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BUILDING CODE OF AUSTRALIA REPORT

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Brewery Yard, Central Park Chippendale NSW 2008.

Prepared for: Johnstaff Projects (NSW) Pty Ltd

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Table of Contents

Date	Rev No	No. of Pages	Issue or Description of Amendment	Assessed By	Approved By	Date Approved
30.07.18	A	38	Draft for Design Team	Charbel Gabriel	Brigitte Thearle	30.07.18
30.11.18	B	38	DA Submission	Charbel Gabriel	Vijay Perumal	30.11.18
14.12.18	C	38	Final DA	Charbel Gabriel	Vijay Perumal	14.12.18
12.06.19	D	36	Tender BCA Report	Vijay Perumal	Geoffrey Pearce	12.06.19
17.07.19	E	36	DA Submission – Change of use from Educational to Retail/commercial	Vijay Perumal	Geoffrey Pearce	17.07.19

Executive Summary

Development Overview

The proposed development is a mixed retail and commercial use at the Brewery Yard, Central Park Chippendale NSW 2008.

There are also two portions of basement, one providing plant and equipment, the other providing storage and retail space.

The buildings are of high heritage significance.

Compliance Summary

As Accredited Certifiers, we have reviewed architectural design documents prepared by Tzannes Architects for compliance with the Building Code of Australia 2019 Volume One.

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. The submission for the Construction Certifcate will need to include verification from a suitably accredited fire engineer: -

No.	Alternative Solution Description	DTS Clause	Performance Requirement
Fire Safety Items			
1.	**Reduction of FRLs – Heritage Fabric** There will be several components of heritage fabric that will not meet the current requirements for fire resistance. These elements are to be assessed as part of the performance solution.	C1.1, C2.7, C2.8, C2.9, Spec C1.1	CP1, CP2
2.	**Separation of Classifications on the same storey** Separation of classification in the following areas will be assessed as part of the performance solution: ▪ Basement – Class 6 and 7b portions ▪ Ground floor – Class 5 and Class 6 portions	C1.1, C2.7, C2.9, Spec C1.1	CP1, CP2
3.	**Reduction of FRLs** It is proposed to reduce the FRL of the following: ▪ Slab portions above the Class 7b portions from 4 hours to 2 hours. ▪ Slab and Column portions of the Class 6 portions from 3 hours to 2 hours	C1.1, C2.9, Spec C1.1	CP1, CP2
4.	**Reduction of FRL for Glass Floor** The glass floor on the ground level is proposed to be constructed of glass which will not achieve the required FRL between the basement and ground floor. This is to be captured as part of a performance solution	C1.1, C2.9, Spec C1.1	CP1, CP2

5.	**Western Fire Stair – Combined Fire Isolated & External Stair in Lieu of Fire isolated** The western stair is proposed to be a combination of a fire isolated stair and an external stair in lieu of fire isolated exit. The following deviations occur with regards to the configuration of this stair: ▪ External stair is serving the top storey which is above an effective height of 25m. ▪ The stair is a combination of fire isolated stair and an external stair in lieu of fire isolated exit, therefore does not fully meet either set of requirements ▪ Unprotected openings are proposed to be within 6m of the path to the external portion of the stair (but more than 3m from the path/stair)	D1.3, D1.7, D1.8	DP4, DP5, EP2.2
6.	**Non-fire Isolated Stair** Stair 03 is required to be constructed as a “fire isolated stair as per D1.3 of the BCA”. Architectural details indicate this stairway is not proposed to be constructed within a fire-isolated shaft and does not provide independent egress to a road or open space	D1.3, D1.7, Spec C1,1	CP1, CP2, DP5, EP2.2
7.	**Exit travel distances – Commercial Portions** The travel distances to a point of choice to the Commercial portions is proposed to be up to 30m in lieu of 20m.	D1.4	DP4 & EP2.2
8.	**Low Ceiling Height** Clear unobstructed ceiling height at Mezzanine on Level 2 currently measures 1.9m.	D1.6, F3.1	DP6, EP2.2, FP3.1
9.	**Discharge of Fire-Isolated Exits** Discharge path from northern fire stair required occupants to pass within 6m of openings to ground foyer which are not proposed to be protected Discharge path from south eastern fire stairs requires occupants to pass within 6m of openings in heritage fabric which are not proposed to be protected.	D1.7	CP8, DP4 & DP5
10.	**Travel by non-fire-isolated stairways or ramps – Level 2 Mezzanine** The stairs serving as the single required exit to the level 2 mezzanine do not provide egress via their own flights to the level of road or open space. The egress path is considered to be discontinuous.	D1.9	DP4, DP5

