BCA Report

28 ADDISON STREET GOULBURN

Regulatory Compliance Report

BCA Assessment

Prepared for: The Trustee for 28 Addison Property Trust

Date: 20 September 2024

Revision: 2

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Date	Rev No	No. of Pages	Issue or Description of Amendment	Assessed By	Approved By	Date Approved
23/05/24	1	28	Draft - Stakeholder Review	Kurtis Lamaro	Aaron Celarc	31/05/24
19/09/24	2	28	Final Report	Kurtis Lamaro	Aaron Celarc	20/09/24

1. EXECUTIVE SUMMARY

The proposed development is 3 residences at 28 Addison St, Goulburn, NSW, 2580 for The Trustee for 28 Addison Property Trust.

Summary of Compliance

As Registered Certifiers or relevant building surveyor we have reviewed the architectural design documents prepared by Paul Meyer Design Pty Ltd (refer appendix A) for compliance with the building assessment provisions currently outlined in BCA 2022.

This report has been prepared to assess the project against the Building Code of Australia to enable the issuance of construction approvals. Further assessment of the design will be undertaken as the design develops to ensure compliance is achieved prior to approval being issued.

Deviations from the Deemed-to-Satisfy Provisions

The assessment of the design documentation has revealed that the following areas deviate from the deemed-to-satisfy provisions of the BCA. These items are to be addressed to ensure compliance is achieved, either through design amendment to achieve compliance with the deemed-to-satisfy provisions, or through a performance solution demonstrating compliance with the Performance Requirements of the BCA:

No.	Description	Relevant DTS Clauses	Performance Requirements
Fire Safety Items			
1	**Rationalisation of fire-resistant level's (FRL)** As the building is considered to be 'Type C' Construction on a performance basis, all building elements are required to be constructed in accordance with Spec 5 of the BCA. Rationalisation to required FRL's (as specified within appendix C) are to be addressed as part of a fire engineered solution. The following information is to be provided which will be assumed to be captured in the Fire Engineering Report: ▪ Survey all of existing loadbearing walls, floor and columns forming part of new works to be provided, confirming respective fire resistance levels (FRL's) of each required element. This is to be provided from the Structural Engineer. Any FRL's that are not upgraded to comply with today's code are to be addressed through a fire engineered solution (upon stakeholder review and acceptance). It is noted that the walls between / bounding SOU's will require a fire rating of 60/60/60. **Once determined, Fire Compartment Drawings are to be provided for review, to determine the full extent of non-conformances.**	Spec 5	C1P1, C1P2
2	**Type of Construction** It is proposed to reduce the type of construction from type B to type C in accordance with clause C2D6. Concession C2D6 cannot	C2D6	C1P1, C1P2

No.	Description	Relevant DTS Clauses	Performance Requirements
	be applied because each SOU is not provided with access to at least 2 exits or its own direct access to a road or open space. The reduction to type C construction will need to be addressed through a performance solution, or the building will need to be constructed to type B construction requirements.		
3	**Non-combustible Building Elements** As per Clause 2.2 of Spec 5 of the BCA, where a part of a building required to have an FRL depends upon direct vertical or lateral support from another part to maintain its FRL, that supporting part, must— i. have an FRL not less than that required by other provisions of this Specification; and ii. if located within the same fire compartment as the part it supports have an FRL in respect of structural adequacy the greater of that required a. for the supporting part itself; and b. for the part it supports; and iii. be non-combustible It has been assumed that the existing building will have timber floor framing, columns and beams throughout the building, this would not comply with the above provisions of the BCA and will need to be justified through fire engineering where design amendments are not afforded.	C2D10, C2D14	C1P2, C1P3
4	**Spandrel Separation** Where the building has not been sprinkler protected with an AS 2118 Part 1 or Part 4 system, Spandrel separation is required to be provided in accordance with this Clause. For the purposes of C3D7, window or other opening means that part of the external wall of a building that does not have an FRL of 60/60/60 or greater (two-way fire rating). Spandrels are required in accordance with BCA Clause C3D7, which stipulates a 900mm high spandrel; with 600mm of this spandrel being above the finished floor level. Alternatively, an 1100mm horizontal slab may be utilized. The spandrel material is required to be non-combustible and to achieve an FRL of 60/60/60. Compliant spandrel protection will likely not be achieved and where design amendments are not afforded, this will need to be captured as a Fire Engineered Solution	C3D7	C1P1, C1P2, C1P8
Miscellaneous Items			
5	**Balustrades**	D3D17, D3D18, D3D19	D1P3

No.	Description	Relevant DTS Clauses	Performance Requirements
	The existing balustrades will likely not comply with the requirements of the current code. The strategy of compliance to the existing balustrades are to be confirmed. **Compliance pathway TBC**		
6	**Handrails** Two handrails are required in all non-fire isolated and circulation stairways. The following departures are noted: *Ground Floor* ▪ The stairway provided egress from the first floor is currently only provided with one handrail. **The above departures are rectified through design development to achieve DTS compliance**	D3D22	D1P2
7	**Weatherproofing of External Walls** As the external walls are proposed to be constructed of a material not nominated in F3D5, a performance solution is to be provided by the façade engineer/registered architect demonstrating that the external walls comply with the requirements of Performance Requirement F3P1 (previously FP1.4).	F3D5	F3P1 (previously FP1.4).

