



DESIGN CONFIDENCE

Ms Nadine Lafleur

Fire & Life Safety Upgrade Strategy

Unit 1, 162 Harbord Road
Brookvale

EXECUTIVE SUMMARY

Design Confidence has been commissioned by Ms Nadine Lafleur to prepare a Fire and Life Safety Upgrade Strategy for Unit 1 of 162 Harbord Road Brookvale as it relates to an application for a Building Certificate with Northern Beaches Council.

The strategy intends to address Clause 94 of the Environmental Planning and Assessment Regulation 2000, which has been triggered due to the internal alterations undertaken within the existing building located at Unit 1 of 162 Harbord Road, Brookvale.

The Table below lists the compliance departures with the existing building and the extent of works.

ITEM	DESCRIPTION OF PROBLEM	CLAUSE	EXTENT OF WORKS
FIRE-RESISTANCE			
1.	External walls are located less than 1.5m of the side boundary and are constructed of – (i) masonry brickwork with unknown; and (ii) lightweight construction with unknown FRL.	C1.1	(i) Nil, Council accept existing; and (ii) Upgrade the lightweight construction so as to achieve FRL --/90/90.
2.	The fire hazard properties of materials are unknown.	C1.10	Nil, Council accept existing;
3.	The floor separating the storey next above is provided as a concrete slab with unknown FRL.	C2.9	Nil, Council accept existing.
4.	Non protection of existing openings in external walls.	C3.2	Nil, Council accept existing.
ACCESS AND EGRESS			
5.	The unobstructed width via the exit doorway located adjacent to the reception area is less than 750m (being not less than 700mm).	D1.6	Nil, Council accept existing.
6.	The path of travel from the required exits along the northern boundary to the road (at Harbord Road) is less than 1m in width (being not less than 980mm).	D1.10	Nil, Council accept existing.
7.	The electrical meters, distribution board and central telecommunications board are not separated from the building with a non-combustible enclosure.	D2.7	The electrical meters, distribution board and central telecommunications board are to be enclosed by non-combustible construction or fire protective covering and suitably sealed against smoke spread.
8.	The stairway serving the storage area is provided with – (i) Increased riser heights; (ii) Reduced going lengths; (iii) Inconsistent risers and goings throughout the flight; (iv) Openings within the riser to allow a 125mm sphere to pass through the treads; and (v) Inadequate application of slip resistance strip provided to the nosing of each tread.	D2.13	(i) Nil, Council accept existing; (ii) The opening at each riser shall be modified to ensure a 125mm sphere does not pass through; (iii) Each tread of the stairway shall be provided with nosing strips having a slip resistance not less than P3 (dry) and P4 (wet) when tested in accordance with AS4586-2013, along the full width of the path of travel; or (iv) Demolish and decommission the subject stairway.

ITEM	DESCRIPTION OF PROBLEM	CLAUSE	EXTENT OF WORKS
9.	The landings of the stairway serving the storage area is not provided with a slip resistant surface.	D2.14	(i) Each landing surface of the stairway shall be provided with a slip resistance not less than P3 (dry) and P4 (wet) when tested in accordance with AS4586-2013; or (ii) Demolish and decommission the subject stairway.
10.	The threshold at doorways within the external wall to the building incorporate a step at a point closer than the width of the door leaf.	D2.15	(i) Nil, Council accept existing; (ii) The threshold at the main entrance doorway shall be modified so that a threshold ramp complying with Clause 10.5 of AS1428.1-2009 is provided.
11.	The stairway serving the storage area is not provided with a handrail to at least one side of the stairway flight.	D2.17	(i) Provide a handrail to at least one side of the stairway flight complying with Clause D2.17 of the BCA; or (ii) Demolish and decommission the subject stairway.
12.	The doorway serving as a required exit at the rear of the building, within the Spin Room, is provided as a sliding door.	D2.19	(i) Nil, Council accept existing; and (ii) The door shall be able to be opened manually under a force of not more than 110N.
13.	(i) The main entrance door serving as a required exit, swings against the direction of egress; and (ii) The swing door serving as a required exit, impedes in the path of egress to the road along the northern boundary.	D2.20	(i) Nil, Council accept existing; (ii) The main entrance doorway shall be fitted with a hold open device so as to remain open whilst the building is in use; and (iii) The swing door discharging to the open space at the northern boundary shall be fitted with a hold open device so as to remain locked open when occupants discharge via the doorway.
14.	The operational latch of the door serving as a required exits is located above 1,100mm from the floor.	D2.21	The operational latch of the main entry door shall be relocated to a height 900mm-1,100mm above the floor level and operable without a key from the side that faces a person seeking egress in accordance with D2.21 of the BCA.
SERVICES & EQUIPMENT			
15.	No fire hydrant system.	E1.3	(i) Provide a fire hydrant system complying with Clause E1.3 of the BCA and AS2419.1-2005; or (ii) Undertake an assessment to demonstrate that hydrant coverage may be provided to all internal parts of the building from the street hydrant provided directly outside the building.
16.	No fire hose reels.	E1.4	Provide a fire reels complying with Clause E1.4 of the BCA and AS2441-2005.
17.	Inadequate installation of portable fire extinguishers signage throughout the building.	E1.6	Install portable fire extinguishers, including signage throughout the building in accordance with Clause E1.6 of the BCA and AS2444-2001.

ITEM	DESCRIPTION OF PROBLEM	CLAUSE	EXTENT OF WORKS
18.	Inadequate provision of emergency lighting throughout the building.	E4.2	Install emergency lighting throughout all parts of the building in accordance with Clause E4.2 & E4.4 of the BCA and AS2293.1-2005.
19.	Inadequate provision of exit signage throughout the building.	E4.5	Install exit signage (incl. directional signage) throughout all parts of the building in accordance with Clause E4.5, E4.6 & E4.8 of the BCA and AS2293.1-2005.

Table 0.1 – Compliance departures

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Project: Unit 1, 162 Harbord Road, Brookvale
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Revision History:

OUR REFERENCE	REMARKS	ISSUE DATE
P217_152-1 (FLSUS) NH	Report issued as DRAFT for stakeholder review and comment	25 May 2017
P217_152-2 (FLSUS) NH	Report issued to client	16 June 2017

1. INTRODUCTION

1.1 GENERAL

Design Confidence has been commissioned by Ms Nadine Lafleur to prepare a Fire and Life Safety Upgrade Strategy for Unit 1 of 162 Harbord Road Brookvale as it relates to an application for a Building Certificate with Northern Beaches Council.

The strategy intends to address Clause 94 of the Environmental Planning and Assessment Regulation 2000, which has been triggered due to the internal alterations undertaken within the existing building located at Unit 1 of 162 Harbord Road, Brookvale.

1.2 PURPOSE

The purpose of this report is to address Clause 94 of the Environmental Planning and Assessment Regulation 2000, by the following:

- (i) Provide an upgrade strategy for review and concurrence by the Consent Authority.

For identified compliance departures, either:

- (i) Suitable resolutions are proposed to obviate such compliance departures; or
- (ii) Where resolution of a compliance departure causes physical and/or practical constraints within the existing building; a recommendation to seeking the discretion of the Consent Authority occurs.