11.	**Fire hydrants – Radiant Heat Protection** The booster assembly is proposed to be located within 10m of the building and is not proposed to extend 2m either side of and both side of and 3m above the upper hose connections. Furthermore, the portion of the building within 10m of the booster assembly is to the side and the heat protection provided does not therefore protect fire fighters.	E1.3	EP1.3
12.	**Atrium Construction - Construction of Bounding Walls** It is anticipated that the bounding walls to the atrium will deviate from the deemed to satisfy provisions. The construction of the bounding walls is to be assessed on a performance basis.	G3.4	CP2, EP2.2
13.	**Atrium – Smoke Hazard Management** It is anticipated that the smoke hazard management requirements to the atrium will be rationalised and assessed on a performance basis	G3.8	EP2.2

The fire engineered solution relating to EP1.3 and EP2.2 will be subject to consultation with the NSW Fire Brigade as part of the Construction Certificate process.

The assessment of the design documentation has also revealed that the following additional information is required in order to assess BCA compliance within the development.

No.	Further Information / Review Required	Report Reference
1.	**Boundaries & Adjoining Roads** Please provide details as to which boundaries are adjacent to/will be adjacent to roads and, where roads are adjacent, provide the details as to the location of the far side of the road to enable a review of proximity to fire source features.	N/A
2.	**Structural Adequacy of Existing Structure** A review of the structure is to be undertaken by a suitably qualified structural engineer to determine compliance with the loading requirements and fire resistance requirement under Part B and C of the BCA.	2.2, 3.1
3.	**Non-Combustible Building Elements** Details of the existing and proposed external walls are to be provided, including details of the combustibility of all materials making up external walls. This includes insulation, sarking etc.	3.3
4.	**Population Numbers** Class 6 retail portion on ground floor equates to 960m2. Client to confirm proposed use of this retail space to determine egress and sanitary facility requirements of the BCA	Multiple

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.

1.0 Introduction

The proposed development is a mixed retail and commercial use at the Brewery Yard, Central Park Chippendale NSW 2008.

There are also two portions of basement, one providing plant and equipment, the other providing storage and retail space.

The buildings are of high heritage significance.

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.

1.1 Current Legislation

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.

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.

1.2 Upgrade to Existing Buildings

The legislation currently in force in New South Wales has three key provisions for upgrade that will affect the proposed development. These provisions are as outlined below. It is noted that, regardless of any upgrade requirements, all new building work is to comply with the BCA applicable to the project (in this case, the BCA in force at the time of application for Construction Certificate).

Notwithstanding the below, provisions do exist for Council or NSW Fire Brigades to undertake an inspection of the building and request an upgrade where occupant safety in relation to egress or risk of spread of fire to an adjoining property may be compromised.

Clause 94 Upgrade

The consent authority, when assessing the development application may require that the existing building be brought into partial on full compliance with the current provisions at the BCA. The trigger for upgrade includes:

- Where the building works, together with any other works completed or authorised within the previous 3 years, represents more than half the total volume of the building; or
- The consent authority is not satisfied that the measures contained in the building are inadequate:
  i. to protect persons using the building, and to facilitate their egress from the building, in the event of fire, or
  ii. to restrict the spread of fire from the building to other buildings nearby.