The feasibility and any additional requirements that will apply as a result of performance solution/s will need to be confirmed by the professional preparing the performance solution/s. Any performance solution/s will need to be prepared by a suitably qualified/accredited professional.

Refer to parts 10 of this report for further details regarding the required services.

Any fire engineered solutions will need to be approved after consultation with the NSW Fire Brigade as part of the Construction Certificate process via a Section 26 and 27 submission

Further Assessment

The assessment of the design documentation has also revealed that the following additional information is required in order to complete the assessment, and/or the following areas need to be further reviewed.

No.	Further Information / Review Required
1.	Provide compartment plans
2.	Clear site plan to be provided which outlines the location of all site boundaries
3.	Provide stair, balustrades, and handrail drawings
4.	Provide hydrant coverage plans / confirm whether a hydrant system is required
5.	Details to be provided for balconies for assessment of climbability

Documentation to enable assessment and demonstrate compliance will be required to address the above items prior to approval.

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 (Development Certification and Fire Safety) Regulation 2021.

2. INTRODUCTION

The proposed development comprises of 3 residences at 28 Addison St, Goulburn, NSW, 2580

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.

The applicable legislation governing the design of buildings is the Environmental Planning and Assessment Act 1979. Section 19 of the of the Environmental Planning and Assessment (Development Certification and Fire Safety) Regulations 2021 requires all new building works to comply with the current BCA.

The BCA applicable to the development is the version that is in force at the time of a valid Construction Certificate application which includes the entrance floor. For the purposes of this Report, BCA 2022 has been utilised.

3. COMPLIANCE WITH THE BCA

The Building Code of Australia is a performance based document, whereby compliance is achieved by complying with the Governing Requirements and the Performance Requirements.

Performance Requirements are satisfied by one of the following:

1) A Performance Solution
2) A Deemed-to-Satisfy Solution
3) A combination of (1) and (2)

4. DOCUMENTATION OF PERFORMANCE SOLUTIONS

A Performance Solution must demonstrate compliance with all relevant Performance Requirements, or the solution must be at least equivalent to the Deemed-to-Satisfy provisions.

Compliance with the Performance Requirements is to be demonstrated through one or a combination of the following:

a) Evidence of suitability in accordance with Part A5 of the BCA that shows the use of a material, product, plumbing and drainage product, form of construction or design meets the relevant Performance Requirements.
b) A Verification Method including the following:
    i. The Verification Methods provided in the NCC.
    ii. Other Verification Methods, accepted by the appropriate authority that show compliance with the relevant Performance Requirements
c) Expert Judgement
d) Comparison with the Deemed-to-Satisfy Provisions

Where a Performance Solution is proposed as the method to achieve compliance, the following steps must be undertaken:

a) Prepare a performance-based design brief in consultation with relevant stakeholders,
b) Carry out analysis, using one or more of the assessment methods nominated above, as proposed by the performance-based design brief,
c) Evaluate results from (b) against the acceptance criteria in the performance-based design brief,
d) Prepare a final report that includes:
    i. All Performance Requirements and/or Deemed-to-Satisfy Provisions identified as applicable,
    ii. Identification of all assessment methods used,
    iii. Details of required steps above,
    iv. Confirmation that the Performance Requirement has been met; and
    v. Details of conditions or limitations, if an exist, regarding the Performance Solution.

In some instances a building or part of a building may be required to be brought into total or partial conformity with the BCA. Below is a summary of the key triggers where this may occur:

- Section 19 of the Environmental Planning and Assessment (Development Certification & Fire Safety) Regulations 2021
- Section 64 of the Environmental Planning and Assessment Regulations 2021

Compliance with Development Consent and Building Code of Australia – Section 19

- The new works must comply with the current provisions of the BCA and this can be achieved by DTS or performance means,
- Where works can be completed in isolation to the current code the remainder of the building would not need to be upgraded,
- In cases where a system cannot be upgraded in isolation or be addressed via a performance solution, the element would need to be upgraded. The extent of the upgrade would be dependent on the specific measure,

Consent Authority may Require Upgrade of Buildings – Section 64

- As part of the Development Application process the Consent Authority may choose to impose an upgrade Condition of Consent which requires the building or part to be brought into total or partial conformity with the BCA,
- This may apply to existing buildings which:

A. involves an application for rebuilding or alterations,
B. the measures contained in the building are inadequate to (protect persons using the building, facilities safe egress, restrict the spread of fire).

