel Distances** The following distances are proposed to be verified as part of the fire engineering for : **Basement** ▪ Up to 56m to an exit in lieu of 40m where two exits are available ▪ Up to 28m to a point of choice in lieu of 20m ▪ Up to 34m to a point of choice in lieu of 20m from B1 end of trip facilities **Hotel Building 2A** ▪ Ground- 24m to a single exit in lieu of 20m from commercial lobby ▪ Level 2 roof terrace- 45m to a single exit in lieu of 20m ▪ Level 3- 29m to a single exit in lieu of 20m **Commercial building 2B** ▪ 48m to a an exit where two exits are available in lieu of 40m ▪ 22m to a point of choice in lieu of 20m	D1.4	DP4, EP2.2
7	**Aggregate egress widths** The exit width currently provided on level 1 Building 2A will be insufficient for the propped use as an event space and population number	D1.6	DP6
8	**Plant room egress** It is proposed a secondary egress pathway from the 2B plant room will utilise a complaint AS1657 ladder for egress, as this area is greater than 100m2 a fire engineered performance solution will be required	D1.16	DP4, EP2.2
9	**Swinging doors** Building 2B ground floor northern doors are not swinging in the direction of egress	D2.20	DP4
10	**Internal Hydrants** Due to the level changes at ground floor it is anticipated the internal fire hydrants in the fire stairs will not be located at the storey they ate serving as required by E1.4, this is a technical departure and is to be addressed through a fire engineered performance solution.	E1.3	EP1.3
11	**Hydrant Booster Location** Location of fire hydrant booster to be documented in the Fire Engineering Report due to multiple buildings and street frontages.	E1.3	EP1.3
12	**Pump room** It is anticipated that the fire pump room location and access will not meet the prescriptive requirements of 2118.6-2017. Further details required for assessment	E1.5	EP1.4

13	**Fire control room** The building shall be provided with a fire control room. It is proposed the fire control room will be located at basement level 1 in lieu of at ground floor. This is to be addressed through a performance based solution	E1.8	EP1.6
14	**Fire indicator panel** Location and arrangement of mimic panels and fire indicator panel to be documented as part of the fire engineered solution due to the numerous entrance lobbies.	E2.2	EP2.2
15	**Atrium Construction** The voids running through building 2B acting as an atrium will not meet the prescriptive requirements of Part G3 and Specification G3.8 and is to be addressed through a fire engineered performance solution. It is proposed that the standby power requirement for atriums will be assessed as a fire engineered performance solution	G3.3, G3.4, G3.6, G3.8, Spec G3.8	CP1, CP2, DP4, EP2.2
Miscellaneous Items			
16	Fire and compartmentation drawings to be provided to determine fire separation requirements.		
17	Location of fire extinguishers on hotel levels as they are required to be within 10m of an SOU entry door		

The fire engineered solution relating to EP1.4, EP1.6 and EP2.2 category 2 items will need to be approved after consultation with the NSW Fire Brigade as part of the Construction Certificate process.

(NSW) The application for Construction Certificate shall be assessed under the relevant provisions of the Environmental Planning & Assessment Act 1979 (As Amended) and the Environmental Planning & Assessment Regulation 2000.

Assessed by

Aaron Celarc
Senior Building Surveyor
McKenzie Group Consulting Pty Ltd

2. Introduction

The proposed development comprises of two towers one being a commercial building of CLT construction and a Hotel tower both on a shared podium with basement below.

The site is located at Site 2 Sydney Olympic Park, it is bounded by Australia Ave, Murray Rose Ave and Parkview Drive

This report is based upon the review of the design documentation listed in Appendix A of this Report

The report is intended as an overview of the relevant provisions of the Building Code of Australia for assistance only. Detailed drawings and associated review will still be required as the final design is developed.

(NSW) The applicable legislation governing the design of buildings is the Environmental Planning and Assessment Act 1979. This Act requires that all new building works must be designed to comply with the BCA.

(NSW) The version of the BCA applicable to the development, is version that in place at the time of the application to the Certifying authority for the Construction Certificate. For the purposes of this Report, BCA 2019 has been utilised as the version of the BCA applicable at the time of preparation this Report.

3. Preliminaries

3.1. **Building Assessment Data**

Summary of Construction Determination:

Part of Project	**Building 2A and 2B (united Building)**
Classification	7a, 6, 5, 3
Number of Storeys	39
Rise In Storeys	35
Type of Construction	A
Effective Height (m)	111.28m

Note: The effective height of the project now includes all stories included in the rise in stories of the project.

Summary of the floor areas and relevant populations where applicable: - Note areas to be updated once Fitzpatrick Partners completed detailed area schedule

Part of Project	**BCA Classification**	**Approx. Floor Area (m^2)**	**Approximate Volume (m^3)**	**Assumed Population**
Basement 4	7a	5088m2	TBC	170
Basement 3	7a	5088m2	TBC	170
Basement 2	7a	5088m2	TBC	170
Basement 1	7a	5210m2	TBC	173
Ground floor Building 2A	3	1524m2	TBC	304*
Level 1Building 2A function space	9b	1776m2	TBC	490

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Approximate Volume (m^3)	Assumed Population
Roof top pool/bar/studio Building 2A	3	714	TBC	238
Ground floor Building 2B	6	1524m2	TBC	152
Level 2 Building 2B	5	1664m2	TBC	164
Level 3-12 Building 2B	5	1301m2	TBC	131
Levels 7 2B	5	1373m2	TBC	137
Level 8 2B	5	1373m2	TBC	137
Level 13 Building 2B	Plant	863m2	TBC	29

Notes:

- The above populations have been based on floor areas and calculations in accordance with Table D1.13 of the BCA.
- The floor areas have been adjusted without ancillary areas such as sanitary facilities, corridors, shelving and or racking layouts in storage areas.
- The Car park areas have been considered ancillary to the use for the purposes of population numbers

3.2. **Structural Provisions (BCA B1):**

The importance level of the building is to be determined by the Structural Engineers

Any new structural works are to comply with the applicable requirements of BCA Part B1, including the new verification method BV2, and AS/NZS 1170.0-2002, AS/NZS 1170-1-2002, AS/NZS1170.2-2011.

Glazing is to comply with AS1288-2006, and AS2047-2014.

Prior to the issue of the Construction Certificate structural certification is required to be provided.

3.3. **Development Approval**

A copy of the Development Approval conditions and approved drawings will be required prior to the issuing of the Construction Certificate for that component of works.

The proposed development must not be inconsistent with the endorsed drawings and all relevant conditions will need to be satisfied and accurately reflect the construction issue drawings.

4. Fire Protection

4.1. Fire Compartmentation (BCA C1.1)

The BCA stipulates three levels of fire resistant construction, which is based upon the rise in storeys and classification of the building. Each of these types of construction has maximum floor area and volume limitations as per BCA Table C2.2.

Based upon the rise in storeys and use of the building, it is required to be constructed in accordance with the requirements of Type A Construction, in accordance with Table 3 & 3.9 of Specification C1.1 of the Building Code of Australia 2019

The building has been assessed on the basis of the following fire separation / compartmentation within the development:

- Bounding construction to the sole occupancy units of 90 minutes,
- Separation between the car park levels and the residential/ retails portions of 120 minutes,
- Fire compartmentation of the building at each floor level,
- Fire compartmentation of the development

The maximum floor area and volume limitations of a fire compartment as nominated in the deemed to satisfy provisions are as follows:

Classification		**Type of Construction**		
		A	**B**	**C**
5, 9b or 9c aged care building	max floor area—	**8 000 m²**	5 500 m²	3 000 m²
	max volume—	**48 000 m³**	33 000 m³	18 000 m³
6, 7, 8 or 9a (except for patient care areas)	max floor area—	**5 000 m²**	3 500 m²	2 000 m²
	max volume—	**30 000 m³**	21 000 m³	12 000 m³

If the building exceeds the area / volume limitations of the BCA provisions, the building is then considered a large isolated building and the following provisions will apply:

- Automatic sprinkler protection to AS2118.1 and BCA Specification E1.5 throughout the development / smoke detection and alarm system in accordance with AS1670,
- Provision of a fire hydrant ring main

4.2. Fire Resistance (BCA C1.1)

The building should be constructed generally in accordance with the relevant provisions of Specification C1.1 of the BCA applicable to Type A Construction, Please refer to Appendix C which outlines the required fire rating to be achieved by the development. These fire ratings are summarised below:-

Other passive fire protection issues that will need to be addressed in detailed documentation phase include:

- Lift Motor Rooms;
- Emergency Power Supply;
- Emergency Generators;

- Electricity Supply;
- Boilers or Batteries;
- Hydrant Pump Rooms;
- Sprinkler Pump Rooms;
- Fire Control Room

The above areas are to be separated from the remainder of the building by construction achieving a minimum fire resistance level of 120 minutes.