The development consent for this project does not contain requirements to upgrade the building under this clause of legislation.

It is noted that the change of use and Access to Premises Upgrades noted below are required regardless of whether the consent authority impose upgrade as part of their consent.

Change of Use – Legislative Upgrade

The legislation requires that, where a change of use is proposed, structural elements and Category 1 fire safety measures be upgraded to comply with the current BCA requirements. As such, the proposed change of use has been assessed against the current performance standards. Essential fire safety measures should be designed to the current performance standard referenced under the BCA 2019. The measures that are to be assessed are as follows:

1. Part B: Structural Integrity and Ability to Support New Loads
2. Part C: Fire Resisting Construction
3. EP1.3: Fire Hydrants
4. EP1.4: Automatic Fire Suppression System (Sprinklers)
5. EP1.6: Fire Control Centres
6. EP2.2: Smoke Hazard Management
7. EP3.2: Emergency Lifts

Access to Premises – Legislative Upgrade

The Commonwealth Disability (Access to Premises – Buildings) Standards (the Premises Standards) commenced on 1 May 2011. The Premises Standards set out administrative provisions and an Access Code detailing technical requirements applying to alternations, additions and new buildings. Where works are proposed to existing buildings, note the affected part, in addition to where works are being undertaken, is to be addressed. This includes the front entry of the building, and the path from the entry to the area where works are being undertaken.
The affected part of the building:

- Must be “upgraded” to comply with the Premises Standards subject to any exceptions or concessions
- Only applies to any part of an existing building once work requiring building approval is to be undertaken.

The affected part of the building does not apply to:

- existing parts of buildings outside the area of the new work and the affected part upgrade
- an access way from the allotment boundary, from any accessible car parking space on the allotment or between other buildings on the allotment.

Upgrading works for an affected part may include:
- accessibility of upper floors to new work
- providing lift access features such as Braille or tactile buttons
- signage
- removing a step at a building entrance
- upgrading handrails on a ramp
- minimum width requirements of doorways or passageways, including passing and turning spaces.

2.0 PRELIMINARIES

2.1 Building Assessment Data

Summary of Construction Determination: -

Part of Project	Brewery Yard
Classification	5, 6, 7b
Number of Storeys	8
Rise In Storeys	7
Type of Construction	Type A
Effective Height (m)	26.355m*

Summary of the floor areas and relevant populations where applicable: -

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Assumed Population
Basement	7b	100m^2	4
Basement	7	70m^2	70
Ground Floor	5	110m^2	11
Ground Floor	6	960m2	672*
Level One	5	1099m^2	110
Level Two	5	1022m^2	103
Level Two Mezzanine	5	200m2	20
Level Three	5	1053m^2	106
Level Four	5	572m^2	58
Level Five	5	406m^2	41
Level Six	5	258m^2	26

Notes:
1. The above populations have been based on the floor areas and calculations in accordance with Table D1.13 of the BCA.
2. Population numbers to ground floor excluded 30% of floor area for fit out
3. The floor areas have been adjusted without ancillary areas such as sanitary facilities, corridors, shelving and or racking layouts in storage areas.
4. The carpark areas have been considered ancillary to the use for the purposes of population numbers

2.2 Structural Provisions (BCA B1)

Any new structural works are to comply with the applicable requirements of AS/NZS 1170.1.

Glazing is to comply with AS1288, and AS2047.

Prior to the issue of the Construction Certificate structural certification is required to be provided, including determination of the importance level of the development.

This is to include assessment against the provisions of BCA Clause B1.6 – Construction of Buildings in Flood Areas

A review of the existing heritage fabric is to be undertaken by a suitably qualified structural engineer to ensure the loading requirements for the new uses can be met by the structure.

2.3 Development Approval

A Development Approval will be required from the Local Authority for the development. A copy of the Development Permit conditions and approved drawings will be required prior to the issuing of the Building Approval 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.