5. PRELIMINARIES

5.1. BUILDING ASSESSMENT DATA

Summary of Construction Determination:

Part of Project	Building 1
Classification	Class 2
Number of Storeys	2
Rise In Storeys	2
Type of Construction	B
Effective Height (m)	3.86m

Note:

- *The effective height of the project includes all stories included in the rise in stories of the project,*
- *The effective height of the building has been determined based on RL 651.38 – RL 647.52. Where these RL's change the effective height of the building will need to be reassessed.*

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

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Approximate Volume (m^3)	Assumed Population
Ground Floor	2	131.96	509.37	8
First Floor	2	129.52	492.176	8
Total		261.48	1,001.546	16

- Notes: *The above populations have been based on floor areas and calculations in accordance with Table D2D18 (prev. Table D1.13) of the BCA.*

6. STRUCTURE

6.1. STRUCTURAL PROVISIONS (BCA B1)

New structural works are to comply with the applicable requirements of BCA Part B1, including AS/NZS 1170.0-2002, AS/NZS 1170-1-2002, AS/NZS 1170.2-2021 and AS 1170.4-2007.

Depending on the importance level of the building as determined by AS/NZS 1170.0-2002, the non structural elements of the building, including partitions (and non-structural fire walls), ceilings, services and racking/shelving may be required to comply with the seismic restraint requirements of AS 1170.4-2007. Where this is required, certification will be required confirming that the design of the seismic restraints comply with AS 1170.4-2007. This may be provided by a specialist seismic consultant or by the architect and services design engineers.

It is noted that Verification Method, B1V2 (previously BV2)is a pathway available to verify compliance with BCA Performance Requirement B1P1 (1)(c) (previously BP1.1(a)(iii)).

Glazing is to comply with AS1288-2021, and AS2047-2014.

7. FIRE PROTECTION

7.1. FIRE COMPARTMENTATION (BCA C2D2 (PREVIOUSLY 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 C3D3 (previously C2.2).

Based upon the rise in storeys and use of the building, it is required to be constructed in accordance with the requirements of Type B Construction, in accordance with Tables S5C21a-g of Specification 5 (previously Table 4 & 4.9 of Specification C1.1) of the Building Code of Australia 2022.

Type of Construction

It is proposed to reduce the type of construction from type B to type C in accordance with clause C2D6. Concession C2D6 cannot be applied because each SOU is not provided with access to at least 2 exits or its own direct access to a road or open space.

The reduction to type C construction will need to be addressed through a performance solution, or the building will

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

Classification		Type of Construction		
		A	B	C
5, 9b or 9c aged care building	max floor area—	8 000 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, 7, 8 or 9a (except for patient care areas)	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

7.2. FIRE HAZARD PROPERTIES (BCA C2D10 AND C2D11 (PREVIOUSLY C1.10 AND BCA C1.9))

Combustible Materials

The following materials, though combustible or containing combustible fibres, may be used wherever a non-combustible material is required:

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

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

BCA 2022 introduced a number of additional clarifications and considers the following materials, when entirely composed of itself, are non-combustible and may be used wherever a non-combustible material is required:

a) Concrete.
b) Steel, including metallic coated steel,
c) Masonry, including mortar,
d) Aluminium, including aluminium alloy,
e) Autoclaved aerated concrete, including mortar,

f) Iron,
g) Terracotta,
h) Porcelain,
i) Ceramic,
j) Natural stone,
k) Copper,
l) Zinc,
m) Lead,
n) Bronze,
o) Brass.

Any Aluminium Composite Panels must be labelled in accordance with SA TS 5344.

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

a) An ancillary element that is non-combustible.
b) A gutter, downpipe or other plumbing fixture or fitting.
c) A flashing.
d) A grate or grille not more than 2 m² in area associated with a building service.
e) An electrical switch, socket-outlet, cover plate or the like.
f) A light fitting.
g) A required sign.
h) A sign other than one provided under (a) or (g) that—
    i) achieves a group number of 1 or 2; and
    ii) does not extend beyond one storey; and
    iii) does not extend beyond one fire compartment; and
    iv) is separated vertically from other signs permitted under (h) by at least 2 storeys.
i) An awning, sunshade, canopy, blind or shading hood other than one provided under (a) that—
    i) meets the relevant requirements of Table S7C7 as for an internal element; and
    ii) serves a storey—
        A. at ground level; or
        B. immediately above a storey at ground level; and
    iii) does not serve an exit, where it would render the exit unusable in a fire.
j) A part of a security, intercom or announcement system.
k) Wiring.
l) Waterproofing material installed in accordance with AS 4654.2 and applied to an adjacent floor surface, including vertical upturn, or a roof surface.
m) Collars, sleeves and insulation associated with service installations.
n) Screens applied to vents, weepholes and gaps complying with AS 3959.
o) Wiper and brush seals associated with doors, windows or other openings.
p) A gasket, caulking, sealant or adhesive directly associated with (a) to (o)

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

Interior Linings

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 7 (previously Specification C1.10) of the Building Code of Australia. The following requirements apply:

Non-Sprinkler Protected Areas

a) Floor Coverings – Critical radiant Flux not less than 2.2 kW/m^2 a maximum smoke development rate of 750 percent-minutes
b) Wall and Ceiling Linings – Material Group No. 1, 2, 3 and with a smoke growth rate index not more than 100, or an average specific extinction area less than 250m^2/kg
c) Other Materials – Spread of Flame Index not exceeding 9 and Smoke Developed Index not exceeding 8 (if Spread of Flame if >5)

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.

