



BUILDING CODE OF AUSTRALIA REPORT

**Northside Development
Fredrick St, St Leonards**

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Date	Revision Number	No. of pages	Issue or Description of Amendment	Checked By	Approved By	Date Approved
26.10.15	A	16	Preliminary Assessment	Geoff Pearce	-	-
02.12.15	B	16	Revised based on updated drawings	Geoff Pearce	-	-
09.12.15	C	17	Minor Amendment	Geoff Pearce	-	-
09.06.15	D	18	Amendment based on Services Feedback	Geoff Pearce	-	-
13.06.15	E	18	As above	Geoff Pearce	-	-

Executive Summary

As Accredited Certifiers, we have reviewed architectural design documents prepared by Silver Thomas Hanley (refer appendix A) for compliance with the Building Code of Australia 2016.

The assessment of the design documentation has revealed that the following areas are required to be assessed against the relevant performance requirements of the BCA. The submission for Construction certificate will need to include verification from a suitably accredited fire engineer: -

DTS Clause	Description of Non-Compliance	Performance Requirement
D1.4 and D1.5	The following travel distances will be required to be included within the fire engineered solution for the proposed development: -	DP4 and EP2.2

Ground Floor

- Maximum distance of travel of 63m in lieu of 40m from the North Western Corner of the carparking area to Stair No.1.

Level 01

- Maximum travel distance of 65m to an exit from the South Eastern corner of the carparking start to the exit.

Level 02

- 29m to a point of choice on the Deck area in lieu of the required 20m.
- 66m between alternative exits in lieu of the required 60m from Stair No.2 to Stair No.3.
- 56m to an exit in lieu of the required 40m from the South Eastern Deck area.
- 28m to a point of choice from Consulting Suite No.15.8.

Level 03

- 38m to a point of choice from the covered deck area.
- 36.5m to a point of choice from the 1st stage recovery area.
- Maximum of 54m to an exit from the Gym area to Stair 02.

Level 04 - 07

- 53m to an exit from DU to stair 01, in lieu of the required 30m.
- 75m between alternative exits.

We note that the above egress provisions will be required to be assessed within the fire engineered solution for the development in accordance with Performance Requirement DP4 and EP2.2 of the BCA.

D1.3	We note that Stair No.3 serves 3 storeys, rising from Level 01 Floor Plan and also serves a patient care area. We assume that this stair will remain non-fire isolated. Therefore this will be required to also be included within the Fire Engineering Report for the development in accordance with Performance Requirement DP4 and DP5 of the BCA.	DP4 and DP5
D1.7	We note that as Stair No.2 discharges within the carpark space, this scenario will therefore be required to be addressed within the Fire Engineered Solution, pursuant to Performance Requirement DP5 of the BCA.	DP5
D2.4	We note that separation between rising and descending stair flights to Stair No.2 will be required to be included within the Fire Engineered Solution for the development in accordance with Performance Requirement DP4 of the BCA.	DP4
D1.7	No protection provided to occupants who have discharged from Stair 01 at Level 01, traveling past the line of the carpark, as per the requirements of Clause D1.7. We note that this will be required to be assessed in accordance with Performance Requirement DP4 and DP5 of the BCA.	DP4 and DP5
E1.3	Location of Fire Hydrant Booster assembly is proposed to not be in sight of the main entrance, to be included within the Fire Engineered Solution for the project.	EP1.3
E1.4	It is proposed to lock the cupboards serving the Fire Hose Reel cupboards within the Mental Health Areas. We note that this scenario will be required to be included within the Fire Engineered Solution in accordance with Performance Requirement EP1.1 of the BCA.	EP1.1
E1.5	Proposed use of a K8 15mm orifice sprinkler head is all Light Hazard Sprinkler Protected Areas in lieu of a 10mm Orifice sprinkler heads. In addition, proposal to remove sprinkler protection from all non-combustible lines cupboards.	EP1.5
Table E2.2	Similar to the Fire Hose Reel cupboards, BGA cupboards within the Mental Health areas are proposed to be locked. We note that this scenario will be required to be included within the Fire Engineered Solution in accordance with Performance Requirement EP2.2 of the BCA.	EP2.2