2.4 Copy of Certificate of Title:

A copy of the current Certificate of Title and Registered Plan / Plan of Subdivision is required. Where it is proposed to construct any part of the building work within an easement, the consent of the relevant authority and /or Council is required prior to the issue of the Building Approval.

3.0 FIRE PROTECTION

3.1 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, the building is required to be 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;

- Fire compartmentation of the building at each floor level,
- Fire separation between commercial portions of 120 minutes.
- Fire separation between retail portions of 180 minutes
- Fire separation between any storage portions in the end of trip facilities (that comprise of more than 10% of the floor area of the storey) and the remainder of the building of 240 minutes..
- Separation between the atrium and the remainder of the building by bounding walls complying with the atrium provisions.

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	max floor area—	**8 000 m^2**	5 500 m^2	3 000 m^2
	max volume—	**48 000 m^3**	33 000 m^3	18 000 m^3
6, 7b	max floor area—	**5 000 m^2**	3 500 m^2	2 000 m^2
	max volume—	**30 000 m^3**	21 000 m^3	12 000 m^3

3.2 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 –

a) More than 2 storeys, or
b) 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.

Details of bounding walls to be provided, however it is anticipated that there will be deviations from the deemed to satisfy provisions that need to be assessed on a performance basis. Feasibility of any performance solutions to be confirmed by accredited fire safety engineer.

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 AS2118.1-1999 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 AS1668.1-1998 and BCA Specification G3.8 Part 3;
- Fire detection and alarm system complying with AS1670.1-2015 and BCA Specification G3.8 Part 4;
- Sound System and Intercom system for emergency purposes complying with AS1670.4-2015and 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;

3.3 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 ** which outlines the required fire rating to be achieved by the development. These fire ratings are summarised below:-

Building Element		5	6	7b
External Walls	Loadbearing Non- loadbearing	120/120/120 -/120/120	180/180/180 -/180/180	240/240/240 -/240/240
External Columns		120/-/-	180/-/-	240/-/-
Fire Walls		120/120/120	180/180/180	240/240/240
Fire Stair / Shaft Walls	Loadbearing Non-loadbearing	120/120/120 -/120/120	180/120/120 -/120/120	240/120/120 -/120/120
Public Corridors	Loadbearing Non-loadbearing	120/–/– -/-/-	180/–/– -/-/-	240/–/– -/-/-

Service Shaft Walls	Loadbearing Non-loadbearing	120/ 90/ 90 -/90/90	180/120/120 -/120/120	240/120/120 -/120/120
Floors		120/120/120	180/180/180	240/240/240
Walls, Beams, Columns Supporting Floors		120/–/–	180/–/–	240/–/–
Walls, Beams, Columns Supporting Roof		120/–/–	180/–/–	240/–/–
Roof		120/ 60/ 30	180/ 60/ 30	240/ 90/ 60

A review of the fire resistance levels achieved by the heritage components is to be undertaken by a suitably qualified structural engineer. Where the existing and/or new elements do not meet the current FRL's required for the proposed uses, this will need to be addressed through either or a combination of the following:

- FRL's achieved by existing structure are verified as part of a performance solution by the accredited fire safety engineer to BCA Performance Requirements CP1 and CP2
- The existing elements are amended to provide the required FRLs. Any works proposed to existing heritage fabric will be subject to consultation from the heritage architect/consultant.

It's also proposed to reduce the required FRL's to the following locations:

- The slab portions above the 7b portions from 4 hours to 2 hours.
- The glass floor on the ground level is proposed to be constructed of glass which will not achieve the required FRL between the basement and ground floor.

The accredited fire safety engineer will need to confirm feasibility of any performance solutions and where FRLs are to be increased to enable feasibility.

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

- Lift Motor Rooms,
- Emergency Power Supply,
- Electricity Supply,
- 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.

