REF: 065921-05BCA

BUILDING CODE OF AUSTRALIA REPORT

Building R1
Cnr Lime Street & Margaret Street, Barangaroo South

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Date	Rev No	No. of pages	Issue or Description of Amendment	Checked By	Approved By	Date Approved
16.01.14	A	15	Draft for Development Application	Brigitte Thearle		28.01.14
28.01.14	B	15	Final for Development Application	Brigitte Thearle		08.07.14
08.07.14	C	15	Revised Final for Development Application	Brigitte Thearle		22.07.14
29.07.14	D	15	Minor administrative revision	Brigitte Thearle	Geoffrey Pearce	29.07.14
15.09.14	E	15	Minor administrative revision	Brigitte Thearle	Geoffrey Pearce	15.09.14

Executive Summary

As Accredited Certifiers, we have reviewed architectural design documents prepared by Collins & Turner (refer appendix A) for compliance with the Building Code of Australia 2014.

It is noted that the use of the building has not yet been finalised and is not part of this Project Application. The likey use of the building will be retail (food & beverage) or function, and on that basis the report assess the building against the provisions relating to retail provisions.

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	Travel distance to a point of choice on levels 1 and 2 of up to 25m to a single exit in lieu of 20m	DP4
D1.4	The distance between alternate exits on level 1 is less than the required minimum of 9m.	DP4, EP2.2
D1.6	The total aggregate exit width per level within the building caters for 200 occupants per level, with 215 proposed to each level. The shortfall of aggregate egress width on each level of 0.5m is to be assessed as part of the alternate solution.	DP6, EP2.2

The documentation will need further detailing such as door hardware, specifications, service design, as outlined in Appendix D of this report.

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,

Brigitte Thearle

1.0 Introduction

The proposed development comprises of a new three storey building which is proposed to be used as a retail venue.

The proposed development is for the construction of a three storey building, known as Building R1, at Baragaroo South. The building is likely to be used for food and drink premises in the future, subject to a separate fitout and use application.

The site is located on Lime Street, Barangaroo South and is bounded by Margaret Street, Transport Place and the public promenade.

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: -

	Building R1
Classification	6/9b
Number of Storeys Contained	3*
Rise In Storeys	3*
Type of Construction	A
Effective Height (m)	<25m

* Building R1 and the proposed basement are considered one building under the deemed to satisfy provisions of the BCA. It is proposed to assess R1 as a separate building to the basement. This has been verified under the basement fire engineering report SY110163 R1.2 prepared by Defire, dated 7 February 2014. This strategy has previously been reviewed and accepted by Fire & Rescue NSW and has been adopted across Barangaroo South Stage 1A. This report has been prepared on the basis of the building being a separate building with an effective height of less than 12m.

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

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Assumed Population
Ground Floor	6/9b	236m2	25 staff 190 patrons
Level 1	6/9b	330m2	25 staff

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Assumed Population
		(+80m2 balcony)	190 patrons
Level 2	6/9b	230m2 (+185m2 balcony)	25 staff 190 patrons
	Total	**804m²** **(1,069m2 including balcony)**	**75 staff** **570 patrons**

Notes:
1. The above populations are based on the population numbers provided by Lend Lease.

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 of Specification C1.1 of the Building Code of Australia 2014. The building is required to be Type A Construction.

The building has been assessed on the basis of the building being one fire compartment.

The following fire resistance levels are required to building elements:
- Floors 180/180/180
- Internal Columns 180/-/-

Please refer to Appendix A of this report for further details.

As the building is proposed to be of concrete construction with a steel roof. The roof covering is to be non-combustible.

Where the building is sprinkler protected, non-fire isolated stairways may be provided that connect all three storeys without the need for fire separation. Where sprinklers are not proposed, the three storeys are not permitted under the deemed to satisfy provisions to be connected by non fire isolated stairs. Where the three storeys are connected, it is anticipated that this would need to be addressed through a combination of fire engineering and design changes.

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 180 minutes;
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 180 minutes (or 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 Vertical Separation of openings in external walls:

It is anticipated that the building will be sprinkler protected and as such, spandrel separation is not required. If the building is not proposed to be sprinklered, the building must be provided with spandrel separation between opening on different storeys.

Spandrels are required in accordance with BCA Clause 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 achieve an FRL of 60/60/60.