This Fire and Life Safety Upgrade Strategy directly highlights matters for consideration under Clause 94 of the Environmental Planning and Assessment Regulation 2000, as requires consent authorities to consider whether the measures contained in the building are adequate to:

- (i) Protect persons using the building and to facilitate their egress from the building, in the event of a fire; or
- (ii) To restrict the spread of fire from the building to other buildings nearby.

This strategy is not anticipated to achieve full compliance with BCA 2016, considering the existing nature of the building. This will assist the Consent Authority's consideration and discretion in approving the works undertaken as part of an application for a Building Certificate, which relates to Clause 94 of the Environmental Planning and Assessment Regulation 2000 as to the level of fire and life safety upgrade required (if any) .

Section 5 of this report identifies BCA compliance departures and also provides suggested resolutions. For certain compliance departures it has been requested through supporting justification that the Consent Authority offers some dispensation with respect to Clause 94 of the Environmental Planning & Assessment Regulation 2000.

1.3 BASIS

The content of this report reflects and relies upon:

- (i) The principles and provisions of the Building Code of Australia (BCA) 2016, including the New South Wales variations;
- (ii) 'The Guidelines for Achieving Fire Safety When Recycling a Building' prepared by The Australian Uniform Building Regulations Co-ordinating Council and dated August 1992 (The Guidelines);

- (iii) Architectural plans prepared by N.F. Billyard P/L;
- (iv) Site inspection undertaken on 19 May 2017;
- (v) Development Application Assessment Report (DA2016/0851) prepared by Northern Beaches Council.

1.4 EXCLUSIONS

It is conveyed that this report shall not be construed to infer that an assessment for compliance with the following has been undertaken:

- (i) Structural adequacy and fire ratings;
- (ii) Mechanical, Hydraulic or Electrical services;
- (iii) Operational capacity of existing fire services;
- (iv) Access for people with a disability;
- (v) Any provisions of the BCA not specifically referenced within this report;
- (vi) The individual requirements of Work cover and service providers (Telstra, Sydney Water, and the like);
- (vii) WorkCover Authority requirements; and
- (viii) Determining full compliance with the BCA.

1.5 SCOPE

This report does not assess the level of property protection, business interruption or environmental protection associated with the development. The assessment is limited to compliance with the Building Regulations, which is mainly concerned with life safety and protection of adjoining properties.

Problems related to fire safety of the building during construction, renovation or demolitions are excluded from the scope of this report.

This report does not address insurance issues. It is recommended that relevant insurers are advised of the contents of this report, so that insurance issues can be appropriately addressed between the building owner and/or operator and their insurer.

Matters related to Work Health and Safety or community protection are generally outside the scope of this report, except where directly relevant to the fire engineered solutions presented.

With regard to arson, the assessment is limited to a single ignition caused by an amateur attack of limited proportions. Arson associated with organised criminal or terrorist attacks or use of accelerants has not been considered.

The implementation of the recommendations of this report is the responsibility of others and outside the involvement of Design Confidence in this project.

1.6 PROJECT TEAM

The project team is currently as follows:

ROLE	ORGANISATION	NAME
Client	Luxe Yoga Pty Ltd	Nadine Lafleur
Building Owner	Beach Property Group Pty Ltd	Theo Poulos James Economides
Consent Authority	Northern Beaches Council	TBC
Building Regulations Consultant	Design Confidence	Nicolas Hurtado Luke Sheehy

Table 1.1 – Project Team

2. PROJECT DESCRIPTION

2.1 BUILDING CHARACTERISTICS

The existing building is located at 162 Harbord Road, Brookvale, comprising 2x tenancies, with the subject tenancy space accessed via the ground floor of the Harbord Road frontage (known as unit 1) and the tenancy above accessed via the side driveway.



Figure 2.1 – Aerial image

The property is located within the Northern Beaches Council local government area.

Surrounding buildings are also understood to be of a varying nature and height with industrial / commercial and residential buildings being the predominate use.

Table 2.1 below summarises BCA fundamentals applicable to the building part.

CHARACTERISTICS	DESCRIPTION	
Building Address	Unit 1, 162 Harbord Road, Brookvale	
	Existing	Proposed
Building use classification	Class 8	Class 9b
Rise in storeys	Rise in storeys of 1	Rise in storeys of 1
Effective Height	Effective height less than 12m	Effective height less than 12m
DTS required Type of construction	Type C Construction	Type C construction

Table 2.1 – BCA Characteristics

2.2 DESCRIPTION

Table 2.2 below summarises the primary building elements of the building.

BUILDING ELEMENT	DESCRIPTION
Intermediate floor	Concrete slab
External walls	Brickwork (load bearing) Fibre-cement with studs (unknown) Sheet metal with studs (unknown)
Internal walls	Brickwork (non-loadbearing) Plasterboard with studs (non-loadbearing)
Internal columns	Concrete (loadbearing)
Stairway	Timber
Ceilings	Plasterboard
Roof	Concrete slab

Table 2.2 – Building elements

2.3 WORKS UNDERTAKEN

It is understood the works undertaken within the building as part of the original development consent includes (but not limited to) the following -

- (i) new glazing assembly at the main building entry, comprising bi-fold doors and a single swing door;
- (ii) new sanitary facilities (incl. accessible sanitary facility);
- (iii) new raised stage within the spin room;
- (iv) new internal walls comprising lightweight construction to separate each compartment within the tenancy space;
- (v) new internal doors associated with internal walls separating each compartment;
- (vi) new café incl. joinery and equipment associated with the tenancy space; and
- (vii) painting and superficial modifications to the floors, walls and ceilings.

It should be noted that the following features were existing and not included as part of the works undertaken –

- (i) doors and windows within the external walls (excl. the main entrance door as described above);
- (ii) the timber stairway serving the storage area.

3. OCCUPANT CHARACTERISTICS

3.1 GENERAL

It is anticipated that occupants within the building will represent a known occupant population ranging from young adults to senior adults.

3.2 OCCUPANT (GROUPS) ROLES

Occupant characteristics and their interaction with their environment are of equal importance as the characteristics of the building.

The building occupants can be broadly classified into two (2) groups:

- (i) Employees: Employees are expected to be awake and alert while in the building.
- (ii) Patrons / Visitors: Customers are not expected to be familiar with the building and will only be within the building whilst it is in operation by employees.

3.3 DISTRIBUTION

Occupancy characteristics are considered to be representative of the general population having specific age, physical and mental attributes.

The building population is expected to be well-distributed.

3.4 STATE

The state of the occupants affects their ability to recognise and interpret fire cues (smoke, flames, noise) in a fire emergency situation and also the ability to react and take appropriate actions to avoid injury or death.

All occupants are expected to be awake and alert at the start of a fire emergency having nil factors impairing their response to fire cues.

3.5 PHYSICAL ATTRIBUTES

It is considered that the mobility of the occupants will represent the general population with the majority of occupants being able-bodied having no physical disabilities based on the function and use of the Yoga Studio.