7.3. VERTICAL SEPARATION OF OPENINGS IN EXTERNAL WALLS (BCA C3D7 (PREVIOUSLY C2.6))

A building of Type A construction must be provided with spandrel separation between openings on different storeys unless the building is protected with a sprinkler system (other than a FPAA101D or FPAA101H system) throughout in accordance with Specification 17 (previously Specification E1.5). It is noted where the building sprinkler system is subject to performance solution, the concession noted above would need to be addressed on a performance basis.

For the purposes of C3D7 (previously C2.6), window or other opening means that part of the external wall of a building that does not have an FRL of 60/60/60 or greater.

Spandrels are required in accordance with BCA Clause C3D7 (previously C2.6), which stipulates a 900mm high spandrel; with 600mm of this spandrel being above the finished floor level. Alternatively, an 1100mm horizontal slab may be utilized. The spandrel material is required to be non-combustible and to achieve an FRL of 60/60/60.

It is noted that any penetrations in the spandrel construction e.g. for drainage, overflow etc. are to be protected.

Detailed elevations will be required to enable a full check and assessment to be undertaken of the spandrels proposed.

7.4. PROTECTION OF OPENINGS IN EXTERNAL WALLS (BCA C4D3, C4D4, C4D5 (PREVIOUSLY C3.2 / C3.3 / C3.4))

The prescriptive provisions of the BCA stipulate that any external opening within 3m of the boundary, within 6m of the far boundary of a road, river, lake or the like that adjoins the allotment, or within 6m of another building on the allotment 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

Angle Between Walls	Minimum Distance
More than 0° to 45°	5m
More than 45° to 90°	4m
More than 90° to 135°	3m
More than 135° to 180°	2m
More than 180°	Nil

Site plans currently indicate that there are no openings located within proximity to a fire source feature.

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.

7.5. Protection of Openings fire rated building elements (BCA C4D6, C4D11 (previously 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 the same as the FRL of the floor it is passing through;
b) Any penetration through a wall or room required to have an FRL (e.g. substation, boiler room, apartment separating wall etc) is to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a shaft achieving an FRL the same as the FRL of the floor it is passing through;;
c) Self-closing -/60/30 fire doors to the doors opening to the fire isolated stairs (note that this also includes the access doors to the condenser units on the plant platforms).

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

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

8. Access and Egress

8.1. Provision for Escape (BCA D2 (previously D1))

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

- Required non-fire isolated stairways,
- External doors,

The egress provisions that apply to the building also apply to any occupiable outdoor areas.

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

- Door hardware,
- Exit door operation,
- Stair construction,
- Handrail and balustrade construction,
- Door swings

8.2. EXIT TRAVEL DISTANCES (BCA D2D5, D2D6 (PREVIOUSLY D1.4, D1.5))

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 from the DTS provisions as outlined below

The travel distances to exits should not exceed:

Class 2 & 3

- 6m from an exit or from a point of choice from the entrance doorway of a sole occupancy unit
- 20m from a single exit at the level of egress to a road or open space
- Alternate exits not more than 45m apart

There are currently no travel distances exceeding the above limitations.

8.3. DIMENSIONS OF EXITS (BCA D2D7, D2D8, D2D9, D2D10, D2D11 (PREVIOUSLY D1.6))

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

The following table summarises the exit widths required by BCA Clause D2D7, D2D8, D2D9, D2D10, D2D11 (previously D1.6):

Storey	Number of people	Exit Width Required	Exit Width Provided
Ground Floor	8	1m	1m
First Floor	8	1m	1m

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).

Current drawings indicate compliance with the above.

8.4. TRAVEL VIA REQUIRED NON-FIRE ISOLATED STAIRS (BCA D2D14 (PREVIOUSLY D1.9)

A required non-fire isolated stair must provide direct egress, via its own flights from every storey served to the level of road or open space.

The following additional travel distance parameters apply where a required non-fire isolated stair is utilised for egress:

- In a Class 2, 3 or 4 building, the distance between a doorway of a room or a sole occupancy unit to road or open space must not exceed 30m in a building of Type C Construction, or 60m in all other cases,
- In a Class 2, 3 or 9a building, the required non-fire isolated stair must discharge at a point not more than:
  - 15m from a doorway providing egress to a road or open space or from a fire-isolated passageway leading to road or open space; or
  - 30m from one of 2 such doorways or passageways if travel to each of them from the non-fire-isolated stairway or non-fire-isolated ramp is in opposite or approximately opposite directions.

Design currently indicates compliance with the above.

8.5. BALUSTRADES AND HANDRAILS (BCA D3D17, D3D18, D3D19, D3D20, D3D22, D3D29 (PREVIOUSLY D2.16 / BCA D2.17 / D2.24))

Generally

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

Where it is possible to fall more than 4m to the surface below, the balustrade shall not contain any horizontal or near horizontal members that facilitate climbing between 150 – 760mm above the floor. It is noted that these provisions also apply to any building elements, including AC covers and the like, that are within 1m of the required balustrade.

Where a required barrier is fixed to the vertical face forming an edge of a landing, balcony, deck, stairway or the like, the opening formed between the barrier and the face must not exceed 40 mm.

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.

In addition to the above, handrails are required to both sides of all stairs with a width of 2m or more.