4.3. **Atrium Provisions (BCA G3)**

Part G3 of the BCA contains additional fire and smoke management provisions for buildings containing atriums, but only applies where the atrium connects –

i. More than 2 storeys, or

ii. More than 3 storeys if each storey is protected with a sprinkler system and one of those storeys connected is situated at a level which has direct egress to a road or open space

The BCA deemed to satisfy provisions for atriums are outlined below:

Dimensions of Atrium Well

The atrium well must have a width throughout that is able to contain a cylinder having a horizontal diameter of not less than 6m.

Separation of Atrium by Bounding Construction

The atrium must be separated from the remainder of the building at each storey by bounding walls set back not more than 3.5m from the perimeter of the atrium void.

The boundary walls must be constructed to achieve a 60/60/60 FRL and have any door openings protected with self closing -/60/30 fire doors; or

Be constructed of fixed toughened safety or wired glass in non-combustible frames with wall wetting sprinklers.

If a bounding wall separating the atrium is set back from the perimeter of the atrium wall, the balustrade around the atrium wall should be constructed of non-combustible material and be imperforate.

Separation at Roof

The roof of the atrium will require either a FRL of 180 mins, or the roof structure and membrane must be protected by a sprinkler system.

The following fire services must be provided to the entire building in accordance with BCA Specification G3.8:

- Sprinkler system complying with AS2118.1-2017 and BCA Specification G3.8 Part 2;
- Specific smoke control requirements to any mechanical air handling systems serving the atrium, and dedicated smoke exhaust to the atrium itself complying with AS1668.1-2018 and BCA Specification G3.8 Part 3;
- Fire detection and alarm system complying with AS1670.1-2018 and BCA Specification G3.8 Part 4;
- Sound System and Intercom system for emergency purposes complying with AS1670.4-2018 and BCA Specification G3.8 Part 5;

- Where a required path of travel to an exit is within an atrium, a standby power supply system must be provided to operate required fire safety systems in the building (including sprinkler and hydrant pumps, air handling systems, alarms occupant warning and communication systems, etc). The standby power system must comply with BCA Specification G3.8 Part 7;

It is anticipated the following items will be assessed on a performance basis:

- The atrium will not be separated from the remainder of the building at each level by bounding walls in accordance with G3.3 and is required to be assessed against CP1 and EP2.2
- Bounding walls are not proposed in accordance with G3.4 and is required to be assessed against CP1 and EP2.2

4.4. **Fire Hazard Properties (BCA C1.10 and BCA C1.9)**

The fire hazard properties of fixed surface linings and mechanical ductwork will also need to be addressed within the detailed documentation phase pursuant to Specification C1.10 of the Building Code of Australia. The following requirements apply:

Sprinkler Protected Areas

a) Floor Coverings – Critical radiant Flux not less than 1.2 kW/m^2
b) Wall and Ceiling Linings – Material Group No. 1, 2, 3
c) Other Materials – Spread of Flame Index not exceeding 9 and Smoke Developed Index not exceeding 8

Rigid and flexible air handling ductwork must comply with AS4254 Parts 1 & 2 2012.

Floor linings and floor coverings used in lift cars must have a critical radiant flux not less than 2.2, and wall and ceiling linings must be a Material Group No. 1 or 2.

External Wall Cladding

Since the building is of Type A construction, the following components are required to be completely non-combustible:

- External walls, including façade coverings, framing, insulation;
- Flooring and framing of lift pits;
- Non-loadbearing internal walls required to have an FRL;
- All non-loadbearing shafts;
- All loadbearing internal walls and loadbearing fire walls, including those that are part of loadbearing shafts.

Please provide product specifications and test reports to AS 1530.1-1994 for all materials to demonstrate compliance

For materials and assemblies that are required to be non-combustible, the material or system must be not deemed combustible when tested in accordance with AS 1530.1-1994.

Combustible Materials

The following materials, though combustible or containing combustible fibres, may be used wherever a non-combustible material is required:
a) Plasterboard.
b) Perforated gypsum lath with a normal paper finish.
c) Fibrous-plaster sheet.

d) Fibre-reinforced cement sheeting.
e) Pre-finished metal sheeting having a combustible surface finish not exceeding 1 mm thickness and where the Spread-of-Flame Index of the product is not greater than 0.
f) Sarking type materials that do not exceed 1mm in thickness and have a Flammability Index not greater than 5.
g) Bonded laminated materials where -
   (i) each laminate is non-combustible; and
   (ii) each adhesive layer does not exceed 1 mm in thickness; and
   (iii) the total thickness of the adhesive layers does not exceed 2 mm; and
   (iv) the Spread-of-Flame Index and the Smoke-Developed Index of the bonded laminated material as a whole does not exceed 0 and 3 respectively.

It is recommended that once material selections are made, copies of the fire test certificates/reports be provided for review and approval.

The BCA does nominate that ancillary elements may not be fixed to an external wall that is required to be non-combustible unless they comprise of the following:

a) An ancillary element that is non-combustible.
b) A gutter, downpipe or other plumbing fixture or fitting.
c) A flashing.
d) A grate or grille not more than 2 m² in area associated with a building service.
e) An electrical switch, socket-outlet, cover plate or the like.
f) A light fitting.
g) A required sign.
h) A sign other than one provided under (a) or (g) that—
   i) achieves a group number of 1 or 2; and
   ii) does not extend beyond one storey; and
   iii) does not extend beyond one fire compartment; and
   iv) is separated vertically from other signs permitted under (h) by at least 2 storeys.

Please provide fire hazard properties reports for any proposed signs and confirm their extent i.e. not spanning more than one storey or fire compartment:

4.5. **Fire-protected timber: Concession (C1.9)**

Fire-protected timber may be used wherever an element is required to be non-combustible, provided –
a) The building is –
   (i) a separate building; or
   (ii) a part of a building –
      (A) which only occupies part of a story, and is separated from the remaining part by a fire wall; or
      (B) which is located above or below a part not containing fire protected tim ber and the floor between the adjoining parts is provided with an FRL not less than that prescribed for a fire wall for the lower storey; and
b) the building has an effective height of not more than 25m; and
c) the building has a sprinkler system (other than FPAA101D or FPAA101H system) throughout complying with specification E1.5; and
d) any insulation installed in the cavity of the timber building element required to have an FRL is non-combustible; and
e) Cavity barriers are provided in accordance with Specification C1.13.

4.6. **Separation of equipment (C2.12)**

Equipment listed below must be separated from the remainder of the building providing a FRL as required by Spec C1.1 but not less than 120/120/120 with a self-closing fire door with an FRL or not less than -/120/30. When separating a lift shaft and life motor room, an FRL of not less than 12/-/- is required.

a) Lift motors and lift control panels; or
b) Emergency generators used to sustain emergency equipment operating in the emergency mode; or
c) Central smoke control plant; or
d) Boilers; or
e) A battery system installed in that building that has total voltage of 12 volts or more and a storage capacity of 200kWh or more.