Occupants with physical disabilities (permanent or temporary – injuries), affecting their ability to evacuate can be present in the building. Visually and hearing impaired occupants can also be present in the building. The overview of disability prevalence in Australian population is summarised in the following figure¹

¹ Disability, Ageing and Carers, Australia: Summary of Findings, December 2009. Australian Bureau of Statistics, Publication 4430.0 pp. 4

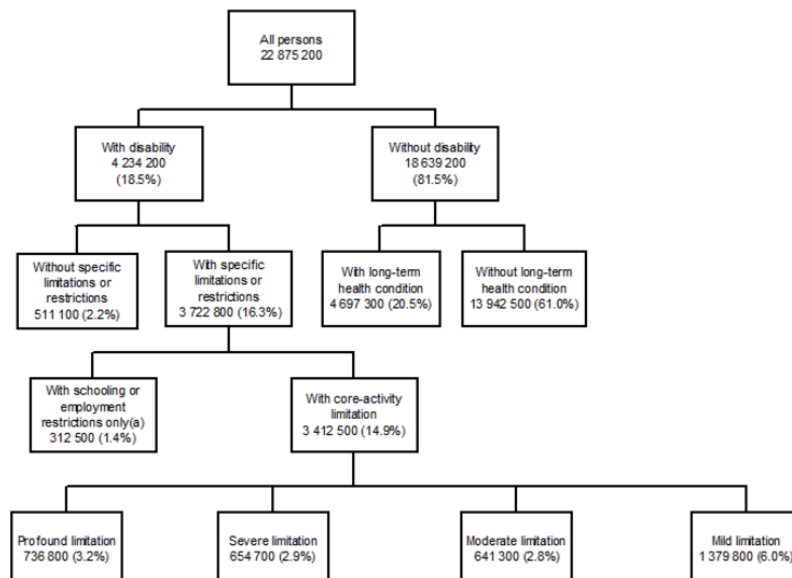


Figure 3.1 – Overview of disability in Australia in 2012

Core-activities comprise communication, mobility and self-care and the disabilities can range from mild (difficulties walking, using aids) to profound (inability to do or always requiring help with core activity tasks).

3.6 MENTAL ATTRIBUTES

Occupants are considered to possess the entire range of abilities to understand and interpret a fire cues in a fire emergency situation.

Occupants can vary in age group, having some degree of mental disability that can have adverse effect on the ability to implement decisions and their emergency behaviour.

3.7 LEVEL OF ASSISTANCE REQUIRED AND AVAILABLE

The majority of the occupants are considered to not require assistance in a fire emergency evacuation. Some occupants may require some assistance or even full assistance. It is considered that the building manager should have the information about occupants requiring some or full assistance available, however the manager is not present at all times in the building.

Required assistance may be provided by other occupants in the building. Some occupants may need to rely on assistance provided by fire fighters in evacuation.

The BCA DTS provisions do not have any specific requirements for egress of persons with disabilities, particularly if they are unable to use a stair. This has been an issue of ongoing concern and many documents have been published in this area. In 1998, the Australian Building Codes Board released a consultation document, the "Building Access Outcomes Report". The report states:

Emergency egress from a building for the general community is provided by exits and, from levels other than the ground level, by stairs or fire stairs. People with mobility disabilities may have difficult using or may not be able to use, stairs.

Furthermore, the report goes on to discuss 'safe refuges', 'evacuation, using lifts' and other potential solutions, although at this time no conclusive solution has been agreed on, or regulated.

3.8 EMERGENCY TRAINING

It's assumed that most occupants will not have appropriate emergency training, nevertheless, they are assumed to have the ability to interpret fire cues and take appropriate action to evacuate the building or extinguish the fire, if safe to do so.

3.9 ACTIVITY AT THE OUTBREAK OF FIRE

There could be a whole range of activities being undertaken at the outbreak of a fire, representative of the occupants in the building. The most likely activities within a mixed use public assembly and drinking / eating establishment that may result in a fire includes cooking an intentionally set. Refer to Section 5 for further information.

3.10 FAMILIARTY WITH THE BUILDING

Employees are expected to be familiar with the building and be able to determine the appropriate egress route in a fire emergency (substantially straightforward egress provisions contained in the building). This enables timely assistance for other less mobile occupants.

The small footprint of the building will not impose significant risk for occupants for their ability to evacuate in an emergency.

4. HAZARDS

4.1 GENERAL LAYOUT

Hazards to occupants relating to the building layout are minimised by virtue of the building part being a single sole occupancy unit and having a relatively small footprint, which minimises the distances occupants need to travel to reach an exit and mitigates the risk of occupants being trapped by a fire.

4.2 ACTIVITIES

4.2.1.1 *Activities associated with Public Assembly (Gym) Occupancies*

Ignition risks are associated with the intentionally set fires and electrical malfunction.

4.2.1.2 *Life Safety Statistics*

Due to the limited data available for fires in office building in Australia, statistics from the United States have been relied upon. Due to the similarities between the countries, this data can be reasonably applied in Australia.

A study by the NFPA indicates that fire departments responded to an estimated average of 1,350 in gymnasium clubs per year (2000-2004). These fires caused an annual average of 1 civilian death, 22 civilian injuries and \$34.5 million in direct property damage².

Contained trash or rubbish fires accounted for 34% of the reported fires in public assembly properties with confined cooking, electrical equipment and smoking materials accounting for approximately 40% of those fires reported².

4.2.2.1 *Activities associated with Eating and Drinking (Café) Establishments*

Ignition risks are associated with the cooking, electrical malfunctioning and heating.

4.2.2.2 *Life Safety Statistics*

Due to the limited current data available for fires in boarding houses in Australia, statistics from the United States have been relied upon. Due to the similarities between the countries, this data can be reasonably applied in Australia.

A study by the NFPA³ indicates an annual average of 7,410 structure fires occurred in eating and drinking establishments between the years 2010-2014.

The fires in eating and drinking establishments resulted in an annual average of 3 civilian deaths and 110 civilian injuries.

The fires were found to be more likely to occur on Fridays and the weekend, with fires more common during times of high peak demand (7am - midnight) which coincides with the busier periods of a working week, with cooking equipment and electrical malfunction allowed to be left unattended whilst the eating and drinking establishment are closed.

4.3 IGNITION SOURCES

4.3.1 *Activities associated with Public Assembly (Gym) Occupancies*

² Flynn, J., US structure fires in public assembly properties excluding eating and drinking establishments and religious and funeral properties, NFPA, August 2007, www.nfpa.org

³ Campbell, R., Structure Fires in Eating and Drinking Establishments, NFPA Research Group, MA, 2017

The first ignition source of fires in public assembly occupancies, according to NFPA was identified as rubbish, trash or waste with 34% of fires, as mentioned above. Cooking materials, including foods, were identified as accounting for 14% as being the first source of ignition.

Given the main ignition source being contained trash or rubbish, for those fires that where the heat source is report and known, these were found to have been caused by a cigarette or match.

4.3.2 Activities associated with Eating and Drinking (Café) Establishments

The leading cause of fires in eating and drinking establishments, according to the NFPA⁴, are cooking equipment, accounting for 61% of the structure fires reported and 38% of direct property damage. Ignition sources were also attributed to electrical distribution and lighting equipment and heating equipment as demonstrated in Figure 4.1 below.