4.4 Passive Fire Protection

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

- Lift motor rooms,
- Emergency power supply,
- Emergency generators,
- Electricity supply,
- Boilers or batteries,
- Hydrant Pump rooms,
- Sprinkler Pump Rooms,

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

4.4 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 stairway
- Required non-fire isolated stairways
- External perimeter doorways

The proposal has been assessed on the basis of one fire isolated stair being provided that serves all levels, also non-fire isolated tenant stair is proposed to supplement egress and movement within the building.

Other detailing issues that will need to be addressed include:

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

5.1 Exit Travel Distances

The locations of the proposed exits would appear to indicate that the deemed to satisfy requirements in terms of travel distances and egress widths would need to be assessed as part of the fire engineering for the building.

The travel distances to exits should not exceed:

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

Further to the above, travel distance to a point of choice on levels 1 and 2 of up to 25m to a single exit in lieu of 20m, has been identified.

The distance between alternate exits on level 1 is less than the required minimum of 9m. This is to be assessed as part of the alternate solution to BCA Performance Requirement DP4 and EP2.2.

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).

The following table summarises the exit widths required:

Floor Level	Exit Width Provided	Number of people (as provided)	Exit Width required
Ground	1m	215	2.5m
Level 1	2m	215	2.5m
Level 2	2m	215	2.5m

An additional exit will be required on the ground floor to ensure 2m of aggregate width is provided.

The exit width provided is 2m per level on the basis of the tenant stair being provided with a clear width of 1m.

The total aggregate exit width per level within the building caters for 200 occupants per level. The shortfall of aggregate egress width on each level of 0.5m is to be assessed as part of the alternate solution to BCA Performance Requirement DP6 and EP2.2.

Doorways are permitted to contain a clear opening width of 750mm with a height of 1980mm as part of egress requirements. Access for persons with disabilities however requires a clear doorway opening width of 850mm.

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.

It is noted that the fire stair has three doors opening to it on level 1. The maximum permitted per storey is 2 doors unless one of the following is implemented:

- The stair is provided with automatic stair pressurisation complying with AS/NZS 1668.1-1998
- A smoke lobby is provided to each door that complies with BCA Clause D2.6

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, the balustrade shall not contain any horizontal or near horizontal members that facilitate climbing. This will be reviewed as part of design development.

Handrails should generally be provided at a minimum height of 865mm along side 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 2014. 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 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.

Note the doors (or the frames) in the full height glazing are to achieve a 30% luminance contrast from the remaining full height glazing. In addition, decal's compliant with AS 1428.1-2009 will need to be provided to all full height glazing.

6.0 Fire Services & Equipment

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

- 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,
- 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

Although a sprinkler system is not required by the deemed to satisfy provisions, it is understood that a system is being installed to assist the fire protection in the building and permit a stair to connect three storeys without being fire isolated. This system is to comply with BCA Spec E1.5 and AS 2118.1-1999

A fire control centre is not required; however fire services will need to be co-ordinated.

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.

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

Fire hydrants are to be provided within fire isolated stairs.

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, and are only permitted to serve the level on which they are located.

7.0 Ventilation and Smoke Hazard Management

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

- Automatic Shutdown of Mechanical Systems in accordance with the requirements of AS/NZS 1668.1-1998; AND
- Automatic Smoke Detection and Alarm System in accordance with the requirements of BCA Spec E2.2a and AS 1670.1-2004 OR
- An automatic sprinkler system in accordance with the relevant provision of clause E1.5 of the BCA and AS 2118.1-1999 throughout the building OR
- Automatic Pressurisation to Fire Isolated Exits in accordance with the requirements of AS/NZS 1668.1-1998

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
- 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: -

BCA Class	Occupant Number	Population	Number of facilities required		
			WC	Urinals	Basins
6 (Restaurant) or 9b (Function Room) STAFF	Male	38	2	2	2
	Female	38	3	NA	2
	Unisex Facility		1	NA	1
6 (Restaurant) or 9b (Function Room) PATRONS	Male	285	2	6	3
	Female	285	7	NA	3
	Unisex Facility		1	NA	1
TOTAL - Male			**4**	**8**	**5**
TOTAL - Female			**10**	**NA**	**5**

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.

With regards to the accessible unisex sanitary facilities, please be aware, Table F2.4 requires such facilities be provided on each floor where sanitary facilities are provided and where more than 1 bank of sanitary facilities is provided on the floor, then at a rate of not less than half of the provided banks i.e. if there are 3 banks of sanitary facilities proposed on the floor then at least 2 accessible unisex sanitary facilities shall be provided to coincide.