4.7. **Protection of Openings fire rated building elements (BCA C3.5 and BCA C3.10)**

The prescriptive provisions of the BCA stipulate that openings within building elements required to have an FRL shall be protected as follows:

a) Penetrations through fire rated floors to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a fire rated shaft achieving an FRL of 120 minutes

b) Any penetration through a wall or room required to have an FRL (e.g. substation, boiler room, apartment separating wall etc) is to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a shaft achieving an FRL of 120 minutes (or 120/120/120 where it is a room such as a substation);

c) Self-closing -/60/30 fire doors to the doors opening to the fire isolated stairs (note that this also includes the access doors to the condenser units on the plant platforms).

Note that where fire dampers, fire collars, etc are utilised, allowance needs to be made for access hatches to be provided within the walls / ceilings to ensure that maintenance access is provided.

As the design develops, details will need to be included in relation to sealing of penetrations / construction of fire rated shafts.

Due to CLT constriction being used it is anticipated that tested fire rated systems will not be available for the service penetration and is to be addressed on a performance basis

5. Access and Egress

5.1. **Provision for Escape (BCA D1)**

The egress provisions for the proposed building are provided by the following:

- Fire isolated stairways
- External perimeter doorways
- Required non-fire isolated stairways
- Non Fire isolated Stairs
- External Doors
- Horizontal Exits
- Fire Isolated Stairs

Detailing issues that will need to be addressed as the design develops include:

- Door Hardware
- Exit Door Operation
- Stair Construction

- Handrail and Balustrade construction
- Details of Separation of Rising and Descending Stairs

5.2. **Travel via Fire Isolated Exits (BCA D1.7)**

The proposed exits are required to be fire isolated.

The BCA requires each fire isolated stairway to provide independent egress from each storey served and discharge directly, or by way of its own fire isolated passageway to:

- A road or open space; or
- To a point in a storey within the confines of the building, that is used only for pedestrian movement, car parking or the like and is open for at least 2/3 of its perimeter, and an unimpeded path of travel not more than 20m to a road or open space; or
- A covered area that adjoins a road or open space, is open for at least 1/3 of its perimeter, has an unobstructed clear height throughout of not less than 3m, and provides an unimpeded path of travel to a road or open space of not less than 6m.

Additionally, where the path of travel from the point of discharge requires occupants to pass within 6m of any part of the external wall of the same building (measured horizontally), that external wall must have a 60/60/60 FRL and have any openings protected internally for a distance of 3m above or below the path of travel.

5.3. **Fire Stair Re-Entry**

The doors of a fire isolated exit must not be locked from the inside so as to allow provision for fire stair re-entry in Class 9a and 9c buildings or parts, or within fire isolated exits serving any storey above any effective height of 25m.

The requirement for doors to remain unlocked do not apply to a door fitted with a failsafe device that automatically unlocks the door upon activation of a fire alarm and –

a) On at least every fourth storey the doors are not able to be locked and a sign is fixed on such doors stating that re-entry is available; or
b) An intercommunication system, or an audible or visual alarm system operated from within the enclosure is provided, and a sign is fixed adjacent to such doors explaining its purpose and method of operation.

5.4. **Exit Travel Distances (BCA D1.4)**

The locations of the proposed exits would appear to indicate that the deemed to satisfy requirements in terms of travel distances, distances between alternative exits and egress widths would be satisfied.

The travel distances to exits should not exceed:

Class 5 to 9

- no point on the floor must be more than 20m to a single exit or point of choice and where two exits are provided, a maximum of 40m to one of those exits; and
- exits shall be located to not be more than 60m apart and not closer than 9m

Class 2 & 3

- 6m from an exit or from a point of choice from the entrance doorway of a sole occupancy unit
- 20m from a single exit at the level of egress to a road or open space

Alternate exits not more than 45m apart

The locations of the proposed exits indicate that the deemed to satisfy requirements in terms of travel distances would be satisfied, with the exception of the following:

Basement (drawings currently under review)

- Up to 56m to an exit in lieu of 40m where two exits are available
- Up to 28m to a point of choice in lieu of 20m
- Up to 34m to a point of choice in lieu of 20m from B1 end of trip facilities

Hotel Building 2A

- Ground- 24m to a single exit in lieu of 20m from commercial lobby
- Level 2 roof terrace- 45m to a single exit in lieu of 20m
- Level 3- 29m to a single exit in lieu of 20m

Commercial building 2B

- 48m to a an exit where two exits are available in lieu of 40m
- 22m to a point of choice in lieu of 20m

The extended travel distances and distance between the exit stairs will need to addressed as performance solutions by the Fire Safety Engineer using BCA Performance Requirements DP4 & EP2.2

5.5. Dimensions of Exits (BCA D1.6)

Minimum dimensions of 1000mm and 2000mm height to be provided within exits, with the paths of travel should provide a minimum width of 1000mm (note that all maintenance access, cat walks, etc may comply with AS1657-2018 in which case a 600mm clear width is required).

The following table summarises the exit widths required by BCA Clause D1.6:

Storey	Number of people	Exit Width Required	Exit Width Provided
Basement 4	150	1.5m	2.0m
Basement 3	150	1.5m	2.0m
Basement 2	150	1.5m	2.0m
Basement 1	150	1.5m	2.0m
Ground floor building 2A	TBC	TBC	10.7m TBC
Level 1 building 2A function space	490	4.5m	4.0m
Ground floor building 2B	360*	3.5m	6.4m TBC
Level 2 building 2B	112	1.25m	2.0m
Level 3-12 building 2B	131	1.5m	2.0m

Storey	Number of people	Exit Width Required	Exit Width Provided
Level 13 building 2B	29	1.0m	1.0m

Doorways are permitted to contain a clear opening width of the required width of the exit minus 250mm, with a height of 1980mm as part of egress requirements. Access for persons with disabilities however requires a clear doorway opening width of 850mm (i.e. minimum 920 mm doors).

The following doors being designed to swing in the direction of egress:

- Building 2B ground floor northern doors are not swinging in the direction of egress

5.6. **Balustrades and Handrails (BCA D2.16 / BCA D2.17 / D2.24)**

Generally

Balustrading to a minimum height of 1000mm with a maximum opening of 124mm in any direction should be provided adjacent to balconies, landings, corridors etc where located adjacent to a change in level exceeding 1000mm, or where it is possible to fall through an openable window located more than 4m above the surface beneath.

Where it is possible to fall more than 4m to the surface below, the balustrade shall not contain any horizontal or near horizontal members that facilitate climbing between 150 – 760mm above the floor.

Handrails should generally be provided at a minimum height of 865mm alongside of all ramps and stairs.

The public stairs and ramps located along an accessible path of travel should be designed in accordance with the requirements of AS1428.1 for persons with disabilities. This requires a handrail on each side of the stair and ramp and for the handrail to extend approximately 550mm – 600mm past the last tread / end of ramp.

Intermediate rails located between 665mm and 7500mm should be provided within Class 9b Primary Schools.

Fire Isolated Stairways & Class 7b/8 Buildings

Balustrades in the fire isolated stairways and Class 7b or 8 parts of buildings are permitted to contain a 3 rail system, with a bottom rail situated at not more than 150mm above the nosings. The distance between the rails shall not exceed 460mm.

Handrails are required on both sides of all stairways except for fire isolated stairways used only for emergency egress purposes.

Note: in a required exit serving an area required to be accessible, handrails must be designed and constructed to comply with Clause 12 of AS1428.1-2009

Openable Windows in Bedrooms & Early Childhood Centres

In bedrooms of Class 2 and 3 buildings, and Class 9b early childhood centres, where the distance from the floor level to the level below exceeds 2m, window openings shall be provided with protection in accordance with BCA Clause D2.24.