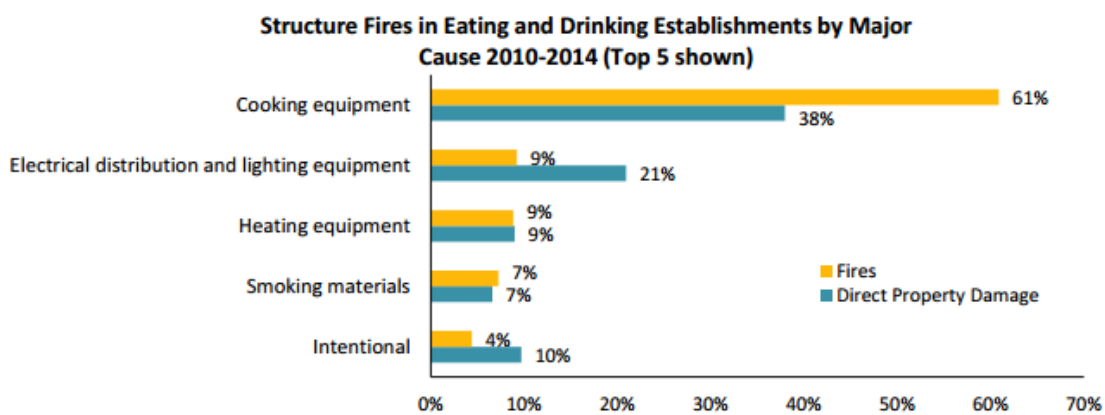


Figure 4.2 – Major Causes of Structure Fires in Eating and Drinking Establishments

Given the main ignition source being cooking equipment, most fires were found to have originated in the kitchen or cooking area with 74% of the structure fires caused unintentionally and 19% caused by failure of equipment or heat source.

4.4 FUEL SOURCES

The type and arrangement of combustibles affect the growth characteristics, while the total amount of fuel and ventilation characteristics in the compartment of fire origin govern the intensity and duration of the fire⁵.

The type of fuel is expected to be a mixture of cellulosic and plastic type materials.

It is expected that the majority of the fuel load in the building will be contained to the occupied areas.

4.5 EXTENT OF FIRE SPREAD

It is generally accepted that the greater the fire spread the greater risk to building occupants⁶.

It is important to note that the data reported that only 14% of structural fires that occurred in a public assembly properties extended beyond the room of origin. Fire spread beyond the room of origin coincides with flashover, which is when all combustibles in the room are involved in fire.

⁴ Campbell, R., Structure Fires in Eating and Drinking Establishments, NFPA Research Group, MA, 2017

⁵ Zalok H., 2011, Validation of Methodologies to Determine Fire Load for Use in Structural Fire Protection, The Fire Protection Research Foundation, Quincy, MA, pp.1

⁶ Thomas I, Effectiveness of Fire Safety Components and System. Centre for Environmental Safety and Risk Engineering, Victoria University, pp. 5

Of these fires, only 2% of fires extended beyond the building of fire origin⁷.

On this basis, extensive fire spread is unlikely and fire spread to adjoining allotments is unlikely. This can be contributed to the majority of fires being confined via such methods as first aid firefighting and rapid fire department response.

⁷ Flynn, J., US structure fires in public assembly properties excluding eating and drinking establishments and religious and funeral properties, NFPA, August 2007, www.nfpa.org

5. FIRE AND LIFE SAFETY UPGRADE STRATEGY

5.1 GENERAL PHILOSOPHY

The philosophy of the strategy is to provide an enhanced level of life safety for evacuating occupants, although not specifically in accordance with the DTS Provisions or Performance Requirements of the BCA. The aim is to improve the level of life safety to an acceptable level, whilst at the same time maintaining significant fabric within the building.

It should be stressed that the aim is not necessarily to comply with the DTS provisions or Performance provisions contained within the BCA but to provide an adequate level of life safety to an appropriate level.

The strategy adopted herein has been developed via the methodology contained within the "Guidelines for Achieving Fire Safety when Recycling a Building" which as published by the Australian Uniform Building Regulations Co-ordinating Council (AUBRCC) August 1992 (The Guidelines).

The Guidelines were designed with the objective of assisting in the process of ensuring the level of fire safety within a recycled building is congruent with that of the overall level of fire protection afforded to occupants for a new building by the BCA.

The Guidelines states that:

It should not automatically be a cause for concern if a recycled building exhibits a level of fire safety somewhat lower or different from that which would arise from a full application of all BCA requirements.

The reference to 'BCA requirements' has been taken to mean the DTS provisions of the BCA.

Furthermore, the Guidelines noted that a building which is recycled by following the Guidelines should meet the objectives of the BCA.

For the purpose of this assessment, the building has been treated as a Class 9b building part of Type C construction.

5.2 FIRE RESISTANCE

5.2.1 Fire Resisting Construction (C1.1)

Problem

Building elements, specifically the external wall required to have an FRL are located within close proximity of the side boundaries.

Intent

The intent of the fire resisting constructions pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to protect other property from physical damage caused by structural failure of a building as a result of fire.

Background

The building is comprised of mixed types of materials that have been used for various building elements. The following building elements not achieving the required FRL are taken as follows:

- (i) External walls consisting of masonry;

- (ii) External walls consisting of fibre-cement lining on timber studs;



Figure 5.2.1a – East elevation

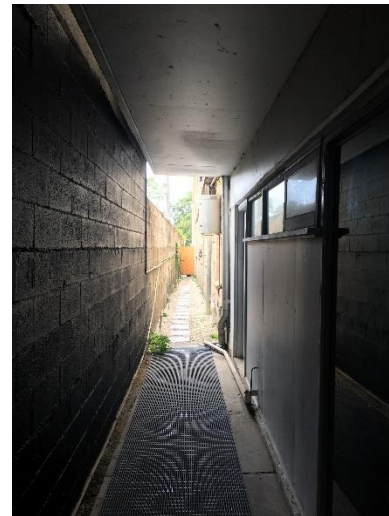


Figure 5.2.1b – South elevation

Assessment

As noted above, for the purpose of this assessment, the building has been treated as being of Type C construction, reference should be made to Section 5.1 of this report which explains why it has been treated as Type C construction.

In this regard, a literature review was undertaken in relation to the existing building elements and the findings are as follows:

External walls – Brickwork

The external walls are taken as consisting of brick construction. Such construction is taken as achieving an FRL from both sides, whereby a building element need only achieve an FRL when tested from the outside for Type C construction.

In this regard, Austral Bricks indicate that their standard series brick consisting of typical brick dimensions achieve an FRL of 240/240/120 (unrendered)

 STANDARD SERIES	
Size	230x110x76
Weight - kg	3
Brick Wall Density - kg/m ² (with mortar)	177.5
Units per Square Metre	48.5
Fire Resistance Levels, FRL (mins) #	
Structural Adequacy	240
Integrity	240
Insulation Unrendered	120

Figure 5.2.1c – FRL of brick

The above FRL is a greater FRL than that required for Type C construction in this instance, which is 90/90/90.

External walls – Fibre-cement

Parts of the external walls consisting of the fibre-cement cladding are required to be upgraded to achieve an FRL not less than --/90/90 so as to achieve an equivalent level of fire resistance for a DTS compliant building.

Summary

The assessment undertaken above demonstrates that the current measures and proposed measures are adequate to protect persons using the building, and to facilitate their egress from the building, in the event of fire, or to restrict the spread of fire from the building to other buildings nearby.

5.2.2 Fire Hazard Properties (C1.10)

Problem

The fire hazard properties of various linings, materials and assemblies is unknown.

Intent

The intent of fire hazard properties pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to stipulate the minimum fire hazard properties of materials susceptible to the effects of flame or heat.

Background

The plasterboard used for walls and ceilings have unknown fire hazard properties.