E4.9	As part of the design, it is proposed to remove SSISEP speakers from within the Patients Rooms within the Mental Health portions of the building. In addition it is also proposed that a buzzer and mute switch to be provided at the MIMMIC Panel.	EP4.3
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The fire engineered solution relating to EP1.3, EP1.5 and EP2.2 will need to be approved after consultation with the NSW Fire Brigade as part of the Construction Certificate process.

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

Assessed By,

Geoff Pearce

1.0 Introduction

The proposed development comprises of a 9 storey new Health Care development from Ramsay Health Care.

The site is located on Fredrick St, St Leonards.

1.1 Current Legislation

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

The version of the BCA applicable to the development, is version that in place at the time of the application to the Certifying authority for the Construction Certificate.

2.0 Building Assessment Data

Summary of Construction Determination: -

Northside Development	
Classification	5, 7a, 9a
Number of Storeys Contained	9
Rise In Storeys	9
Type of Construction	A
Effective Height (m)	33.2m*

NB: The effective height of the building has been assessed from RL 74.8 to RL108.00.

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

Part of Project	BCA Classification	Approx. Floor Area (m ²)	Assumed Population
Ground Floor	7a & 9a	2753	29 – Consulting Suites 82 - Carpark
Level 01	7a & 9a	2882	30*– Consulting Suites 67 - Carpark
Level 02	9a	1443	30*– Consulting Suites 20* – Office
Level 03	5	2031	100*
Level 04	9a	1365	50*
Level 05	9a	1365	50*

Part of Project	BCA Classification	Approx. Floor Area (m ²)	Assumed Population
Level 06	9a	1265	50*
Level 07	9a	1181	50*
Level 08/09	Plant	Plant	NA
Total		13,285m²	558

Notes: * We have assumed a maximum population to serve areas inclusive of staffing numbers. If this estimate is incorrect, please confirm accurate numbers to allow for the further review and comment.

3.0 Structural Provisions

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

Glazing is to comply with AS1288, and AS2047.

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

4.0 Fire Resistance

The buildings should be constructed generally in accordance with Table 3 & 3.9 of Specification C1.1 of the Building Code of Australia 2015.

The building is required to be **Type A** Construction.

The building has been assessed on the basis of the following fire separation/compartimentation within the development;

- Separation between the carpark levels and the Hospital portions of 120/120/120 minutes,
- Fire compartmentation of the building at each floor level, of 120minutes,
- Lift shafts will be required to achieve an FRL of 120/120/120,
- Fire compartmentation of the development will be required to be required to achieve compliance with Clause C2.5 of the BCA which requires the following to be provided throughout: -
 - Fire Compartments not to exceed 2000m².
 - Ward Areas to be divided into areas not exceeding 1000m² and fire separated from the remainder of the building by an FRL of 60/60/60.
 - Ward Areas to be further divided into smoke compartments of 500m².
 - Treatment Areas to be divided into smoke compartments of 1000m².
- Medical records store room located on Level 01 to be fire separated by 60/60/60 from the remainder of the building.

In addition to the above, we also note that all loadbearing walls provided throughout the development will be required to be constructed from Masonry as per the provisions of Specification C1.1 of the BCA.

4.1 Protection of Openings

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

1. Any external opening within 3m of the fire source feature protected by -/60/- fire rated construction, or externally located wall wetting sprinklers, or an alternate solution be provided to verify CP2 of the BCA.
2. Penetrations through fire rated floors to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a fire rated shaft achieving an FRL of 120min;
3. Any penetration through a wall or room required to have an FRL (e.g. substation, boiler room, apartment separating wall etc) is to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a shaft achieving an FRL of 120/120/120 where it is a room such as a substation;
4. 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.