Where the lowest part of the window opening is less than 1.7m above a floor, the window opening must be:

a) Fitted with a device to restrict the opening; or
b) Fitted with a screen with secure fittings

The device or screen required must –

a) Not permit a 125mm sphere to pass through it; and
b) Resist an outward horizontal action of 250N; and
c) Have a child resistant release mechanism if the screen or device is able to be removed, unlocked or overridden

Further review will be undertaken to ensure compliance as the design develops.

5.7. **Slip Resistance**

The adoption of BCA 2014 introduced a requirement for slip resistance of stairway treads and ramp surfaces. The requirements are as follows:

Table D2.14 SLIP-RESISTANCE CLASSIFICATION

Application	Surface conditions	
	Dry	**Wet**
Ramp steeper than 1:14	*P4 or R11*	*P5 or R12*
Ramp not steeper than 1:14	*P3 or R10*	*P4 or R11*
Tread or landing surface	*P3 or R10*	*P4 or R11*
Nosing or landing edge strip	*P3*	*P4*

6. Services and Equipment

The following section of this report describes the essential fire safety measures and the minimum performance requirements of those measures. A draft essential fire safety schedule can be found in Appendix B.

6.1. **Fire Hydrants (BCA E1.3)**

A system of Fire Hydrants is required to be provided in accordance with BCA Clause E1.3 and AS2419.1-2005.

Pressure and flow information will be required to confirm the required pressures and flow to the system, depending on the type of hydrant to be utilized;

- Feed hydrants (within 20m of hard stand for pumping appliance), 200 kPa NSW - 150
- Attack hydrant (within 50m of hard stand) 350 kPa NSW - 250
- Hydrants on a pump station, 700 kPa

The flow requirements depend on the size of the fire compartment and type of building, Hydraulic Engineer to confirm flow requirements

The building is required to be provided with a booster assembly as part of the fire hydrant requirements. The booster is required to be located attached to the building at the main entry. If remote from the building, the booster is to be located at the main vehicle entry or with sight of the main entry of the building within 20m of a hardstand area.

A fire ring main is required.

The fire pump location is not satisfactory

It is anticipated the fire hydrant booster assembly is not provided with compliant radiant heat protection that extends 2m either side of the booster and 3m above the booster set as required by AS2419.1-2005.

Due to the level changes at ground floor it is anticipated the internal fire hydrants in the fire stairs will not be located at the storey they ate serving as required by E1.4, this is a technical departure and is to be addressed through a fire engineered performance solution.

6.2. **Fire Hose Reels**

A Fire Hose Reel System is not required to the class 3 and 5 portions BCA Clause E1.4 and AS2441-2005.

The system is required to provide coverage to the basement zones only.

Fire hose reels are to be located within 4m of exits and provide coverage within the building based on a 36m hose length and 4m of water spray. Where required, additional fire hose reels shall be located internally as required to provide coverage. These hose reels are to be located adjacent to internal hydrants.

Fire hose reel cupboards must not contain any other services such as water meters, etc., and doors to fire hose reel cupboards are not to impede the path of egress unless an alternative solution is developed under BCA Performance Requirement EP1.1

Fire Hose reel are not to extend through Fire and Smoke Walls.

The hose reels coverage is to be confirmed by the Hydraulic Engineer.

6.3. **Fire Extinguishers (BCA E1.6)**

The provision of portable fire extinguishers is required to BCA Clause E1.6 and AS2444 - 2001 to provide coverage.

Table E.6 details when portable fire extinguishers are required:

Occupancy Class	**Risk Class (as defined in AS 2444)**
General provisions – Class 2 to 9 buildings (except within sole-occupancy units of a Class 9c building)	a) To cover Class AE or E fire risks associated with emergency services switchboards. (Note 1) b) To cover Class F fire risks involving cooking oils and fats in kitchens. c) To cover Class B fire risks in locations where flammable liquids in excess of 50 litres are stored or used (not excluding that held in fuel tanks of vehicles). d) To cover Class A fire risks in normally occupied fire compartments less than 500m^2 not provided with fire hose reels (excluding open deck carparks). e) To cover Class A fire risks in classrooms and associated schools not provided with fire hose reels. f) To cover Class A fire risks associated with Class 2 or 3 building or class 4 part of building.
Specific provisions (in addition to general provisions) – a) Class 9a health care building b) Class 3 parts of detention and correctional occupancies c) Class 3 accommodation for children, aged persons and people with disabilities	To cover class A and E fire risks. (Note 2)

Occupancy Class	Risk Class (as defined in AS 2444)
d) Class 9c building	

In addition, extinguishers are to be provided to the class 3 portions of the building in accordance with the below:

- an ABE type fire extinguisher is to be installed with a minimum size of 2.5 kg; and
- extinguishers are to be distributed outside a sole-occupancy unit

a) to serve only the storey at which they are located; and
b) so that the travel distance from the entrance doorway of any sole-occupancy unit to the nearest fire extinguisher is not more than 10 m.

Fire extinguishers are to be located in accordance with AS 2444 - 2001, often collocated with fire hydrants and/or fire hose reels.

6.4. **Automatic Sprinkler Protection (BCA E1.5)**

Automatic sprinkler protection is required to Specification E1.5 and AS2118.1-2017 to the following areas:

- Throughout the entire building where the effective height exceeds 25m;
- Throughout any Class 7a car park (other than open deck car parks) containing accommodation for more than 40 vehicles;

Location of pumps, tanks, FIP, control valves and booster assemblies will be subject to review by the FRNSW as part of the Building Approval process.

The sprinkler system shall be connected to and activate an occupant warning system complying with BCA Specification E2.2a.

Details of the proposed sprinkler system design will need to be reviewed as the design develops.

An occupant warning system should be provided in accordance with BCA Specification E1.5.

6.5. **Smoke Hazard Management (BCA E2.2)**

Smoke hazard management shall be provided throughout the building by means of the following systems:

- Zone Smoke Control in accordance with the requirements of AS/NZS 1668.1-2015 Amendment 1 ;
- Automatic Shutdown of Mechanical Systems in accordance with the requirements of AS/NZS 1668.1-2015 Amendment 1;
- Automatic Smoke Exhaust System activated by Automatic Smoke Detection & Alarm System in accordance with the requirements of BCA Spec E2.2a and AS1670.1-2018
- Automatic Smoke Detection and Alarm System in accordance with the requirements of BCA Spec E2.2a and AS 1670.1-2018;
- Automatic Pressurisation to Fire Isolated Exits in accordance with the requirements of AS/NZS 1668.1-2015 Amendment 1
- Automatic smoke detection and alarm system complying with BCA Specification E2.2b and AS/NZS1668.1-2015 Amendment 1;
- Carpark ventilation systems must comply with Clause 5.5 of AS/NZS1668.1-2015 Amendment 1 except that fans with metal blades suitable for operation at normal temperature may be used and the electrical power and control cabling need not be fire rated

A fire indicator panel is required as part of the detection system. This panel is to be located within 4m of the main entry and should be incorporated within the fire control room. Any variation to the prescriptive provisions will require the consent of the fire brigade and should form part of the fire safety engineering report to verify the performance requirements of the BCA.