Figure 5.2.2 – Internal walls and ceilings in the corridor

Assessment

A literature review was undertaken in relation to the fire hazard properties of existing materials and the findings are as follows:

Table 3 of The Guidelines permits that generally, existing materials may remain except where located within a fire-isolated exit, which the building does not contain.⁸

⁸ Australian Uniform Building Regulations Co-ordinating Council, The Guidelines for Achieving Fire Safety When Recycling a Building, 1992

Summary

The assessment undertaken above demonstrates that the current measures are adequate to protect persons using the building, and to facilitate their egress from the building, in the event of fire.

5.2.3 Protection of openings in external walls (C3.2)

Problem

Openings located within external walls required to have an FRL are not protected.

Intent

The intent of the protection of the openings pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to restrict the spread of fire from the building to other buildings nearby.

Background

Various existing openings within the northern and eastern external wall are located within 3m of the side boundary.

Assessment

From the intent, one is only required to assess the spread of fire from the subject building to other buildings nearby, which in this instance is the buildings on the adjoining allotments.

It shall be demonstrated that the unprotected openings are adequate to restrict the spread of fire from the building to other buildings.

Eastern Elevation

In terms of the eastern elevation, the opening located less than 3m from the side boundary is a garage roller door which is perpendicular to the side boundary.

The neighbouring building at the northern elevation is a yard used to store and handle sand material and is arranged such that the yard is located along the main vehicular entry via Harbord Road. The yard is comprised blockwork masonry wall structures along the boundaries to store sand material and the building on the allotment is set back approx. 40m from the front boundary.

In terms of exposure, the subject opening within the external wall of the eastern elevation is setback located ~1.8m perpendicular from the northern side boundary.



Figure 5.2.3a – Opening along the eastern elevation



Figure 5.2.3b – Aerial plan indicating setbacks

In this regard, the risk of radiant heat exposure and fire spread to the neighbouring property is negligible on the basis the subject opening is set back ~5m from the front boundary and the neighbouring building on the allotment is set back ~ 40m from the front boundary.

Northern Elevation

The openings along the northern elevation are directly exposed to the side boundary, and located less than 3m, being ~1m.

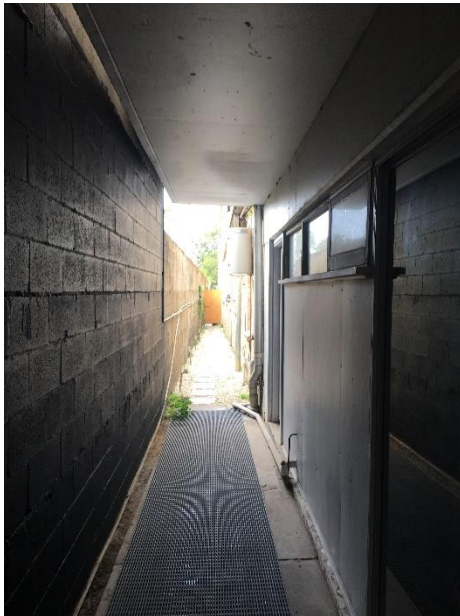


Figure 5.2.3c – view of openings along northern boundary



Figure 5.2.3d – view of external wall along northern boundary

It should be noted that the neighbouring boundary is comprised of core filled masonry blockwork to a height equal to or above the top sill of the doorways or windows located less than 3m from the boundary. Additionally, the building on the allotment is set back ~40m from the front boundary and the height variation between the top of the block work wall and the subject openings increases based on the sloping level of the land.

From the above, the risk of fire spread to the neighbouring building is not likely to occur on the basis the openings along the northern boundary face a continuous core-filled masonry wall and the location of the building on the neighbouring allotment (that is not a Class 10 structure) is at some distance away from the subject openings.

Summary

The assessment undertaken above demonstrates that the current measures are adequate to restrict the spread of fire from the building to other buildings nearby in this instance.

5.3 ACCESS AND EGRESS

5.3.1 Dimensions of exits and paths of travel to exits (D1.6)

Problem

Inadequate dimension of exits occurs.

Intent

The intent of the dimension of exits and paths of travel to exits pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to require exits and paths of travel to an exit to have dimensions to allow all occupants to evacuate within a reasonable time.

Background

The unobstructed width via the exit doorway, located adjacent to the reception area is less than 750mm (being ~700mm).

Assessment

Table 3 of The Guidelines permits that generally, the 1m unobstructed width may reduce to 800mm and 700mm at doorways.

Summary

The assessment undertaken above demonstrates that the existing measures are adequate to protect persons using the building and to facilitate their egress from the building, in the event of a fire.

5.3.2 Discharge from exits (D1.10)

Problem

Reduced unobstructed width along path of travel to road.

Intent

The intent of the discharge from exits pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to require the safe discharge from an exit to a road or open space.

Background

The unobstructed width along the path of travel to the road from the required exits along the northern boundary is less than 1m (being ~900mm).

Assessment

The BCA recognises the unobstructed width of the path of travel to an exit is dependent of the number of people served by the exit.

An unobstructed width of 1m caters for 100 occupants.

It is intended to rely on a performance based approach to demonstrate that the unobstructed width of the path of travel is adequate to protect persons using the building and facilitate their egress from the building to the road, in the event of a fire.

In relation to the performance of the design (i.e. ability for occupants to evacuate safely), the following commentary is offered -

Due to the size of the floor plate and relatively low occupant numbers leading to the from the required exits along the path of travel to the road, evacuation of occupants is expected to take place in a single lane fashion due to occupants walking in staggered formation.

Research indicates that the widest part of human body is the width of the person at the shoulders and reducing to the lower parts of the body. In the U.S.A. shoulder width of the 97.5th percentile of adult is 51cm and the hip width is 45.5cm for females and 38cm for males.⁹

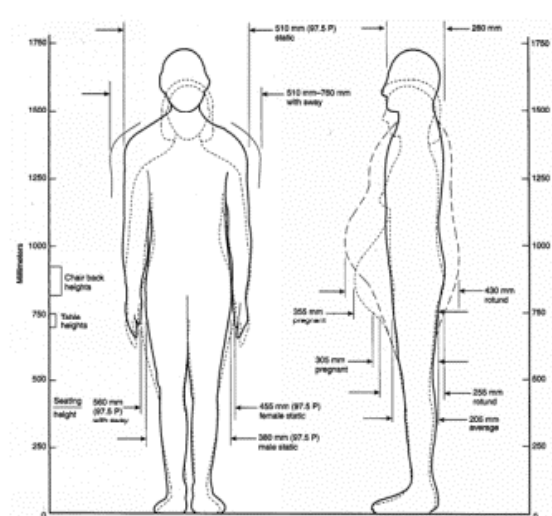


Figure 5.3.2 – Anthropometric data for adults (NFPA 101)

Similarly, a handbook published by Standards Australia reveals that the shoulder breadth and the elbow-elbow breadth for the 95th percentile of British adult men is 51cm and the hip breadth of the 95th percentile of British adult men is 40.5cm and adult women is 43.5cm¹⁰. For the purposes of this assessment, the most onerous widths will be utilised.

The unobstructed width has to also take into account human body sway. In this regard, researchers suggest that around 100mm or 10cm additional exit width should be allowed on each side of the human body¹¹. In this regard, the required width based on human movement results in 51cm + 20cm = 71cm (at worst case), being less than 95cm.