3.4 Fire Hazard Properties (BCA C1.10 and BCA C1.12)

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 Building Code of Australia. The following requirements apply:

Sprinkler Protected Areas

a) Floor Coverings – Critical radiant Flux not less than 1.2 kW/m2
b) Wall and Ceiling Linings – Material Group No. 1,2,3
c) Other Materials – Spread of Flame Index not exceeding 0 and Smoke Developed Index not exceeding 2

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

As the building is of Type A construction the external walls, including any external and internal claddings & linings must be non-combustible as determined by AS1530.1. 1994.

The following materials 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) Bonded laminated materials where—
   i. each lamina, including any core, is non-combustible; and
   ii. each adhesive layer does not exceed 1 mm in thickness and the total thickness of the adhesive layers does not exceed 2mm; and
   iii. 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.

The BCA does nominate that ancillary elements may be fixed to an external wall that is required to be non-combustible unless they comprise of the following:

a) A gutter, downpipe or other plumbing fixture or fitting.
b) A flashing.
c) A grate or grille not more than 2 m² in area associated with a building service.
d) An electrical switch, socket-outlet, cover plate or the like.
e) A light fitting.
f) A required sign.
g) 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.

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

Details of existing external walls are also to be provided to enable review.

3.5 Protection of Openings in External Walls (BCA C3.2)

The prescriptive provisions of the BCA stipulate that any external opening within 3m of the fire source feature requires protection by -/60/- fire rated construction, or externally located wall wetting sprinklers.

Where a building is separated into fire compartments, the distance between parts of external walls and openings within them must be not less than the table below unless those parts of each external wall has an FRL not less than 60/60/60 and openings are protected.

Angle Between Walls	Minimum Distance
0º (walls opposite)	6m
More than 0º to 45º	5m
More than 45º to 90º	4m
More than 90º to 135º	3m
More than 135º to 180º	2m
More than 180º	Nil

The walls to west of end of trip facilities (adjoining ramp) are to be confirmed. This wall is either to be fire rated or wall on other side of ramp to the ground is to be fire rated to afford protection between compartments.

Fire source feature is defined as;

a) The far boundary of a road, river, lake or the like adjoining an allotment,
b) The side or rear boundary of the allotment,
c) *The external wall of another building on the allotment which is not a class 10 building.*

Currently roads are indicated to north, west and southern boundaries of the site. The location of the far side of lanes/roads is to be confirmed to enable assessment. Where the far boundaries are within 6m of the façade, the building elements within 6m will require protection. The eastern boundary is considered to be a side boundary with closest part of façade being 4.7m from the boundary, therefore no protection required. Confirmation of road and boundary location is to be provided to enable assessment.

3.6 Protection of Openings in 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 to commercial and gym portions and 240 minutes to storage portions

b) 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.

4.0 EGRESS PROVISIONS

4.1 Provisions for Escape (BCA D1)

The egress provisions from the proposed building are provided by:

- Fire isolated stairways
- External perimeter doorways
- Required non-fire isolated stairways

The level 2 mezzanine is served by a single required non-fire isolated stair that discharges at level 2 in lieu of discharging at the level of road or open space. The egress path is considered to be discontinuous as occupants then need to travel to a fire isolated exit to egress the building. This is to be assessed as part of the performance solution to BCA Performance Requirement DP4 by the accredited fire safety engineer.

Stair 03 is required to be constructed as a “fire isolated stair as per D1.3 of the BCA”. Architectural details indicate this stairway is not proposed to be constructed within a fire-isolated shaft and does not provide independent egress to a road or open space. This is to be assessed as part of the performance solution by the accredited fire safety engineer.

Other detailing issues that will need to be addressed include:

- Door Hardware
- Exit door operation
- Stair construction
- Handrail and balustrade construction
- Discharge from the Fire Isolated Exits
- Details of the egress provisions to the Road.

It is understood that all egress stairs proposed are new and will comply with current BCA requirements.

4.2 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.