In addition to the above, the following additional smoke hazard management provisions are required due to the atrium in the building:

- The operation of mechanical air handling systems serving the atrium must be deigned to operate in accordance with BCA Specification G3.8, Section 3
- The atrium must be provided with a smoke exhaust system in accordance with BCA Specification G3.8, Section 3.4
- A smoke detection system complying with AS1670.1-2018 and BCA Specification G3.8; Section 4 is to be installed throughout the building
- A break glass fire alarm system must be provided at each door to a fire isolated stairways

6.6. **Lift Services (BCA E3.4 and BCA E3.6)**

The passenger lifts to be installed are to be:-

- Fitted with warning signs, fire service controls in accordance with Clauses E3.3, Figure E3.3, E3.7, E3.9 and E3.10 of the BCA.
- Stretcher facilities are to be provided within the lifts with minimum dimensions of 600m wide, 2000mm long and 1400mm high;
- At least two emergency lifts with stretcher facilities in accordance with Part E3.4 of the BCA. The two emergency lifts shall be located in separate shafts. These lifts are to serve all storeys that are served by passenger lifts.
- Be provided with the following in order to satisfy accessibility requirements:
  - A handrail in accordance with AS1735.12-1999,
  - Minimum internal floor dimensions of 1400 x 1600mm for lifts which travel more than 12m, or 1100 x 1400mm for lifts which travel not more than 12m,
  - Fitted with a series of door opening sensory devices which will detect a 75mm diameter or across the door opening between 50mm and 1550mm above floor level,
  - Have a set of buttons for operating the lift located at heights above level complying with AS1735.12 - 1999
  - For lifts serving more than 2 levels, automatic audible information within the lift car identifying the level each time the car stops, and audible and visual indication at each lift landing to indicate the arrival of a car
- Emergency hands free communication, including a button that alerts a call centre of a problem and a light to signal that the call has been received

6.7. **Exit Signs and Emergency Lighting (BCA E4.2 and BCA E4.5)**

Emergency Lighting and Exit Signs indicating exit location paths of travel to exits to be provided in accordance with BCA Part E4 and AS/NZS 2293.1-2018, including the potential use of photo luminescent exit signs.

Details are required to be provided for review.

6.8. **Sound Systems and Intercom Systems for Emergency Purposes (BCA E4.9)**

A Sound System and Intercom System is required in accordance with AS1670.4-2018 and BCA Clause E4.9

Details are to be provided for our review.

6.9. Fire Control Centre (BCA E1.8)

As the effective height of the building exceeds 50m, the fire control centre must be located within a dedicated room in accordance with the requirements of BCA Specification E1.8

The proposed Fire Control Room does not comply as follows:

It is proposed the fire control room will be located at basement level 1 in lieu of at ground floor. This is to be addressed through a performance based solution

6.10. Fire Precautions During Construction (BCA E1.9)

After the building has reached an effective height of 12m, the following fire services are required to be operational:

- Required fire hydrants and fire hose reels on every storey covered by the roof/floor structure (except the 2 uppermost storeys); and
- Booster connections installed.

Due to the height of the building this will need to be considered and implemented during construction.

7. Health and Amenity

7.1. Sanitary Facilities (BCA F2.2 and BCA F2.3)

Retail

Separate sanitary facilities are required to be provided for male & female employees. In relation to the public, sanitary facilities are required to be provided either where more than 600 persons can be accommodated (standard shops) or for café / restaurant where there are more than 20 seats.

Offices

Separate sanitary facilities are required to be provided for male & female employees at a rate at the following.

The following table summarises the sanitary facilities required / provided:

Sanitary Facilities Required			
Market Hall	WC	Urinals	Basins
Male	3	4	3
Female	6	0	4
Accessible	1	NA	1
Function space	WC	Urinals	Basins
Male	4	5	4
Female	7	0	4
Accessible	1	NA	1

The amenities provided in the commercial building can cater for 80 male and 75 female occupants per level

Note: Bathrooms to 2B retail to be provided by the different tenants dependant of use

Detailed designs will need to be developed as to the layout, dimensions, etc of the sanitary facilities.

Note: The Unisex facilities provided for people with disabilities may be counted once for each sex. These facilities are to be provided in accordance with AS1428.1-2009.

Bathroom Construction

Where bathrooms or rooms containing water closets have the WC within 1200mm of the doorway, the door shall be either sliding, open outwards, or be provided with removable hinges.

7.2. **Floor Wastes**

Floor wastes to be provided within bathrooms and laundries where located above another sole occupancy unit. The floor shall be sloped towards these wastes.

Floor wastes are required to be provided where wall hung urinals are provided and the floor shall be sloped towards these wastes.

Floor wastes are indicated.

7.3. **Light and Ventilation (BCA Part F4)**

Class 2, 3 & 4

Natural light and ventilation is to be provided to all habitable rooms at a rate of 10% and 5% of the floor area of the rooms respectively.

A required window that faces a boundary of an adjoining allotment or a wall of the same building or another building on the allotment must not be less than a horizontal distance from that boundary or wall that is the greater of:

(i) generally — 1 m; and
(ii) 50% of the square root of the exterior height of the wall in which the window is located, measured in metres from its sill.

Class 5, 6, 7, 8 & 9

Natural Ventilation is required to be provided to rooms at a rate of 5% of the floor area in openings. Alternatively, mechanical ventilation is required in accordance with AS1668.2-2012

Artificial lighting complying with AS/NZS1680.0-2009 is to be incorporated with the final detailed design to be developed to confirm this.

7.4. **Sound Transmission and Insulation (BCA F5)**

Please note for walls requiring impact resistance an air gap between leafs of the wall construction is required to be provided.

Please provide a report from the acoustic engineer verifying design compliance with the provisions of part F5 of the BCA.

7.5. **Waterproofing (BCA FP1.4)**

Performance Requirement FP1.4 which relates to the prevention of the penetration of water through external walls, must be complied with. It is noted that there are no Deemed-to-Satisfy Provisions for this Performance Requirement in respect of external walls.

As such, a performance solution is to be prepared by a suitably qualified professional that demonstrates that the external walls of the proposed building complies with Performance Requirement FP1.4 which reads as follows:

A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause—

a) unhealthy or dangerous conditions, or loss of amenity for occupants; and
b) undue dampness or deterioration of building elements.

External above Ground Membranes

All external above ground areas (roof slabs, balconies etc.) shall be protected by a waterproofing system in accordance with AS4654 Parts 1 and 2 – 2012.

For external balconies the waterproofing membrane must have a vertical upward termination height in accordance with the table below dependant on the wind class of the site. The wind class is determined by the structural engineer.

Wind Class Regions A & B	Wind Class Regions C & D	Ultimate Limit State Wind Speed	Termination Height (mm)
N1	-	34	40
N2	-	40	50
N3	C1	50	70
N4	C2	61	100
N5	C3	74	150
N6	C4	86	180

Wet Areas

Internal wet areas throughout the development (e.g. bathrooms, laundries) shall be waterproofed in accordance with AS3740 - 2010 requirements.

Further review will be undertaken as the design develops with respect to the specification of waterproofing membrane, provision of water-stops at doorways etc.

7.6. **Stormwater Drainage**

Stormwater drainage systems serving the building are to comply with AS3500.3 - 2018.

The use of a syphonic stormwater drainage system is not covered by Australian Standards and an appropriate performance solution will need to be documented by the hydraulic consultant addressing the system compliance against BCA Performance Requirements FP1.2 & FP1.3.

8. Energy Efficiency

The proposed development shall comply with Part J of the BCA. To achieve compliance, there are two options available:

1) The building can comply with the deemed-to-satisfy provisions of the BCA, relating to the following areas:
    - Building Fabric
    - Glazing
    - Building Sealing
    - Air Conditioning & Ventilation Systems
    - Artificial Lighting & Power
    - Hot Water Supply

2) The building can be verified against a reference building as per Verification Method JV3. This requires that the proposed building and its services be shown to have an annual energy consumption of equal or less than the reference building which has been modelled as per the requirements of Part J of the BCA.

Certification from an appropriately qualified engineer should be provided for either option with a report / computations outlining how compliance is achieved.

Access for maintenance is to be provided to the building in accordance with the requirements of BCA Part J8.

The proposed site will be located in a climate zone 6

Due to special nature of the building some energy provisions may not be appropriate.

8.1. **Access for Maintenance**

Access if to be provided to all plant, equipment and components associated with the provision of the above energy requirements i.e.