Therefore, the subject width of 95cm is considered adequate to accommodate more than 95% of occupants and provide for body sway.

In terms of fire-fighters, fire-fighter anthropometric data from the United States¹², which is comparable to Australia, indicates that the 95th percentile shoulder width of fire-fighters (combined) is ~600mm with 100mm body sway resulting in ~800mm, which is less than the subject width along the path of travel.

⁹ Bukowski, R., Emergency egress from buildings, NIST technical note 1623, National institute of science and technology, U.S. Department of commerce, January 2009, www.nist.gov

¹⁰ Standards Australia, Handbook- Ergonomics- the human factor: a practical approach to work systems design, HB59-1994

¹¹ Bukowski, R., Emergency egress from buildings, NIST technical note 1623, National institute of science and technology, U.S. Department of commerce, January 2009, www.nist.gov

¹² Fire Apparatus Manufacturer's Association (FAMA), Firefighter Anthropometric Data While Paper, FAMA, Massachusetts, 2007

Occupants from the building are expected to evacuate or be in the process of evacuating, prior to the commencement of operations by Fire & Rescue NSW.

As such, this reduces the likelihood of a situation, where Fire & Rescue NSW operations are potentially hampered by occupants travelling in the opposite direction along the path of travel to exits.

Summary

The assessment undertaken above demonstrates that the existing measures are adequate to protect persons using the building and to facilitate their egress from the building, in the event of a fire.

5.3.3 Installations in exits and paths of travel (D2.7)

Problem

Electrical meters and distribution boards are not enclosed in non-combustible construction or a fire-protective covering and are not effectively sealed against smoke spread.

Intent

The intent of installations in exits and paths of travel pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to maximise the safety of occupants evacuating to or within exits by limiting the types of services which may be located in exits and paths of travel.

Background

The central telecommunications board, electrical meter and distribution board located within the entry foyer and Yoga/ Pilate's room are not provided with a non-combustible enclosure or fire-protective covering.



Figure 5.3.3a – View of electrical meters / distribution boards 1



Figure 5.3.3b – View of electrical meters / distribution boards 2

Assessment

As part of the works, the central telecommunications board, electrical meters and distribution boards are to be enclosed in non-combustible construction or a fire-protective covering (i.e. 1 layer of 13mm fire protective grade plasterboard) and any openings are effectively sealed against smoke spread in accordance with D2.7 of the BCA.

Summary

The assessment undertaken above demonstrates that the proposed measures are adequate to protect persons using the building and to facilitate their egress from the building, in the event of a fire.

5.3.4 Goings and risers (D2.13)

Problem

As detailed within Table 0.1 above, problems occur with the goings and risers of the stairway.

Intent

The intent of the goings and risers pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to enable the safe movement of people using stairways.

Background

The stairway serving the storage area was found to be provided with the following compliance deficiencies –

- (i) Increase riser heights above 190mm;
- (ii) Reduced going lengths less than 250mm;
- (iii) Goings and risers are not constant throughout the flight;
- (iv) Openings within the risers that would permit a 125mm sphere to pass through;
- (v) Inadequate application of a nosing strip having a slip resistance classification P3 (dry) and P4 (wet) when tested in accordance with AS4586-2013 to each stair tread.

Assessment

Table 3 of The Guidelines permits that generally, existing treads and risers may remain and hence the consistency along the flights is permissible in this instance.

It is acknowledged that the stairway is located within a room used as a crèche for young children and hence the opening at each riser shall be modified so as to not permit a 125mm sphere to pass through it, to minimise the risk to children within close proximity.

The treads of the stairway flight shall be provided with a nosing strip as required by D2.13(a)(v) of the BCA having a slip resistance classification P3 (dry) and P4 (wet) when tested in accordance with AS4586-2013.

Alternatively, the stairway may be demolished and decommissioned to negate the need to comply with the above.

Summary

The assessment undertaken above demonstrates that the proposed measures to the stairway is adequate to protect persons using the building and to facilitate their egress from the building.

5.3.5 Landings (D2.14)

Problem

Non provision of landing surface at the stairway having slip-resistance classification.

Intent

The intent of the landings pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to enable the safe movement of people using stairways.

Background

The stairway serving the storage area is not provided with a slip-resistance surface to the each landing of the stairway.

Assessment

The landings of the stairway shall be provided with a strip at the edge of the landing having a slip resistance classification P3 (dry) and P4 (wet) when tested in accordance with AS4586-2013.

Alternatively, the stairway may be demolished and decommissioned to negate the need to comply with the above.

Summary

The assessment undertaken above demonstrates that the proposed measures to the stairway is adequate to protect persons using the building and to facilitate their egress from the building.

5.3.6 Thresholds (D2.15)

Problem

The threshold at doorways contain a step at a point closer to the doorway than the width of the door leaf.

Intent

The intent of thresholds pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to reduce the risk of a person tripping on an unseen step in a doorway.

Background

The doors within the external wall of the building are provided with a step ($\leq 190\text{mm}$) or ramp at the doorway threshold, at a distance less than width of the door leaf.

Assessment

Table 3 of The Guidelines permits that generally, existing thresholds may remain.

Since the entry doorway serves as the principal entrance to the building required to be accessible, the threshold at the main entrance doorway shall be modified so that a threshold ramp complying with Clause 10.5 of AS1428.1-2009 is provided – refer Figure 21 below for design detail.

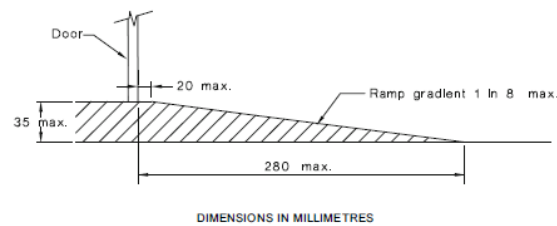


FIGURE 21 THRESHOLD RAMP

Summary

The assessment undertaken above demonstrates that the existing thresholds and the proposed measures are adequate to protect persons using the building and to facilitate their egress from the building.

5.3.7 Handrails (D2.17)

Problem

Non provision of handrail to at least one side of the stairway flight.

Intent

The intent of handrails pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to assist people using the stairway.

Background

The stairway serving the storage area is not provided with at least one handrail to the stairway flight in accordance with Clause D2.17 of the BCA.



Figure 5.3.7 – Stairway serving the storage area

Assessment

The stairway shall be provided with handrails to at least one side of the stairway flight at a height not less than 865mm above the stair treads and floor surface of the landings in accordance with Clause D2.17 of the BCA.

Alternatively, the stairway may be demolished and decommissioned to negate the need to comply with the above.

Summary

The assessment undertaken above demonstrates that the proposed measures are adequate to protect persons using the building, and to facilitate their existing egress from the building, in the event of fire.

5.3.8 Swinging Doors (D2.20)

Problem

The swinging doors serving as required exits, swing against the direction of egress and impede in the path of travel to the road.

Intent

The intent of swinging doors pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to minimise the risk that a door may obstruct a person evacuating.

Background

The main entrance door serving as a required exit door swings against the direction of egress.

The door located adjacent to the reception area, serving as a required exit impedes in the path of egress to the road along the northern boundary.