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.*

4.2 Passive Fire Protection

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

- Lift motor rooms,

To be separated from the remainder of the building by construction achieving a minimum fire resistance level of 120 minutes.

4.3 Fire Hazard Properties

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

5.0 Egress

The egress provisions from the proposed building are provided by:

- Fire isolated stairways
- External perimeter doorways
- Internal non-fire isolated stairway

Other detailing issues that will need to be addressed include:

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

5.1 Exit Travel Distances

The locations of the proposed exit location and sizing will be required to be included within the Fire Engineered Solution for the development.

The travel distances to exits should not exceed:

Class 5-9

- 20m to a single exit or point of choice and where two exits are provided, a maximum of 40m to one of those exits; and
- exits shall be located to not be more than 60m apart and not closer than 9m

Class 9a

- No point on the floor to be more than 12m from a point of choice
- Maximum distance of travel of 30m
- Alternative exits not more than 45m apart

Further to our assessment of the Architectural drawings, we note that the following items will be required to be included within the Fire Engineered Solution for the subject development: -

- We note that separation between rising and descending stair flights to Stair No.2 will be required to be included within the Fire Engineered Solution for the development in accordance with Performance Requirement DP4 of the BCA.
- No protection provided to occupants who have discharged from Stair 01 at Level 01, traveling past the line of the basement, as per the requirements of Clause D1.7. We note that this will be required to be assessed in accordance with Performance Requirement DP4 and DP5 of the BCA.

Travel Distances

Ground Floor

- Maximum distance of travel of 63m in lieu of 40m from the North Western Corner of the carparking area to Stair No.1.

Level 01

- Maximum travel distance of 65m to an exit from the South Eastern corner of the carparking start to the exit.

Level 02

- 29m to a point of choice on the Deck area in lieu of the required 20m.
- 66m between alternative exits in lieu of the required 60m from Stair No.2 to Stair No.3.
- 56m to an exit in lieu of the required 40m from the South Eastern Deck area.
- 28m to a point of choice from Consulting Suite No.15.8.

Level 03

- 38m to a point of choice from the covered deck area.
- 36.5m to a point of choice from the 1st stage recovery area.
- Maximum of 54m to an exit from the Gym area to Stair 02.

Level 04 - 07

- 53m to an exit from DU to stair 01, in lieu of the required 30m.
- 75m between alternative exits.

We note that the above egress provisions will be required to be assessed within the fire engineered solution for the development in accordance with Performance Requirement DP4 and EP2.2 of the BCA.

5.2 Dimensions of Exits

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

5.3 Fire Isolated Exits

Each fire-isolated stairway or fire-isolated ramp must provide independent egress from each storey served and discharge directly, or by way of its own fire-isolated passageway to:

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

than 3 m and provides an unimpeded path of travel from the point of discharge to the road or open space of not more than 6 m.

Where a path of travel from the point of discharge of a fire-isolated exit necessitates passing within 6m of any part of an external wall of the same building, measured horizontally at right angles to the path of travel, that part of the wall must have an FRL of not less than 60/60/60 and any openings protected internally in accordance with C3.4, for a distance of 3 m above or below, as appropriate, the level of the path of travel, or for the height of the wall, whichever is the lesser.

We note that no protection is provided to occupants who have discharged from Stair 01 at Level 01, traveling past the line of the basement, as per the requirements of Clause D1.7. We note that this will be required to be assessed in accordance with Performance Requirement DP4 and DP5 of the BCA.

In addition, we note that Stair No.3 serves 3 storeys, rising from Level 01 Floor Plan and also serves a patient care area. We assume that this stair will remain non-fire isolated. Therefore this will be required to also be included within the Fire Engineering Report for the development in accordance with Performance Requirement DP4 and DP5 of the BCA.