Openable Windows in Bedrooms & Early Childhood Centres

In bedrooms of Class 2 buildings where the distance from the floor level to the level below exceeds 2m, window openings shall be provided with protection in accordance with BCA Clause D3D29.

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

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

The device or screen required must –

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

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

8.6. SLIP RESISTANCE (BCA D3D15 (PREVIOUSLY D2.14))

The slip resistance requirements for ramps and stairs are outlined below:

Table D3D15 (prev. Table D2.14) SLIP-RESISTANCE CLASSIFICATION

Application	Surface conditions	
	Dry	Wet
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp steeper than 1:20 but 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

9. 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.

It is noted that the provisions below also apply to occupiable outdoor areas.

9.1. FIRE HYDRANTS (BCA E1D2 (PREVIOUSLY E1.3))

A Fire Hydrant system is required to be provided in accordance with BCA Clause E1D2 (prev. E1.3) and AS2419.1-2021.

Confirmation is to be provided by a fire services consultant to confirm whether a fire hydrant system is required and/or if an existing hydrant system present.

9.2. FIRE HOSE REELS (BCA E1D3 (PREVIOUSLY E1.4))

A Fire Hose Reel System is not required to BCA Clause E1D3 (previously E1.4) and AS2441-2005.

9.3. FIRE EXTINGUISHERS (BCA E1D14 (PREVIOUSLY E1.6))

The provision of portable fire extinguishers is required to BCA Clause E1D14 (previously E1.6) and AS2444 - 2001 to provide coverage to the following zones.

Portable fire extinguishers must be located not more than 1200mm from the finished floor and not less than 100mm as outlined in AS2444-2001.

E1D14 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.

Occupancy Class	Risk Class (as defined in AS 2444)
	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.

In addition, extinguishers are to be provided to the class 2 portions of the building in accordance with the below:

- an ABE type fire extinguisher is to be installed with a minimum size of 2.5 kg; and
- extinguishers are to be distributed outside a sole-occupancy unit:
  a) to serve only the storey at which they are located; and
  b) so that the travel distance from the entrance doorway of any sole-occupancy unit to the nearest fire extinguisher is not more than 10 m.

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

The fire extinguisher locations are to be confirmed to determine compliance.

9.4. AUTOMATIC SPRINKLER PROTECTION (BCA E1D4 – E1D13 (PREVIOUSLY E1.5))

Automatic sprinkler protection is not required to Specification 17 (previously Spec. E1.5) and AS2118.1-2017.

9.5. SPECIAL HAZARDS (BCA E1D17 (PREVIOUSLY E1.10)

Any special hazard is to be included in the project FEBQ for comment by FRNSW. A list of some special hazards that may require FRNSW and fire engineering involvement are as following:

i. EV charging stations,
ii. Alternative electrical generation (solar, tri-gen),
iii. Car lifts/stackers,
iv. Podium type buildings,
v. Combustible external cladding,
vi. Green walls,
vii. An atrium,
viii. Insulated sandwich panels,
ix. Automatic storage and retrieval systems

Where any of the above is proposed, this will need to be addressed through a performance solution.

9.6. SMOKE HAZARD MANAGEMENT (BCA E2D3 – E2D20 (PREVIOUSLY E2.2)

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

- Automatic Smoke Detection/Alarm System in accordance with the requirements of BCA Spec 20 and AS 3786-2014 and/or AS 1670.1-2018;

Details of compliance with the above requirements are to be provided for review.

9.7. EXIT SIGNS AND EMERGENCY LIGHTING (BCA E4D2, E4D4, E4D5, E4D6 AND E4D8 (PREVIOUSLY E4.2 E4.5, E4.6, E4.8))

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

Where exit signs are proposed to be above 2.7m to avoid potential damage by forklifts in the warehousing areas, this will need to be documented as a performance solution by an accredited fire safety engineer. This would need to be assessed to BCA Performance Requirement E4P2 (previously EP4.2).

Details are required to be provided for review.

10. HEALTH AND AMENITY

10.1. STORMWATER DRAINAGE (BCA CLAUSE F1D3 (PREVIOUSLY CLAUSE F1.1)

Stormwater drainage systems serving the building are to comply with AS3500.3 - 2021.

The use of a syphonic stormwater drainage system is not covered by Australian Standards and any design incorporating one would need an appropriate performance solution will need to be documented by the hydraulic consultant addressing the system compliance against BCA Performance Requirements F1P2 and F1P3 (prev. FP1.2 & FP1.3).

10.2. SURFACE WATER MANAGEMENT (BCA PART F1)

Exposed Joints

Exposed joints in the drainage surface on a roof, balcony, podium or similar horizontal surface part of a building must not be located beneath or run through a planter box, water feature or similar part of the building.

Joints are to be protected in accordance with Section 2.9 of AS 4654.2.

External Waterproofing Membranes

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

10.3. FLOOR WASTES (BCA CLAUSE F2D4 (PREVIOUSLY 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.

10.4. ROOF & WALL CLADDING (BCA PART F3 (PREVIOUSLY PART F1))

BCA 2022 has introduced some deemed to satisfy provisions that relate to the waterproofing of external walls. These provisions apply as follows:

- Masonry, including masonry veneer, unreinforced and reinforced masonry is to comply with AS 3700
- Autoclaved aerated concrete is to comply with AS 5146.3
- Metal wall cladding is to comply with AS 1562.1

Where the installation is not proposed to comply with the above, or a different material is proposed to be used, a performance solution can be utilised to demonstrate compliance.