Figure 5.3.8a – Main entrance door



Figure 5.3.8b – Door impeding path of egress

Assessment

Table 3 of The Guidelines permits that the existing doors which lead to a road or open space to remain provided they are fitted with a device that ensures the door remains in the locked open position whilst the building is in use.

The hold open device shall be released with a key or similar to release the door.

For the door impeding in the path of egress along the northern boundary, the door shall be modified so that the door is able to swing fully open and be locked open against the external wall of the building so as to not impede the path of egress.

Summary

The assessment undertaken above demonstrates that the proposed measures are adequate to protect persons using the building, and to facilitate their egress from the building, in the event of fire.

5.3.9 Operation of latch (D2.21)

Problem

The operative latch of the door serving as a required exit is located at height above 1,100mm from the floor level.

Intent

The intent of the operation of latch pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to minimise the risk that evacuation will be delayed by the operation of a door latch.

Background

The operative latch of the door serving as the main entrance is provided at height above 1,100mm from the floor (being ~1,270mm).



Figure 5.3.9 – Height of operative latch

Assessment

The operative latch of the subject door is to be relocated to height between 900mm and 1,100mm above the floor and required to comply with D2.21 of the BCA.

This minimises the risk that the door may obstruct a person evacuating.

Summary

The assessment undertaken above demonstrates that the proposed measures are adequate to protect persons using the building, and to facilitate their egress from the building, in the event of fire.

5.4 SERVICES AND EQUIPMENT

5.4.1 Fire hydrant (E1.3)

Problem

No fire hydrant system is provided to serve the building.

Intent

The intent of fire hydrants pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to facilitate the needs of the fire brigade.

Background

The building part is determined as being associated with the space / tenancy above and hence calculated as exceeding 500m².

With the above, no fire hydrant system is provided to serve the building.

Assessment

The existing building shall be protected with a fire hydrant system complying with Clause E1.3 and AS2419.1-2005.

As an alternative to providing onsite hydrants, it is understood a street hydrant is located directly in front of the building on Harbord Road and hence an assessment may be undertaken by a suitably qualified engineer to demonstrate that hydrant coverage may be provided to all parts of the building and meeting required discharge pressures and flows pursuant to AS2419.1-2005.

Summary

The assessment undertaken above demonstrates that the proposed measures are adequate to facilitate the needs of the fire brigade.

5.4.2 Fire hose reels (E1.4)

Problem

No fire hose reels have been provided to serve the building.

Intent

The intent of fire hose reels pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to enable, where appropriate, a buildings occupants to undertake initial attack on a fire.

Background

The building part is determined as being associated with the space / tenancy above and hence calculated as exceeding 500m².

With the above, no fire hose reel system is provided to serve the building.

Assessment

The existing building shall be protected with a fire hydrant system complying with Clause E1.4 and AS2441-2005.

Summary

The assessment undertaken above demonstrates that the proposed measures are adequate to enable, a buildings occupants to undertake initial attack on a fire

5.4.3 Portable fire extinguishers (E1.6)

Problem

The signage for the portable fire extinguishers installed throughout the building is inadequate and incorrectly installed.

Intent

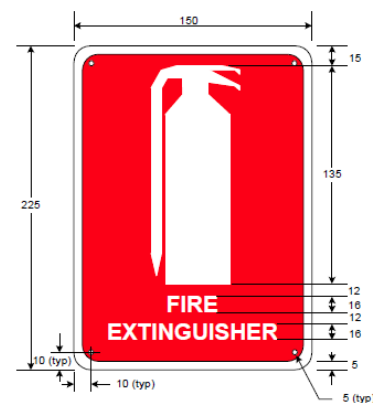
The intent of portable fire extinguishers pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to require the installation of suitable portable fire extinguishers to address specific hazards.

Background

The signage of the portable fire extinguishers installed are not in accordance with AS2444-2001 and not installed at height not less than 2.0m above the floor level.



Figure 5.4.3 – Portable fire extinguisher installed



DIMENSIONS IN MILLIMETRES

NOTE: All dimensions shown are minimum. Any enlargement of the sign should have all dimensions in proportion to those shown above.

FIGURE 3.1 TYPICAL EXTINGUISHER LOCATION SIGN

Assessment

Portable fire extinguishers shall be provided in accordance with Table E1.6 of the BCA, with location signage provided in accordance with AS2444-2001 in a position that is clearly visible and at a height not less than 2m.

The above arrangement is consistent with a DTS compliant building.

Summary

The assessment undertaken above demonstrates that the proposed measures are adequate to protect persons using the building and to facilitate their egress from the building, in the event of a fire.

5.4.4 Emergency lighting (E4.2)

Problem

Inadequate supply of emergency lighting to the building.

Intent

The intent of emergency lighting pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to minimise the risk of death or injury to occupants during an emergency because of an inability to see their way along an exit path of travel.

Background

Emergency lighting is not provided to all parts of the building forming a path of travel to an exit, specifically within the Yoga/Pilates room.

Assessment

Emergency shall be provided in accordance with E4.2 & E4.4 of the BCA to all parts of the building.

The above arrangement is consistent with a DTS compliant building.

Summary

The assessment undertaken above demonstrates that the proposed measures are adequate to protect persons using the building and to facilitate their egress from the building, in the event of a fire.

5.4.5 Exit signs (E4.5)

Problem

Inadequate supply and operation of exit signage to the building.

Intent

The intent of exit signs pursuant to Clause 94 of the Environmental Planning and Assessment Regulation 2000, which differs from the intent of the BCA is to assist occupants in finding their way along an exit path of travel and exits in an emergency.

Background

An exit sign is not provided above or adjacent to each door forming part of a required exit, and directional exit signage has not provided at appropriate positions to indicate the direction to a required exit.

The photoluminescent exit signage was inoperative at the time of the inspection.

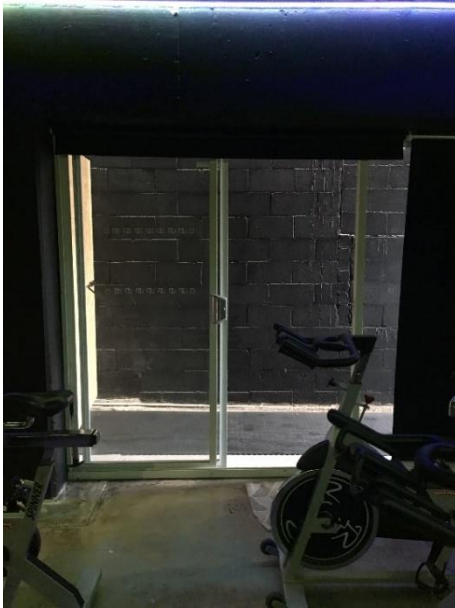


Figure 5.4.5a – No exit signage above exit in spin room

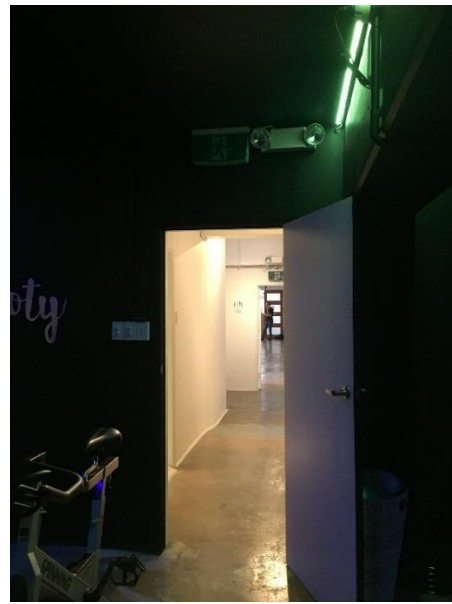


Figure 5.4.5b – non-operational photoluminescent exit signage



Figure 5.4.5c – No directional exit signage



5.4.5d – No directional exit signage above doorway

Assessment

Operational photoluminescent exit signs shall be provided in accordance with E4.5, E4.6 & E4.8 of the BCA.