We note that as Stair No.2 discharges within the carpark space, and does not achieve compliance with the provisions of Clause D1.7 of the BCA as summaries earlier in this section, this scenario will therefore be required to be addressed within the Fire Engineered Solution, pursuant to Performance Requirement DP5 of the BCA.

5.4 Balustrading and Handrail

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

Where it is possible to fall more than 4m to the finished floor below, the balustrade shall not contain any horizontal or near horizontal members that facilitate climbing.

Any windows with a sill height of less than 1.7m in bedrooms or 865mm in all other cases with a fall of more than 2m for windows, 4m for all other cases, openings are to be restricted or a protective barrier that does not allow a 125mm sphere to pass through.

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

The main public stairs and ramps 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.

5.5 Access for Persons with a Disability

Access for people with disabilities shall be provided to and within the building in accordance with the requirements of Clause D3.2, D3.3 and D3.4 of the BCA 2015.

Parts of the building required to be accessible shall comply with the requirements of AS1428.1-2009.

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

Where the main public entrance is via a ramp, tactile indicators shall be provided in accordance with AS 1428.4 at the top and bottom. Parking shall be provided for people with disabilities in accordance with Clause D3.5 of the BCA. Facilities services and features of the building accessible to people with disabilities shall be identified by signage complying with Clause D3.6 of the BCA.

General

Access to be provided to and within the building pursuant to AS1428.1-2009 as follows:

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

Note that entrances that are not accessible are to be located within 50m of an entrance that is accessible.

6.0 Fire Services & Equipment

The following fire services will need to be provided throughout the building:

- An automatic sprinkler system in accordance with the relevant provision of Clause E1.5 of the BCA and AS2118.6 as it is understood that the system will be a combines Sprinkler/Hydrant system,
- Fire hydrants in accordance with clause E1.3 of the BCA and AS 2419.1-2005,
- Fire hose reels in accordance with clause E1.4 of the BCA and AS 2441-2005,
- Portable Fire Extinguishers in accordance with Clause E1.6 of the BCA and AS 2444-2001,
- Sound System & Intercom System for Emergency Purposes in accordance with AS 1670.4-2004.
- Emergency lighting, exit signage and directional exit signage is required throughout the building in accordance with Part E of the BCA and AS/NZS 2293.1-2005
- Fire Control centre shall be provided in accordance with Clause E1.8 of the BCA.

6.1 Fire Hydrants

A system of Fire Hydrants is required to be provided to BCA Clause E1.3 and AS 2419.1-2005.

We will reply upon design certificate from a Hydraulic Consultant.

The booster if is required to be located attached to the building at the main entry.

Location of Fire Hydrant Booster assembly is proposed to not be in sight of the main entrance, to be included within the Fire Engineered Solution for the project.

6.2 Fire Hose Reels

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

To be located within 4m of exits and provide coverage within the building based on a 36m hose length.

Please note that fire hose reel coverage cannot pass through fire or smoke doors.

It is proposed to lock the cupboards serving the Fire Hose Reel cupboards within the Mental Health Areas. We note that this scenario will be required to be included within the Fire Engineered Solution in accordance with Performance Requirement EP1.1 of the BCA.

6.3 Automatic Sprinkler Protection

An Automatic Fire Suppression System is required to Specification E1.5 and AS2118.

Location of pumps, tanks, FIP, control valves and booster are satisfactory to be confirmed by the Fire Services consultant.

An occupant warning system that is triggered upon activation of the sprinkler system should be provided in accordance with BCA Specification E1.5.

It is proposed to use of a K8 15mm orifice sprinkler head is all Light Hazard Sprinkler Protected Areas in lieu of a 10mm Orifice sprinkler heads.

In addition, proposal to remove sprinkler protection from all non-combustible lines cupboards.

We note that the above items will be required to be included within the Fire Engineered Solution, pursuant to Performance Requirement EP1.5 of the BCA.