The western stair is proposed to be a combination of a fire isolated stair and an external stair in lieu of fire isolated exit. The following components of this stair are to be assessed as part of the performance solution to BCA Performance Requirement DP4, DP5 and EP2.2 by the accredited fire safety engineer:

- External stair is serving the top storey which is above an effective height of 25m.
- The stair is a combination of fire isolated stair and an external stair in lieu of fire isolated exit, therefore does not fully meet either set of requirements
- Unprotected openings are proposed to be within 6m of the path to the external portion of the stair (but more than 3m from the path/stair)

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.

The discharge paths from the following paths are proposed to deviate from the above requirements:

- Discharge path from northern fire stair required occupants to pass within 6m of openings to foyer which are not proposed to be protected.
- Discharge path from south eastern fire stairs requires occupants to pass within 6m of openings in heritage fabric which are not proposed to be protected.

The path to the road from these discharge points is to be assessed as part of the performance solution to BCA Performance Requirements DP4 and DP5 by the accredited fire safety engineer.

4.3 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:

- 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

The locations of the proposed exits indicate that the deemed to satisfy requirements in terms of travel distances would not be satisfied:

- Travel distance to a point of choice on commercial levels of up to 25m in lieu of 20m.

This is to be assessed as part of the performance solution by the accredited fire safety engineer to BCA Performance Requirement DP4.

The doors to level 5 deck and level 6 terrace to be confirmed to enable assessment.

4.4 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 in which case a 600mm clear width is required).

It is noted that the clear unobstructed ceiling height at Mezzanine on Level 2 currently measures 1.9m.
This is to be assessed as part of the performance solution by the accredited fire safety engineer.

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

Storey	Number of People	Exit Width Required	Exit Width Provided
Basement	74	1m	2m
Ground Floor	672	5.5m	6.25m
Level One	110	1.25m	3m
Level Two	103	1.25m	3m

Level Two Mezzanine	20	1m	1m
Level Three	106	1.25m	2m
Level Four	58	1m	2m
Level Five	41	1m	2m
Level Six	26	1m	2m

The exit width provided is 22.75m.

The total aggregate exit width within the building caters for the anticipated occupants.

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 are to be reversed to swing in the direction of egress:

- Door into south eastern fire stair on ground floor

4.5 Balustrading and Handrails (BCA D2.16 and BCA D2.17)

Generally

Balustrading to a height of 1000mm with a maximum opening of 125mm in any direction should be provided adjacent to balconies, landings, corridors etc where located adjacent to a change in level exceeding 1000mm.

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.

Details of proposed balustrading to be provided.

Fire Isolated Stairways & Class 7b Buildings

Balustrades in the fire isolated stairways and Class 7b 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. this does not apply where the stairs are also proposed to be utilised for general access.

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

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

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

4.6 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*

5.0 ACCESS FOR PEOPLE WITH DISABILITIES

5.1 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. Parts of the building required to be accessible shall comply with the requirements of:-

- AS1428.1-2009 General Requirements for Access – New Building Work;
- AS1428.4-2009 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:-

Office & Retail

To and within all areas normally used by the occupants

Access for people with disabilities is not provided to the level 2 mezzanine. As the building has more than 3 storeys, access for people with disabilities is required to be provided, regardless of the floor area of the mezzanine. Where access for people with disabilities is not proposed to be provided, this is to be assessed as part of the performance solution by the accredited access consultant to BCA Performance Requirement DP1 and DP2.

5.2 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 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 500m2 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.

5.3 Provisions for Access within Buildings (BCA D3.3)

A building required to be accessible is required to be equipped with either a 1428.1 compliant lift or 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 200m2.

Within the building the following are required;

- Door circulation space as per AS1428.1 Clause 13.3 and as attached in appendix 1;
- 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.

5.4 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.

5.5 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.

5.6 Provisions for 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 towels and as per following.

Building Type	Minimum accessible unisex sanitary compartments to be provided
Assembly building,	a) 1 on every storey (the mezzanine is not considered a 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.

Performance based solution is required as basement and ground floor do not provide an accessible toilet.