- Adjustable or monitored shading devices
- Time switches and motion detectors
- Room temperature thermostats
- Plant thermostats such as boilers or refrigeration units
- Motorised air dampers and central valves
- Reflectors, Lenses and Diffusers of light fittings
- Heat transfer equipment

9. Access for People with Disabilities

The development is required to comply with the accessibility provisions contained within:

- The Building Code of Australia 2019;
- The Access to Premises Standard;
- AS1428.1-2009 General Requirements for Access – New Building Work;
- AS1428.4.1 -2009 Tactile Ground Surface Indicators
- AS2890.6-2009 Car Parking for People with Disabilities

9.1. **General Building Access Requirements (BCA D3.1)**

Access for people with disabilities shall be provided to and within the building in accordance with the requirements of Clause D3.2, D3.3 and D3.4 of the BCA 2019 1. Parts of the building required to be accessible shall comply with the requirements of:-

AS1428.1-2009 General Requirements for Access – New Building Work;
AS1428.4.1 -2009 Tactile Ground Surface Indicators
AS2890.6-2009 Car Parking for People with Disabilities

Access for persons with a disability is to be provided as follows:

Apartment (Class 3 buildings)

- From the pedestrian entrance to at least 1 floor containing Single Occupancy Units and to the entrance door of all Single Occupancy Units on that floor, and to at least one type of each common facility, such as gyms, shops, laundries (shared), gaming rooms etc.
- Where an AS1428.1 compliant lift or ramp is provided in addition to the above and access is required to and within all spaces, and to the entrance of doors to single occupancy units on the levels, served by the lift or ramp.

Where individual Class 3 single occupancy units are provided:

1 to 10 single occupancy units	To and within 1 accessible single occupancy units
11 to 40	To and within 2 accessible single occupancy units
41 to 60	To and within 3 accessible single occupancy units
61 to 80	To and within 4 single occupancy units
81 to 100	To and within 5 single occupancy units
101 to 200	To and within 5 single occupancy units and 1 for every 25 single occupancy units over 100
201 to 500 single occupancy units	To and with an accessible single occupancy units, plus 1 for every 30 units in excess of 200 units
More than 500	To and with an accessible single occupancy units, plus 1 for every 50 units in excess of 500 units

* Not more than 2 required accessible units may be located adjacent to each other; and
* Where more than 2 single occupancy units are required to be accessible, they must be indicative of the range of units/rooms available.

Office/shops (Class 5/Class 6 buildings)

To and within all areas normally used by the occupants

Car parks (Class 7a buildings)

To and within any level containing accessible car parking spaces.

Assembly Halls/Sporting venues

To all required wheelchair seating spaces and to all areas normally used by occupants except tiers or seating areas or platforms not containing accessible wheelchair seating areas.

Swimming Pools (Class 10b)

To and into swimming pools with a total perimeter greater than 40 m, associated with a Class 1b, 2, 3, 5, 6, 7, 8 or 9 building that is required to be accessible.

9.2. **Provision for Access to Buildings**

The BCA prescribes access to be provided to and within the building as follows:

- Via the principle public entry and at least 50% of all other entrances from the allotment boundary
- From designated car parking spaces for the use of occupants with a disability.
- From another accessible building connected by a pedestrian link.
- All areas used by the public.

In buildings over 500m^2 in floor area, a non-accessible entrance must not be located more than 50m from an accessible entrance.

And where a pedestrian entry contains multiple doors, the following is required;

- Entrance containing not more than 3 doors, at least one of the door leaves must be accessible.
- Where an entrance contains more than 3 doors, not less than 50% of the door leaves must be accessible.

A door is considered to be accessible if it is automatic (open and closing) or is more than 850mm in clear opening width and contains the required door circulation space.

9.3. **Accessibility within Building (BCA D3.3)**

A building required to be accessible is required to be equipped with either a AS 1428.1 compliant lift or AS 1428.1 compliant ramp, (but the maximum vertical rise of a ramp must not exceed 3.6m).

An exemption to not provide either a lift or ramp exists for class 5, 6, 7b, or 8 buildings, where a building contains;

a) Less than 3 storeys; and
b) Floor area of each storey (excluding the entrance level) is not more than 200m^2.

Within the building the following are required;

- Door circulation space as per AS1428.1 Clause 13.3
- Doorways must have a clear opening of 850mm;
- Passing spaces (1.8m wide passages) must be provided at maximum of 20m intervals
- Within 2.0m of end access ways/corridors, turning areas spaces are required to be provided.
- Carpet pile height of not more than 11mm to an adjacent surface
- Any glazed capable of being mistaken for a doorway or opening must be clearly marked (or contain chair rail, hand rail or transom as per AS 1288 requirements)

The design would generally comply with the prescriptive provisions of the BCA with additional ongoing review being undertaken as to door widths, circulation, etc. Further details are to be provided or access to these areas is to be assessed by an access consultant.

9.4. **Car Parking (BCA D3.5)**

Accessible car parking spaces are required to comply with AS 2890.6-2009 at the rate of 1 per 100

A 'shared zone' of minimum 5400mm x 2400mm is required adjacent to accessible car parking spaces, protected with a bollard.

9.5. **Tactile Indicators (BCA D3.8)**

Tactile indicators are required to be provided to warn occupants of all stairs (except Fire Isolated stairs) and ramps regardless of public nature or private environment and where an overhead obstruction occurs less than 2.0m above the finished floor level.

9.6. **Swimming Pools (BCA D3.10)**

Where pools exceed 40m in total perimeter, at least 1 means of accessible entry in the form of the following is required.

a) Fixed or movable ramps (and an aquatic wheelchair) or
b) Zero depth entry at a maximum gradient of 1:14 (and an aquatic wheel chair)
c) Platform swimming pool lift (and an aquatic wheelchair) or
d) A sling style swimming pool lift

Where the perimeter exceeds 70m in total, sling style lifts are not permitted.

9.7. **Stairs (BCA D3.3 inter Alia AS1428.1)**

Stairs shall be constructed as follows:

a) Where the intersection is at the property boundary, the stair shall be set back by a minimum of 900mm so that the handrail TGSIs do not protrude into the transverse path of travel.
b) Where the intersection is at an internal corridor, the stair shall be set back in 300mm, so the handrails do not protrude into transverse path of travel.
c) Stairs shall have opaque risers.
d) Stair nosing shall not project beyond the face of the riser and the riser may be vertical or have a splay backwards up to a maximum 25mm.
e) Stair nosing profiles shall;
    - Have a sharp intersection;
    - Be rounded up to 5mm radius; or
    - Be chamfered up to 5mm x 5mm
f) All stairs, including fire isolated stairs shall, at the nosing of each tread have a strip not less than 50mm and not more than 75mm deep across the full width of the path of travel. The strip may be set back a maximum of 15mm from the front of the nosing. The strip shall have a minimum luminance contrast of 30% to the background. Where the luminous contrasting strip is affixed to the surface of the tread, any change in level shall not exceed a difference of 5mm.

9.8. **Accessible Sanitary Facilities (BCA F2.4)**

Unisex Accessible Sanitary Facilities

An accessible unisex sanitary facility must be located so that it can be entered without crossing an area reserved for one sex only and provided in accordance with AS 1428.1-2009 and must contain a closet pan, washbasin, shelf or bench top and adequate means of disposal of sanitary products and as per following.

Building Type	Minimum accessible unisex sanitary compartments to be provided
Hotels Class 3	a) In every accessible sole-occupancy unit provided with sanitary compartments within the accessible sole-occupancy unit, not less than 1; and b) At each bank of sanitary compartments containing male and female sanitary compartments provided in common areas, not less than 1.
Office, industrial, assembly building, schools, health care except for within a ward area of a Class 9a health-care building	a) 1 on every storey containing sanitary compartments; and b) Where a storey has more than 1 bank of sanitary compartments containing male and female sanitary compartments, at not less than 50% of those banks.

Ambulant Facilities

At each bank of toilets where there is one or more toilets in addition to an accessible unisex sanitary compartment, a sanitary compartment suitable for a person with an ambulant disability in accordance with AS 1428.1-2009 must be provided for use by males and females.

Where male sanitary facilities are provided at a separate location to female sanitary facilities, accessible unisex sanitary facilities are only required at one of those locations.