Where exits are not readily apparent, exit signage shall be provided in corridors and above doorway indicating the direction to a required exit.

The above arrangement is consistent with a DTS compliant building.

Summary

The assessment undertaken above demonstrates that the proposed measures are adequate to protect persons using the building and to facilitate their egress from the building, in the event of a fire.

6. SUMMARY OF FIRE AND LIFE SAFETY UPGRADE STRATEGY

6.1 SUMMARY OF MEASURES

Section 6 serves as a summary of work required for the fire and life safety upgrade strategy which is related to the existing condition and the BCA 2016 compliance departures which currently exist within the building.

6.1.1 Fire resistance

Table 6.1 summarises the measures that are to be implemented as part of the development.

ITEM	MEASURE	DESCRIPTION OF MEASURES
1.	FRL of external wall	Upgrade the lightweight construction so as to achieve FRL --/90/90.

Table 6.1 – Measures

6.1.2 Access and egress

Table 6.2 summarises the measures that are to be implemented as part of the development.

ITEM	MEASURE	DESCRIPTION OF MEASURES
1.	Service in path of travel.	The electrical meters, distribution board and central telecommunications board are to be enclosed by non-combustible construction or fire protective covering and suitably sealed against smoke spread in accordance with D2.7 of the BCA.
2.	Goings and risers	(i) Install slip resistant surface or slip resistant nosing strip to stair treads complying with Table D2.14 of the BCA; and The opening at each riser shall be modified to ensure a 125mm sphere does not pass through; or (ii) Demolish and decommission the subject stairway.
3.	Landings	(i) Install slip resistant surface or slip resistant nosing strip to stair treads complying with Table D2.14 of the BCA; or (ii) Demolish and decommission the subject stairway.
4.	Thresholds	The threshold at the main entrance doorway shall be modified so that a threshold ramp complying with Clause 10.5 of AS1428.1-2009 is provided.
5.	Handrails	(i) Install handrails to at least one side of the flight at a height not less than 865mm above the nosing of treads and floor surface of landings in accordance with Clause D2.17 of the BCA; or (ii) Demolish and decommission the subject stairway.
6.	Doorways and doors	The sliding door within the spin room shall be able to be opened manually under a force of not more than 110N.
7.	Swinging doors	The main entrance doorway shall be fitted with a hold open device so as to remain open whilst the building is in use; and The swing door discharging to the open space at the northern boundary shall be fitted with a hold open device so as to remain locked open when occupants discharge via the doorway.
8.	Operation of latch	The operational latch of the main entry door shall be relocated to a height 900mm-1,100mm above the floor level and openable without a key from the side that faces a person seeking egress in accordance with D2.21 of the BCA.

Table 6.2 – Measures

6.1.3 Services and equipment

Table 6.1 summarises the measures that are to be implemented as part of the development.

ITEM	MEASURE	DESCRIPTION OF MEASURES
1.	Fire hydrant system	Install a fire hydrant system in accordance with E1.3 of the BCA & AS2419.1-2005.
2.	Fire hose reels	Install fire hose reels in accordance with E1.4 of the BCA & AS2441-2005.
3.	Emergency lighting	Install exit signage in accordance with E4.2 of the BCA & AS2293.1-2005.
4.	Exit signs	Install exit signage in accordance with E4.5, E4.6 & E4.8 of the BCA & AS2293.1-2005.
5.	Portable Fire Extinguishers	Install portable fire extinguishers in accordance with E1.6 of the BCA & AS2444-2001.

Table 6.3 – Measures

6.2 MAINTENANCE OF FIRE & OTHER SAFETY MEASURES

It should be noted that the maintenance of fire and other safety systems is a mandatory requirement for building owners under the provisions of the Environmental Planning and Assessment Act 1979 and the Environmental Planning and Assessment Regulation 2000.

Where damage has been caused to a fire safety system so that it no longer functions as designed, a reactive maintenance regime shall be introduced to start to fix the system within two hours following the system being damaged and qualified installers being called, as per industry standard.

7. CONCLUSION

This Fire and Life Safety Upgrade Strategy highlights issues for consideration under Clause 94 of the EP&A Regulation 2000, as requires consent authorities to consider whether the measures contained in the building are adequate to:

- (i) Protect persons using the building and to facilitate their egress from the building, in the event of a fire; or
- (ii) To restrict the spread of fire from the building to other buildings nearby.

The consent authority is requested to review and offer concurrence (or otherwise) with this fire and life safety upgrade strategy.

Report By



Nicolas Hurtado
Associate
For Design Confidence

Verified By



Luke Sheehy
Principal
For Design Confidence

APPENDIX A1

A1 ASSUMPTIONS AND LIMITATIONS

The general assumptions underlying the assessment are identified below. In addition, any detailed assumptions used as inputs to the analysis, are listed below. Assumptions may include simplifications of building performance or human behaviour based on engineering judgement or accepted approaches, which are necessary to enable the issues in question to be rationally addressed. The assumptions are reported so that users of the report are made aware of them and their applicability can be reviewed.

Limitations are defined as boundaries to the applicability of the results or the assessment. Given the unique and variable nature of deliberate fire scenarios (i.e. arson), the assumptions and limitations related specifically to arson events have been not been considered as part of this report.

The conclusions of this report may not be valid if any of the assumptions are incorrect. Similarly, any limitations which are not complied with may invalidate the conclusions of this report.

A1.1 GENERAL ASSUMPTIONS

Any change to the building design or use may mean that the assumptions are not valid, in which case the report is to be reviewed by a suitably qualified Building Surveyor. The conclusions of this report may not be valid if the assumptions are incorrect.

The following assumptions have been made in this report:

- (i) All fire safety aspects of the development which are not addressed within this report comply with the DTS provisions of the BCA, unless otherwise noted;
- (ii) The assessment and analysis are based on the assumption that the development is complete and operational;
- (iii) All fire safety systems and management strategies will be maintained in accordance with relevant Building Regulations and Australian Standards, and any particular requirements of this report;
- (iv) Any significant changes to the design drawings and/or specifications will be referred to the relevant Building Surveyor for review prior to acceptance; and
- (v) It is assumed that the design drawings and specifications supplied and upon which this assessment is based, as detailed within this report, are accurate with respect to the final as-built condition of the facility. No liability is taken for the accuracy of the supplied documentation, which forms the basis of this assessment.

A1.2 LIMITATIONS

Any limitations which are not complied with may invalidate the conclusions of this report, and hence are to be referred to a suitably qualified Building Surveyor for review -

- (i) Any change in the building, occupant characteristics or fuel conditions outside the parameters of this report may invalidate the conclusions of this report; and
- (ii) The conclusions of this report may not apply if all requirements are not fully implemented as described in this report.

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