7.0 Ventilation and Smoke Hazard Management

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

- Zone Smoke Control in accordance with the requirements of AS/NZS 1668.1-1998;
- Automatic Shutdown of Mechanical Systems in accordance with the requirements of AS/NZS 1668.1-1998;
- Automatic Smoke Detection and Alarm System in accordance with the requirements of BCA Spec E2.2a and AS 1670.1-2004
- Automatic Pressurisation to Fire Isolated Exits in accordance with the requirements of AS/NZS 1668.1-1998

- Similar to the Fire Hose Reel cupboards, BGA cupboards within the Mental Health areas are proposed to be locked. We note that this scenario will be required to be included within the Fire Engineered Solution in accordance with Performance Requirement EP2.2 of the BCA.
- Sound System & Intercom System for Emergency Purposes in accordance with AS 1670.4-2004. As part of the design, it is proposed to remove SSISEP speakers from within the Patients Rooms within the Mental Health portions of the building. In addition it is also proposed that a buzzer and mute switch to be provided at the MIMMIC Panel.

We note that this will be required to be included within the Fire Engineered Solution with regard to Performance Requirement EP4.3 of the BCA.

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

Throughout the development the provision of natural or mechanical ventilation is required to all habitable rooms in accordance with F4.5 Building Code of Australia and AS 1668 and AS/NZS 3666.1.

8.0 Lift Services

The passenger lifts to be installed are to be: -

- fitted with warning signs, fire service controls in accordance with AS 1735.2
- Stretcher facilities are to be provided within the lifts with minimum dimensions of 600mm wide, 2000mm long and 1400mm high.
- An emergency lift with stretcher facilities in accordance with part E3.4 of the BCA and AS 1735.2.
- Be provided with the following: -
 - A handrail in accordance with AS 1735.12
 - Minimum internal floor dimensions as specified in AS 1735.12,
 - Fitted with a series of door opening sensory devices which will detect a 75mm diameter or across the door opening between 50mm and 1550mm above floor level,
 - Have a set of buttons for operating the lift located at heights above level complying with AS 1735.12.

9.0 Sanitary Facilities

The sanitary & other facilities within the development would generally consist of: -

Please note the Unisex facilities provided for people with disabilities may be counted once for each sex.

These facilities are to be provided in accordance with AS1428.1-2009.

Where detailed fitout is pending analysis will be undertaken once tenants and indicative layouts/tenant numbers are known. No allowance has been made for corridors etc that would be provided.

10.0 Energy Efficiency

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

1. The building can comply with the deemed-to-satisfy provisions of the BCA, relating to the following areas:
 - Building Fabric
 - Glazing
 - Building Sealing
 - Air Conditioning & Ventilation Systems
 - Artificial Lighting & Power
 - Hot Water Supply
2. The building can be verified against a reference building as per Verification Method JV3. This requires that the proposed building and its services be shown to have an annual energy consumption of equal or less than the reference building which has been modelled as per the requirements of Part J of the BCA.

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

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

The proposed site will be located in a **Climate Zone 5**.

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

Appendix A - Design Documentation

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

Drawing No.	Title	Date	Drawn By	Revision
A2.201	Ground Level Floor Plan	13/05/2016	STH	A
A2.202	Level 01 Floor Plan	13/05/2016	STH	A
A2.203	Level 02 Floor Plan	13/05/2016	STH	A
A2.204	Level 03 Floor Plan	13/05/2016	STH	A
A2.205	Level 04 Floor Plan	13/05/2016	STH	A
A2.206	Level 05 Floor Plan	13/05/2016	STH	A
A2.207	Level 06 Floor Plan	13/05/2016	STH	A
A2.208	Level 07 Floor Plan	13/05/2016	STH	A
A2.209	Level 08 Floor Plan	13/05/2016	STH	A
A2.210	Level 09 Floor Plan	13/05/2016	STH	A

Appendix B - Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2015:

Table 3 TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS

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

Table 3.9 REQUIREMENTS FOR CARPARKS

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