Performance Requirement F3P1 (previously FP1.4) which relates to the prevention of the penetration of water through external walls, must be complied with. Where a performance solution is proposed, it is to be prepared by a suitably qualified professional (façade engineer with NER for structural engineering) that demonstrates that the external walls of the proposed building comply with Performance Requirement F3P1 (previously 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.

10.5. WET AREAS & OVERFLOW PROTECTION (BCA PART F2 (PREVIOUSLY PART F1)

Internal wet areas throughout the development (e.g. bathrooms, laundries) shall be waterproofed in accordance with AS3740 - 2021 requirements.

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

10.6. SANITARY FACILITIES (BCA F4D2, F4D3, F4D4, F4D5, F4D6 (PREVIOUSLY F2.2 AND F2.3)

Apartments

Each apartment is required to be provided with the following:

- A kitchen sink and facilities for the preparation and cooking of food; and
- A bath or shower; and
- A closet pan and wash basin; and
- Clothes washing facilities comprising at least one wash tub and space for a washing machine; and
- Clothes line of at least 7.5m, or space for one heat operated drying device within the same space as the clothes washing.

The design submitted does not indicate that each apartment should satisfy the above requirements.

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.

10.7. LIGHT AND VENTILATION (BCA PART F6 (PREVIOUSLY PART F4)

Class 2

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

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

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

10.8. SOUND TRANSMISSION AND INSULATION (BCA PART F7 (PREVIOUSLY PART F5))

Building elements within Class 2 buildings should provide the following sound insulation levels.

Location	Notes	Sound Insulation Requirement
Walls separating habitable rooms		$R_w + C_{tr} \geq 50$
Walls separating habitable room and kitchen or bathroom	Wall must be of Discontinuous Construction	$R_w + C_{tr} \geq 50$
Floor separating habitable rooms	Impact isolation required	$R_w + C_{tr} \geq 50$ $L_{n,w} + C_I \leq 62$
Duct, soil, waste or water supply pipe, including pipes that is located in a floor or wall cavity, serves or passes through more than one room	Adjacent habitable room or Adjacent non-habitable room	$R_w + C_{tr} \geq 40$ or $R_w + C_{tr} \geq 25$
Door to habitable room		$R_w \geq 30$

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

Please provide a report from the acoustic engineer verifying design compliance with the provisions of Part F7 (previously Part F5) of the BCA.

10.9. CONDENSATION MANAGEMENT (BCA PART F8 (PREVIOUSLY PART F6)

<u>External Wall Construction</u>

Pliable building membranes installed to an external wall must:
- achieve compliance with AS 4200.1, and
- be installed in accordance with AS4200.2, and
- be located on the exterior side of the primary insulation layer or the wall assembly and except for the single skin mason and single skin concrete be separated from water sensitive materials.

Where a pliable building membrane, sarking-type material or insulation layer is installed on the exterior sode of he primary insulation layer, it must have a vapour permeance of not less than: 0.143µg/N.s in climate zones 4 and 5, and not less than 1.14µg/N.s in climate zones 6,7 and 8.

<u>Exhaust Systems</u>

Exhaust systems must achieve a minimum flow rate of 25L/s for bathrooms and sanitary compartments and 40L/s for kitchens and laundries. These exhaust systems must all discharge directly or via a shaft/duct to outdoor air.

An exhaust system that is not run continuously and is serving a bathroom or sanitary compartment that is not ventilated in accordance with F6D7 is to be:

- Interlocked with the rooms light switch; and
- Include a run on timer so that the exhaust system continues to operate for 10 minutes after the light switch is turned off.

Ventilation of Roof Spaces

A roof in climate zones 6, 7 and 8 must have a roof space that:

a) Is located
   i. Immediately above the primary insulation layer; or
   ii. Immediately above sarking with a vapour permeance of not less than 1.14µg/N.s, which is immediately above the primary insulation layer; or
   iii. Immediately above ceiling insulation which meets the requirements of J3D7 (3) and (4)
h) Has a height of not less than 20mm; and
i) Is either
   i. Ventilated to outdoor air through evenly distributed openings in accordance with Table F8D5; or
   ii. Located immediately underneath roof tiles of an unsarked tiled roof

11. Appendix A – Reference Documentation

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

Drawing No.	Title	Revision	Date	Prepared By
01	SITE PLAN	N/A	July 2022	Paul Meyer Design Pty Ltd
02	SITE ANALYSIS PLAN	N/A	July 2022	Paul Meyer Design Pty Ltd
03	EXISTING DWELLING FLOOR PLANS & ELEVATIONS	N/A	July 2022	Paul Meyer Design Pty Ltd
04	GROUND FLOOR PLAN	N/A	July 2022	Paul Meyer Design Pty Ltd
05	LOFT FLOOR PLAN	N/A	July 2022	Paul Meyer Design Pty Ltd
06	GROUND FLOOR AND LOFT FLOOR DIMENSION PLAN	N/A	July 2022	Paul Meyer Design Pty Ltd
07	ELEVATIONS	N/A	July 2022	Paul Meyer Design Pty Ltd
08	ELEVATIONS 2	N/A	July 2022	Paul Meyer Design Pty Ltd
09	SECTION 1-1	N/A	July 2022	Paul Meyer Design Pty Ltd