An ambulant facility for each sex is to be provided at each bank where an accessible facility is provided. The accessible and ambulant WC arrangements are to be amended to comply with AS 1428.1-2009 with regards to required circulation spaces and the spaces between consecutive doors.

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.

10.8 Access for Maintenance

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

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

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Appendix A - Design Documentation

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

Drawing No.	Title	Date	Drawn By	Rev
BR1-ASK-12-00-90	DA Cover Sheet	09.09.14	Collins & Turner	L
BR1-ASK-12-04-05	Site Locality Plan	07.08.14	Collins & Turner	C
BR1-ASK-12-00-00	Ground Level Plan	09.09.14	Collins & Turner	R
BR1-ASK-12-01-00	Level 1 Plan	09.09.14	Collins & Turner	K
BR1-ASK-12-02-00	Level 2 Plan	09.09.14	Collins & Turner	K
BR1-ASK-12-03-00	Roof Canopy Plan	13.08.14	Collins & Turner	F
BR1-ASK-12-04-00	Plant Room Roof Plan	18.08.14	Collins & Turner	G
BR1-ASK-12-00-11	Section (East-West)	09.09.14	Collins & Turner	M
BR1-ASK-12-00-12	Section (North-South)	09.09.14	Collins & Turner	J
BR1-ASK-12-00-21	Elevation East	09.09.14	Collins & Turner	H
BR1-ASK-12-00-22	Elevation North	09.09.14	Collins & Turner	G
BR1-ASK-12-00-23	Elevation South	09.09.14	Collins & Turner	G
BR1-ASK-12-00-24	Elevation West	09.09.14	Collins & Turner	G
BR1-ASK-12-00-50	Materials Schedule	13.08.14	Collins & Turner	D
BR1-ASK-12-00-61	Shadow Study - June 21 09:00	07.08.14	Collins & Turner	B
BR1-ASK-12-00-62	Shadow Study - June 21 12:00	07.08.14	Collins & Turner	B
BR1-ASK-12-00-63	Shadow Study - June 21 15:00	07.08.14	Collins & Turner	B
BR1-ASK-12-00-64	Shadow Study - Sept 22 09:00	07.08.14	Collins & Turner	B
BR1-ASK-12-00-65	Shadow Study -Sept 22 12:00	07.08.14	Collins & Turner	B
BR1-ASK-12-00-66	Shadow Study - Sept 22 15:00	07.08.14	Collins & Turner	B
BR1-ASK-12-00-67	Shadow Study - Dec 21 09:00	07.08.14	Collins & Turner	B
BR1-ASK-12-00-68	Shadow Study - Dec 21 12:00	07.08.14	Collins & Turner	B
BR1-ASK-12-00-69	Shadow Study - Dec 21 15:00	07.08.14	Collins & Turner	B

Appendix B - Draft Fire Safety Schedule

	Essential Fire Safety Measures	Standard of Performance
1.	Access Panels, Doors	BCA Clause C3.13
2.	Automatic Fail Safe Devices	BCA Clause D2.19 & D2.21
3.	Automatic Fire Detection and Alarm System	BCA Spec. E2.2a & AS 1670 – 2004
4.	Automatic Fire Suppression System	BCA Spec. E1.5 & AS 2118.1 – 1999,
5.	Building Occupant Warning System activated by the Sprinkler System	BCA Spec. E1.5 & AS 1670 – 2004
6.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2005
7.	Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 and AS/NZS 2293.1 – 2005
8.	Fire Dampers	BCA Clause C3.15, AS 1668.1 – 1998 & AS 1682.1 & 2 – 1990
9.	Fire Doors	BCA Clause C3.2, C3.4, C3.5, C3.7 & C3.8 and AS 1905.1 – 2005
10.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005
11.	Fire Hydrant System	Clause E1.3 & AS 2419.1 – 2005
12.	Fire Seals	BCA Clause C3.15 & AS 1530.4 – 1997
13.	Lightweight Construction	BCA Clause C1.8 & AS 1530.3 – 1999
14.	Mechanical Air Handling System	BCA Clause E2.2, AS/NZS 1668.1 – 1998 & AS 1668.2 – 1991
15.	Paths of Travel	EP&A Reg 2000 Clause 186
16.	Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
17.	Warning and Operational Signs	Section 183 of the EP & A Regulations 2000, AS 1905.1 – 2005, BCA Clause D2.23, E3.3

Appendix C - Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2014:

Table 3 TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS

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