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 AS1428.1-2009

5.7 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;
- Identify each door required by BCA Clause E4.5 to be provided with an exit sign, stating ‘EXIT’ and ‘Level” number.

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5.8 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 in size – with appropriate handrails and auditory commands.

6.0 FIRE 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, please provide pressure and flow calculations for review.

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), 150 kPa
- Attack hydrant (within 50m of hard stand) 250 kPa
- Hydrants on a pump station, 700 kPa

The flow requirements depend on the size of the fire compartment and type of building.

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 and within sight of the main entry of the building within 20m of a hardstand area.

The booster assembly is proposed to be located within 10m of the building and is not proposed to extend 2m either side of and 3m above the upper hose connections. Furthermore, the portion of the building within 10m of the booster assembly is to the side and the heat protection provided does not therefore protect fire fighters. This is to be assessed as part of the performance solution by the accredited fire safety engineer to BCA Performance Requirement EP1.3

A fire hydrant ring main is required.

The fire pump location is to be confirmed to enable review.

6.2 Fire Hose Reels (BCA E1.4)

A Fire Hose Reel System is required to BCA Clause E1.4 and AS2441-2005

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

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

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 to the building.

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.

Fire extinguishers are to be located in accordance with AS 2444, 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;
- The building contains an atrium.

Location of pumps, tanks, FIP, control valves and booster assemblies will be subject to review.

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

6.5 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 AS2293.1-2005

Details are required to be provided for review.

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

A Sound System and Intercom System is required in accordance with AS1670.4-2015 and BCA Clause E4.9 as the building has an effective height of 25m and contains an atrium.

Details are to be provided for our review.

6.7 Fire Control Centre (BCA E1.8)

As the building contains a floor area of greater than 18,000m2 and has an effective height of more than 25m, a fire control centre is required in accordance with BCA Specification E1.8.

the location of the proposed fire control centre is to be confirmed to enable assessment.

6.8 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;
- Automatic Shutdown of Mechanical Systems in accordance with the requirements of AS/NZS 1668.1-2015;
- Automatic Smoke Exhaust System activated by Automatic Smoke Detection & Alarm System in accordance with the requirements of BCA Spec E2.2a and AS1670.1-2015.
- Automatic Pressurisation to Fire Isolated Exits serving storeys above an effective height of 25m in accordance with the requirements of AS/NZS 1668.1-2015.

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 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 AS1670.1-2004 and BCA Specification G3.8; Section 4 is to be installed throughout the building.
- A smoke detection system complying with AS1670.1-2004 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

Rationalisation of any of the above systems is to be assessed on a performance basis by the accredited fire safety engineer to BCA Performance Requirement EP2.2.

6.9 Lift Services (BCA E3.42 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, E3.7and E3.9 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 two passenger lifts and the lift to the basement also requires to be an emergency lift.
- Be provided with the following: -
    - A handrail in accordance with AS 1735.12;
    - Minimum internal floor dimensions as specified in Table E3.6b of the BCA i.e. 1,400mm x 1,600mm;
    - Minimum clear door opening complying with AS 1735.12;
    - Passenger protection system complying with AS 1735.12;
    - Have a set of buttons for operating the lift located at heights above level complying with AS 1735.12;
    - Lighting in accordance with AS 1735.12;
    - Automatic audible information within the lift car to identify the level each time the car stops; and
    - Audible and visual indication at each lift landing to indicate the arrival of the lift car.

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.

7.0 HEALTH AND AMENITY

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

As per the population numbers provided, the following sanitary facilities are required to be provided:

Class 5 - Office				
		Closet Pans	Urinals	Washbasins
Population	464			
Male Employees	232	12	6	8
Female Employees	232	16		8
Total		**28**	**6**	**16**

Class 6 - Retail				
		Closet Pans	Urinals	Washbasins
Population	672			
Male Patrons	322	3	6	3
Female Patrons	322	7		3
Male Employees	14	1	1	1
Female Employees	14	1		1
Total		**12**	**7**	**8**
Based on the ratio of patrons to employees of			25 :1	

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.
- Class 6 retail portion on ground floor equates to 960m2. Client to confirm proposed use of this retail space to determine egress and sanitary facility requirements of the BCA

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 (BCA F1.11)

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 not indicated.