12. Appendix B – Draft Fire Safety Schedule

No.	Measure	Standard of Performance	Status
Statutory Fire Safety Measures			
1.	Automatic Fire Detection and Alarm System	BCA 2022 Clause E2D8, Spec 20, AS 1670.1 – 2018, AS/NZS 1668.1 – 2015, AS 3786-2014	
2.	Emergency Lighting	BCA 2022 Clause E4D2, E4D4 & AS/NZS 2293.1 – 2018	
3.	Exit Signs	BCA 2022 Clauses E4D5, E4D6 & E4D8 and AS/NZS 2293.1 – 2018	
4.	Fire Hydrant System	BCA 2022 Clause C3D13, E1D2, Spec 18, I3D9 & AS 2419.1 – 2021	
5.	Lightweight Construction	BCA 2022 Clause C2D9, Spec 6	
6.	Portable Fire Extinguishers	BCA 2022 Clause E1D14 & I3D11, AS 2444 – 2001	
Other Fire Safety Measures			
7.	Emergency Evacuation Plan	Fire Engineering Report XXXX Revision XX prepared by XXXX dated XXXX and AS 3745 – 2010	
8.	Paths of Travel	EP&A (Development Certification & Fire Safety) Reg 2021 Section 108, 109	

13. Appendix D – Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2022:

Type B fire rating levels have been included to demonstrate the requirements where the building is proposed to be type B construction.

Type B Construction

Table S5C21a: Type B Construction: FRL of loadbearing parts of external walls

Distance from a fire source feature	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Less than 1.5m	90/90/90	120/120/120	180/180/180	240/240/240
1.5 to less than 3m	90/60/30	120/90/60	180/120/90	240/180/120
3m to less than 9m	90/30/30	120/30/30	180/90/60	240/90/60
9m to less than 18m	90/30/-	120/30/-	180/60/-	240/60/-
18m or more	-/-/-	-/-/-	-/-/-	-/-/-

Table S5C21b: Type B Construction: FRL of non-loadbearing parts of external walls

Distance from a fire source feature	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Less than 1.5m	-/90/90	-/120/120	-/180/180	-/240/240
1.5 to less than 3m	-/60/30	-/90/60	-/120/90	-/180/120
3m or more	-/-/-	-/-/-	-/-/-	-/-/-

Table S5C21c: Type B Construction: FRL of external columns not incorporated in an external wall

Column tyle	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Loadbearing	90/-/-	120/-/-	180/-/-	240/-/-
Non-loadbearing	-/-/-	-/-/-	-/-/-	-/-/-

Table S5C21d: Type B Construction: FRL of common walls and fire walls

Wall type	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Loadbearing or non-loadbearing	90/90/90	120/120/120	180/180/180	240/240/240

Table S5C21e: Type B Construction: FRL of loadbearing internal walls

Location	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Fire-resisting lift and stair shafts	90/90/90	120/120/120	180/180/180	240/240/240
Bounding public corridors, public lobbies and the like	60/60/60	120/-/-	180/-/-	240/-/-
Between or bounding sole-occupancy units	60/60/60	120/-/-	180/-/-	240/-/-

Table S5C21f: Type B Construction: FRL of non-loadbearing internal walls

Location	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Fire-resisting lift and stair shafts	-/90/90	-/120/120	-/120/120	-/120/120
Bounding public corridors, public lobbies and the like	-/60/60	-/-/-	-/-/-	-/-/-
Between or bounding sole-occupancy units	-/60/60	-/-/-	-/-/-	-/-/-

Table S5C21g: Type B Construction: FRL of other building elements not covered by Tables S5C21a to S5C21e

Location	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Other loadbearing internal walls, internal beams, trusses and columns	60/-/-	120/-/-	180/-/-	240/-/-
Roofs	-/-/-	-/-/-	-/-/-	-/-/-

Carparks

1) Notwithstanding S5C21, a carpark may comply with this clause if it is an open-deck carpark or is protected with a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification 17 and is—

   a) a separate building; or
   b) a part of a building, and if occupying only part of a storey, is separated from the remaining part by a fire wall.

2) For the purposes of this clause, a carpark—

   a) includes—

      i. an administration area associated with the functioning of the carpark; and

ii. where the carpark is sprinklered, is associated with a Class 2 or 3 building and provides carparking for separate sole-occupancy units each carparking area with an area not greater than 10% of its floor area for purposes ancillary to the sole-occupancy units; but

b) excludes—
c)
i. except for (a), any area of another classification, or other part of a Class 7 building not used for carparking; and
ii. a building or part of a building specifically intended for the parking of trucks, buses, vans and the like.