An accessible unisex sanitary compartment or an accessible unisex shower need not be provided on a storey or level that is not provided with a passenger lift or ramp complying with AS 1428.1-2009

Accessible unisex showers

Accessible unisex showers must be provided in accordance with AS 1428.1 and at the following rates;

Building	Minimum accessible unisex showers to be provided
Hotels	a) In every accessible sole – occupancy unit provided with showers within the accessible sole-occupancy unit, not less than 1; and b) 1 for every 10 showers or part thereof provided in common areas
gyms	1 for every 10 showers or part thereof provided

9.9. **Signage (BCA D3.6)**

As part of the detailed design package, specifications will need to be developed indicating:

- Sanitary Facility Identification Signs (note that they are to comply with BCA Specification D3.6 and include the use of Braille, Tactile, etc and be placed on the wall on the latch side of the facility);
- Directional / Way Finding signs to the Lifts, Sanitary Facilities, etc;
- Hearing Augmentation System;
- Identify each door required by BCA Clause E4.5 to be provided with an exit sign, stating ‘EXIT’ and ‘Level” number

9.10. **Hearing Augmentation (BCA D3.7)**

A hearing augmentation-listening system shall be installed throughout the building in accordance with the requirements of Clause D3.7 of the BCA, where ever in a 9b building, auditorium conference room, meeting room etc. contain a PA system not used for emergency purposed or any ticket office or teller's booth or reception where the public is screened from the service provider.

9.11. **Lifts (BCA E3.6)**

Lifts compliant to BCA E3.6 and BCA E3.7 must be provided, where required to be provided, with a minimum size of 1400 x 1600mm or 1100mm x 1400mm (whichever is appropriate) in size – with appropriate handrails and auditory commands.

9.12. **SECTION J (Transition Period)**

A transition period applies to Section J requirements, from 1 May 201 to 30 April 2020 Section J of NCC 2016 may apply instead of Section J of NCC 2019. From 1 May 2020 Section J of NCC 2019 will apply.

9.13. **SECTION J (JP1 Energy Use)**

Efficient energy use must be achieved appropriate to the function and use of the building, level of human comfort, solar radiation, energy source of the services and sealing of the building envelope. To achieve this JV1, JV2, JV3 and JV4 verification methods have been introduced.

- JV1 NABERS Energy for Offices
  - To achieve compliance with JP1 a class 5 building must achieve a minimum of 5.5 NABERS Energy for Offices Base Building Commitment Agreement and comply with ANSI/ASHRAI Standard 140.
  - To achieve the energy model for (JP1 (i)) solar radiation the base buildings greenhouse gas emissions are not more than 67% of the 5.5 star level when excluding:
    - Tenant supplementary heating; and
    - Cooling systems; and
    - External lighting; and
    - Car park services.
    - A thermal comfort level between predicted mean vote of -1 to +1 is achieve across not less than 95% of the floor area of all occupied zones for not less than 98% f annual hours of operation.
  - The building also need to comply with additional requirements of Spec JVa.
- JV2 Green Star
  - To achieve compliance with JP1 for Class 3,4,5,6, 7, 8, 9 and common area of Class 2 buildings Green Star can be used as a verification method when the calculation method complies with ANSI/ASHRAE Standard, Specification JVb and when:
    - The building complies with simulation requirements and is registers for a Green Star – Design & As-Built rating; and
    - The annual greenhouse gas emissions of the proposed building are less than 90% of the annual greenhouse gas emissions of the reference building; and
    - In the proposed building, a thermal comfort level of between predicted mean vote of -1 to +1 is achieve across not less than 95% of the floor area of all occupied zones for not less than 98% of the annual hours of operation of the building; and
    - The building complies with the additional requirements of Specification JVa.
- JV3 Verification Using a Reference Building
  - To achieve compliance with JP1 for Class 3,4,5,6, 7, 8, 9 and common area of Class 2 buildings verification using a reference building can be used when the calculation method complies with ANSI/ASHRAE Standard, Specification JVb and when:
    - It is determined that the annual greenhouse gas emissions of the proposed building are not more than the annual greenhouse gas emissions of a reference building when the proposed building is modeled with the proposed services and the proposed building is modelled with the same services as the reference building. The proposed building thermal comfort level is to be between predicted mean vote of -1 to +1 across

not less than 95% of the floor area of all occupied zones for not less than 98% of the annual hours of operation; and
- The building achieves the additional requirements in Specification JVa; and
- The greenhouse gas emissions of the proposed building may be offset by renewable energy generated and use on site and another process such as reclaimed energy used on site.

- JV4 Building Envelope Sealing
  - Compliance with sealing of the building against air leakage is verified when the envelope is sealed at an air permeability rate tested in accordance with Method 1 of AS/NZS ISO 9972, of not more than –
    - For a class 2 building or a class 4 part of a building, 10$m^3hr.m^2$ at 50 Pa reference pressure; or
    - For a class 5, 6, 8, 9a or 9b building other than a ward area in climate zones 1, 7 and 8, 5 $m^3/hr.m^2$ at 50 Pa reference pressure; or
    - For class 3 or 9c building, or a class 9a ward area in climate zones 1, 3, 4, 6, 7 and 8 5$m^3/hr.m^2$ at 50 Pa reference pressure.
  - Part J3 and performance solution that uses on of the other NCC assessment Methods which verifies that compliance with JP1 (e) will be achieve can also be used as verification methods.

10. Appendix A - Reference Documentation

The following documentation was used in the assessment and preparation of this report:

Prepared by Fitzpatrick and Partners dated 15.8.19 Revision M

DRAWING LIST

DA-001	COVER SHEET
DA-002	DRAWING LIST
DA-003	SITE LOCATION PLAN
DA-004	SURVEY
DA-005	SITE PLAN EXISTING & DEMOLITION
DA-006	SITE PLAN
DA-007	SETBACK DIAGRAM
DA-008	PHOTOMONTAGE SHEET 01 - MURRAY ROSE AVE
DA-009	PHOTOMONTAGE SHEET 02 - AUSTRALIA AVE SOUTH
DA-010	PHOTOMONTAGE SHEET 03 - AUSTRALIA AVE NORTH
DA-011	PHOTOMONTAGE SHEET 04 - GROUND PLANE
DA-012	PHOTOMONTAGE SHEET 05 - MARKET PLACE
DA-013	BASEMENT LEVEL 04 PLAN
DA-014	BASEMENT LEVEL 03 PLAN
DA-015	BASEMENT LEVEL 02 PLAN
DA-016	BASEMENT LEVEL 01 PLAN
DA-017	GROUND LOWER PLAN
DA-018	2A - GROUND UPPER PLAN 2B - LEVEL 01 COMMERCIAL
DA-019	2A - LEVEL 01 FUNCTION CENTRE 2B - LEVEL 02 COMMERCIAL
DA-020	2A - LEVEL 01 MEZZANINE PLANT 2B - LEVEL 03 COMMERCIAL
DA-021	2A - LEVEL 02 COMMERCIAL & TERRACE 2B - LEVEL 04 COMMERCIAL
DA-022	2A - LEVEL 03 COMMERCIAL 2B - LEVEL 05 COMMERCIAL
DA-023	2A - LEVEL 04 - 12 TYPICAL 2B - LEVEL 06 COMMERCIAL
DA-024	2A - LEVEL 05 COMMERCIAL 2B - LEVEL 07 COMMERCIAL
DA-025	2A - LEVEL 13 LOWER MID PLANT ROOM 2B - LEVEL 09-12 COMMERCIAL
DA-026	2A - LEVEL 13 UPPER MID PLANT ROOM 2B - LEVEL 13 COMMERCIAL
DA-027	2A - LEVEL 14 HOTEL 2B - LEVEL 14 COMMERCIAL
DA-028	2A - LEVEL 15 - 29 TYPICAL HOTEL 2B - LEVEL 15 MEZZANINE PLANT
DA-029	PLANT FLOOR 2B - ROOF
DA-030	LEVEL 30 POOL / GYM / PLANT ROOM
DA-031	LIFT OVERRUN
DA-032	ROOF PLAN
DA-033	WEST ELEVATION AUSTRALIA AVENUE
DA-034	NORTH ELEVATION - (MURRAY ROSE AVE)
DA-035	NORTH ELEVATION - (DAWN FRASER AVE)
DA-036	SOUTH ELEVATION (DAWN FRASER AVE)
DA-037	SOUTH ELEVATION (PARKVIEW DRIVE)
DA-038	EAST ELEVATION (SERVICE LANE)
DA-039	SECTION NORTH SOUTH
DA-040	2A SECTION - EAST WEST
DA-041	2B SECTION - EAST WEST
DA-042	FACADE DETAIL SHEET 01
DA-043	FACADE DETAIL SHEET 02
DA-044	MATERIALS SELECTION SHEET 01
DA-045	MATERIALS SELECTION SHEET 02