7.3 Light and Ventilation (BCA Part F4)

Class 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. The architect is to provide calculations to verify compliance is achieved.

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 Weatherproofing of External Walls (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.*

8.0 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.

It is anticipated that, due to the heritage nature of the majority of external fabric the building will be assessed using the JV3 Verification Method.

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 5.

8.8 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.

Appendix A - Design Documentation

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

Title	Date	Drawn By
190523_17007_BreweryTransmittal_Tender.pdf	23/05/2019	Tzannes

Appendix B - Draft Fire Safety Schedule

	Essential Fire Safety Measures	Standard of Performance
1.	Access Panels, Doors	BCA Clause C3.13
2.	Automatic Fail Safe Devices	BCA Clause D2.19 & D2.21
3.	Automatic Fire Detection and Alarm System	BCA Spec. E2.2a, Spec G3.8 & AS 1670.1 – 2015, AS/NZS 1668.1 - 2015
4.	Automatic Fire Suppression System	BCA Spec. E1.5 & AS 2118.1 – 2017, AS 2118.6 – 2012 (Combined sprinkler & hydrant)
5.	Building Occupant Warning System	BCA Spec. E1.5, BCA Spec. E2.2a & AS 1670.1 – 2015 – Clause 3.22
6.	Emergency Lifts	BCA Clause E3.4 & AS 1735.2 – 2001
7.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2005 Amdt 1 & 2
8.	EWIS (Sound Systems and Intercom Systems for Emergency Purpose)	BCA Clause E4.9 & AS 1670.4 - 2015 & AS 4428.4-2004
9.	Emergency Evacuation Plan	AS 3745 – 2002
10.	Exit Signs	BCA Clauses E4.5, NSW E4.6 & E4.8 and AS/NZS 2293.1 – 2005 Amdt 1 & 2
11.	Fire Control Centres	BCA Spec. E1.8
12.	Fire Dampers	BCA Clause C3.15, AS/NZS 1668.1 – 2015 & AS 1682.1&2 - 1990
13.	Fire Doors	BCA Clause C3.2, C3.4, C3.5, C3.6, C3.7 & C3.8, Spec C3.4 and AS 1905.1 – 2015
14.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005 Amdt 1
15.	Fire Hydrant System	BCA Clause E1.3 & AS 2419.1 – 2005 Amdt 1 Performance solution by accredited fire safety engineer
16.	Fire Seals, Collars	BCA Clause C3.15, C3.16 & AS 1530.4 – 2014
17.	Fire Windows	BCA Spec. C3.4 Performance solution by accredited fire safety engineer
18.	Lightweight Construction	BCA Clause C1.8, C3.17 & AS 1530.3 – 1999
19.	Mechanical Air Handling System	BCA Clause E2.2, AS/NZS 1668.1 – 2015
20.	Paths of Travel	EP&A Reg 2000 Clause 186 Performance solution by accredited fire safety engineer
21.	Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
22.	Pressurising Systems	BCA Clause E2.2 & AS/NZS 1668.1 – 2015
23.	Smoke Hazard Management System (Zone Smoke Control and Automatic Smoke Exhaust)	BCA Part E2, Clause G3.8, Specification G3.8 & AS/NZS 1668.1 – 2015 Performance solution by accredited fire safety engineer
24.	Stand-by Power System	BCA Clause G3.8

	Essential Fire Safety Measures	Standard of Performance
25.	Wall-Wetting Sprinkler and Drencher Systems	BCA Clause C3.4 & AS 2118.2 – 2010
26.	Warning and Operational Signs	EP&A Reg 2000 Clause 183, BCA Clause D2.23, E3.3

Appendix C- Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2019:

Table 3 TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS

Building element	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