3) For building elements in a carpark as described in (1) and (2), the following minimum FRLs are applicable:

a) External walls:

i. Less than 3 m from a fire-source feature to which it is exposed:
A. Loadbearing: 60/60/60.
B. Non-loadbearing:–/60/60.
ii. 3 m or more from a fire-source feature to which it is exposed: –/–/–.

b) Internal walls:

i. Loadbearing, other than one supporting only the roof (not used for carparking): 60/–/–.
ii. Supporting only the roof (not used for carparking): –/–/–.
iii. Non-loadbearing: –/–/–.

c) Fire walls:

i. From the direction used as a carpark: 60/60/60.
ii. From the direction not used as a carpark: as required by Tables S5C21a to S5C21f as appropriate.

d) Columns:

i. Supporting only the roof (not used for carparking) and 3 m or more from a fire-source feature to which it is exposed: –/–/–.
ii. Steel column, other than one covered by (i) and one that does not support a part of a building that is not used as a carpark—
A. 60/–/–; or
B. an ESA/M of not greater than 26 m2/tonne.
iii. Any other column not covered by (i) or (ii): 60/–/–.

e) Beams:

i. Steel floor beam in continuous contact with a concrete floor slab—
A. 60/–/–; or
B. an ESA/M of not greater than 30 m2/tonne.

ii. Any other beam: 60/–/–.

f) Lift shaft: –/–/–.
g) Fire-resisting stair shaft (within the carpark only): 60/60/60.
h) Roof, floor slab and vehicle ramp: –/–/–.

4) For the purposes of (3), ESA/M means the ratio of exposed surface area to mass per unit length

Type C Construction

Table S5C24a: Type C Construction: FRL of parts of external walls

Distance from a fire source feature	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Less than 1.5m	90/90/90	90/90/90	90/90/90	90/90/90
1.5 to less than 3m	-/-/-	60/60/60	60/60/60	60/60/60
3m or more	-/-/-	-/-/-	-/-/-	-/-/-

Table S5C24b: Type C Construction: FRL of external columns not incorporated in an external wall

Column tyle	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Less than 1.5m	90/-/-	90/-/-	90/-/-	90/-/-
1.5 to less than 3m	-/-/-	60/-/-	60/-/-	60/-/-
3m or more	-/-/-	-/-/-	-/-/-	-/-/-

Table S5C24c: Type C Construction: FRL of common walls and fire walls

Wall type	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Loadbearing or non-loadbearing	90/90/90	90/90/90	90/90/90	90/90/90

Table S5C24d: Type C Construction: FRL of internal walls

Location	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Bounding public corridors, public lobbies and the like	60/60/60	-/-/-	-/-/-	-/-/-
Between or bounding sole-occupancy units	60/60/60	-/-/-	-/-/-	-/-/-
Bounding a stair if required to be fire rated	60/60/60	60/60/60	60/60/60	60/60/60

Table S5C24e: Type C Construction: FRL of roof

Location	FRL (in minutes): Structural Adequacy/ Integrity/ Insulation			
	Class 2,3 or 4 part	Class 5, 7a or 9	Class 6	Class 7b or 8
Roofs	-/-/-	-/-/-	-/-/-	-/-/-

Carparks

5) Notwithstanding S5C21, a carpark may comply with this clause if it is an open-deck carpark or is protected with a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification 17 and is—

c) a separate building; or
d) a part of a building, and if occupying only part of a storey, is separated from the remaining part by a fire wall.

6) For the purposes of this clause, a carpark—

d) includes—

iii. an administration area associated with the functioning of the carpark; and
iv. where the carpark is sprinklered, is associated with a Class 2 or 3 building and provides carparking for separate sole-occupancy units each carparking area with an area not greater than 10% of its floor area for purposes ancillary to the sole-occupancy units; but

e) excludes—
f)

iii. except for (a), any area of another classification, or other part of a Class 7 building not used for carparking; and
iv. a building or part of a building specifically intended for the parking of trucks, buses, vans and the like.

7) For building elements in a carpark as described in (1) and (2), the following minimum FRLs are applicable:

i) External walls:

iii. Less than 1.5 m from a fire-source feature to which it is exposed:
C. Loadbearing: 60/60/60.
D. Non-loadbearing:–/60/60.
iv. 1.5 m or more from a fire-source feature to which it is exposed: –/–/–.

j) Internal walls: -/-/-

k) Fire walls:

iii. From the direction used as a carpark: 60/60/60.
iv. From the direction not used as a carpark: 90/90/90.

l) Columns:

iv. Steel column less than 1.5m from a fire source feature—
C. 60/–/–; or
D. an ESA/M of not greater than 26 m2/tonne.
v. Any other colums not less than 1.5m from a fire source feature: 60/-/-
vi. Any other column not covered by (i) or (ii): -/–/–.

m) Beams:

iii. Steel floor beam, less than 1.5m from a fire source feature, in continuous contact with a concrete floor slab—
C. 60/–/–; or
D. an ESA/M of not greater than 30 m2/tonne.

iv. Any other beam: 60/–/–.
v. More than 1.5m from a fire source feature: -/-/-

n) Roof, floor slab and vehicle ramp: –/–/–.

8) For the purposes of (3), ESA/M means the ratio of exposed surface area to mass per unit length