11. Appendix B - Draft Fire Safety Schedule

	Essential Fire Safety Measures	Standard of Performance
1.	Access Panels, Doors and Hoppers	BCA Clause C3.13
2.	Automatic Fail Safe Devices	BCA Clause D2.19 & D2.21
3.	Automatic Smoke Detection and Alarm System	Clause 3 or 4 or 5 BCA Spec. E2.2a ,AS 1670.1 – 2018, AS/NZS 1668.1 – 2015, AS 3786-2014
4.	Automatic Fire Suppression System	BCA Spec. E1.5 & AS 2118.1 – 2017 Amdt 1, AS 2118.6 – 2012 (Combined sprinkler & hydrant)
5.	Emergency Lifts	BCA Clause E3.4
6.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2018 ~~& 2~~
7.	EWIS	BCA Clause E4.9 & AS 1670.4 - 2018
8.	Emergency Evacuation Plan	AS 3745 – 2002
9.	Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 and AS/NZS 2293.1 – 2018
10.	Fire Control Centres and Rooms	BCA Spec. E1.8
11.	Fire Blankets	BCA Clause E1.6, AS 2444 – 2001
12.	Fire Dampers	BCA Clause C2.12, C3.15, Spec C2.5, D1.7, E2.2, E2.3, F4.12, Spec E2.2, E2.3, Spec E2.2b, Spec G3.8 & AS 1668.1 – 2015
13.	Fire Doors	BCA Clause C3.2, C3.4, C3.5, C3.6, C3.7 & C3.8 and AS 1905.1 – 2015
14.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005 Amdt 1
15.	Fire Hydrant System	Clause C2.12, E1.3, Spec E1.5a, H3.9 & AS 2419.1 – 2005 Amdt 1
16.	Fire Seals	BCA Clause C3.15, C3.16, Spec C3.15, Spec D1.12, & AS 1530.4 –2014
17.	Lightweight Construction	BCA Clause C1.8, Spec C1.8
18.	Mechanical Air Handling System	BCA Clause E2.2, AS/NZS 1668.1 – 2015 & AS 1668.2 – 2018
19.	Paths of Travel	EP&A Reg 2000 Clause 186
20.	Portable Fire Extinguishers	BCA Clause E1.6 & H3.11, AS 2444 – 2001
21.	Pressurising Systems	BCA Clause E2.2 & AS/NZS 1668.1 – 2015
22.	Required Exit Doors (power operated)	BCA Clause D2.19 (b)(iv)
23.	Self-Closing Fire Hoppers	BCA Clause C3.13 & AS 1530.4 – 2014
24.	Smoke Hazard Management System	BCA Part E2 & AS/NZS 1668.1 – 2015
25.	Smoke and/or Heat Alarm System	BCA Spec. E2.2a & AS 3786 – 2014
26.	Stand-by Power System	BCA Clause G3.8
27.	Warning and Operational Signs	Section 183 of the EP & A Regulations 2000, AS 1905.1 –

	Essential Fire Safety Measures	Standard of Performance
		2015, BCA Clause C3.6, D2.23, E3.3

12. Appendix C - Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2016 Amendment 1:

Table 3 TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS	**Class of building — FRL: (in minutes)** *Structural adequacy/Integrity/Insulation*			
	2, 3 or 4 part	**5, 7a or 9**	**6**	**7b or 8**
EXTERNAL WALL (including any column and other building element incorporated within it) or other external building element, where the distance from any fire-source feature to which it is exposed is -				
For *loadbearing* parts-				
less than 1.5 m	90/ 90/ 90	120/120/120	180/180/180	240/240/240
1.5 to less than 3 m	90/ 60/ 60	120/ 90/ 90	180/180/120	240/240/180
3 m or more	90/ 60/ 30	120/ 60/ 30	180/120/ 90	240/180/ 90
For non-*loadbearing* parts -				
less than 1.5 m	–/ 90/ 90	–/120/120	–/180/180	–/240/240
1.5 to less than 3 m	–/ 60/ 60	–/ 90/ 90	–/180/120	–/240/180
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is -				
less than 3 m	90/–/–	120/–/–	180/–/–	240/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS	90/ 90/ 90	120/120/120	180/180/180	240/240/240
INTERNAL WALLS				
Fire-resisting lift and stair *shafts*				
Loadbearing	90/ 90/ 90	120/120/120	180/120/120	240/120/120
Non-*loadbearing*	–/ 90/ 90	–/120/120	–/120/120	–/120/120
Bounding *public corridors*, public lobbies and the like				
Loadbearing	90/ 90/ 90	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*				
Loadbearing	90/ 90/ 90	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Ventilating, pipe, garbage, and like *shafts* not used for the discharge of hot products of combustion				
Loadbearing	90/ 90/ 90	120/ 90/ 90	180/120/120	240/120/120
Non-*loadbearing*	–/ 90/ 90	–/ 90/ 90	–/120/120	–/120/120
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES and COLUMNS	90/–/–	120/–/–	180/–/–	240/–/–
FLOORS	90/ 90/ 90	120/120/120	180/180/180	240/240/240
ROOFS	90/ 60/ 30	120/ 60/ 30	180/ 60/ 30	240/ 90/ 60

Table 3.9 REQUIREMENTS FOR CARPARKS			**FRL (not less than) Structural adequacy/Integrity/Insulation** **ESA/M (not greater than)**
Wall			
(a)	*external wall*		
	(i)	less than 3 m from a *fire-source feature* to which it is exposed:	
		Loadbearing	60/60/60
		Non-*loadbearing*	–/60/60
	(ii)	3 m or more from a *fire-source feature* to which it is exposed	–/–/–
(b)	*internal wall*		
	(i)	*loadbearing*, other than one supporting only the roof (not used for carparking)	60/–/–
	(ii)	supporting only the roof (not used for carparking)	–/–/–
	(iii)	non-*loadbearing*	–/–/–
(c)	*fire wall*		
	(i)	from the direction used as a *carpark*	60/60/60
	(ii)	from the direction not used as a *carpark*	as *required* by Table 3
Column			
(a)	supporting only the roof (not used for carparking) and 3 m or more from a *fire-source feature* to which it is exposed		–/–/–
(b)	steel column, other than one covered by (a) and one that does not support a part of a building that is not used as a *carpark*		60/–/– or 26 m^2/tonne
(c)	any other column not covered by (a) or (b)		60/–/–
Beam			
(a)	steel floor beam in continuous contact with a concrete floor slab		60/–/– or 30 m^2/tonne
(b)	any other beam		60/–/–
Fire-resisting lift and stair shaft (within the *carpark* only)			60/60/60
Floor slab and vehicle ramp			60/60/60
Roof (not used for carparking)			–/–/–
Notes:	1.	ESA/M means the ratio of exposed surface area to mass per unit length.	
	2.	Refer to Specification E1.5 for special requirements for a sprinkler system in a *carpark* complying with Table 3.9 and located within a multi-classified building.	