MBC MODERN BUILDING CERTIFIERS

Building Code of Australia 2016 Amendment 1

BCA DESIGN COMPLIANCE REPORT

Alex Avenue Primary School
Pelican Road, Schofields, NSW 2762

Prepared for: Richard Crookes | Issue date: 25 Jan 19

Contents

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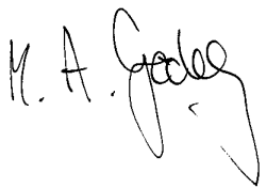
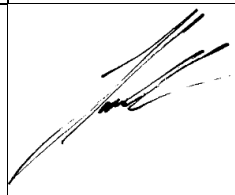
Authorisation

Revision	Comment / Reason for Issue	Issue Date	Prepared by	Reviewed by
A	SSD Submission	25 Jan 19	Mike Gooley	Heath McNab
				

Revision History

Revision	Comment / Reason for Issue	Issue Date	Prepared By
A	SSD Submission	25 Jan 19	Mike Gooley

Commercial in Confidence

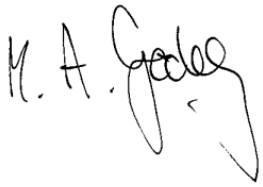
1 Executive Summary

We have reviewed architectural design documents prepared by Group GSA (refer appendix A) for compliance with the Building Code of Australia 2016 Amendment 1.

The architectural design documentation are capable of achieving compliance with the provisions of the BCA. The documentation will need further detailing such as door hardware, construction specifications, services design and manufacturer's details, as outlined within this report.

The application for Crown 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



Mike Gooley

2 Introduction

Modern Building Certifiers (MBC) have been engaged by Richard Crookes to conduct a desktop review of architectural details (as listed in Appendix A), presently concept design form ready for SSD submission, against the applicable provisions of the Building Code of Australia (BCA).

2.1 Purpose

The purpose of this report is to assess the current design proposal against the Deemed-to-Satisfy Provisions of the BCA, and to outline those areas, if any, where:-

- compliance is not achieved,
- areas may warrant redesign to achieve compliance,
- areas may be able to be assessed against the relevant performance provisions of the BCA.

2.2 Methodology

The methodology applied in undertaking this assessment has included:-

- A desktop review of architectural plans, as listed in Appendix A
- Detailed assessment of Sections C, D, E, F, G, H and J (as applicable / relevant) of the BCA

2.3 Limitations

This report does not include or imply any detailed assessment for design, compliance or upgrading for:

- the structural adequacy or design of the building;
- the inherent derived fire-resistance ratings of any proposed structural elements of the building (unless specifically referred to); and
- the design basis and/or operating capabilities of any proposed
    - electrical
    - mechanical
    - hydraulic
    - fire protection services.

This report does not include, or imply compliance with:

- the National Construction Code – Plumbing Code of Australia Volume 3
- the Disability Discrimination Act 1992 including the Disability ((Access to Premises – Buildings) Standards 2010 – unless specifically referred to)
- The deemed to satisfy provisions of Part D3 and F2.4 of BCA 2016 Amendment 1
- Demolition Standards not referred to by the BCA;
- Work Healthy and Safety Act 2011;
- An out of cycle change to the Building Code of Australia.

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- Requirements of other Regulatory Authorities including, but not limited to, Telstra, Telecommunications Supply Authority, Water Supply Authority, Electricity Supply Authority, Work Cover, Roads and Maritime Services (RMS), Roads and Transport Authority, Local Council, ARTC, Department of Planning and the like; and
- Conditions of Development Consent issued by the Local Consent Authority.

2.4 Current Legislation

The applicable legislation governing the design of buildings in NSW is the Environmental Planning and Assessment Act 1979.

Applicable Building Code of Australia (BCA)

The proposed development will be subject to compliance with the relevant requirements of the BCA as in force at the time that the application for the Crown Certification is made.

In this regard it is assumed that the Crown Certificate application will be made prior to the 1st May 2019, as such this report is based upon the Deemed-to-Satisfy provisions of BCA 2016.

Should the application for Construction Certificate be made after 1st May 2019, this report will be required to be updated to reflect any changes made and now required by the BCA. Should an *out of cycle* change occur to the Building Code of Australia, then this report is required to be updated to reflect any applicable changes made and now required by the BCA.

3 Development Description & Assessment Information

3.1 Location and Description

The proposed development comprises a new public school campus.

The site is located on the corner of Pelican Drive and Farmland Drive, Schofields.

The buildings will consist of two (2) storey school classrooms connected via covered walkways, school assembly hall and outdoor playgrounds.

3.2 BCA Classification (Clause A3.2)

The proposed development shall contain the following classifications:-

- Class 9b: school buildings
- Class 10a: COLA

3.3 Rise in Storeys (Clause C1.2)

The proposed development has been assessed to have a *rise in storeys* of two (2).

3.4 Effective Height (Clause A1.1)

The proposed development has been assessed to have an *effective height* of less than 25m.

3.5 Type of Construction Required (Clause C1.1 / Table C1.1)

The proposed development is required to be Type B construction. Specification C1.1 outlines the fire resistance required by certain building elements. This has also been provided is Appendix B.

3.6 Floor Area and Volume Limitations (Clause C2.2 / Table C2.2)

The development is limited to the following floor area and volume compartment limitations:-

Class		Type B
9b - school	Max floor area -	5,500m2
	Max volume -	33,000m3

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3.7 Building Data Summary

Part of Development	Use	Class	Floor Area (approx.) m^2	Population (using D1.13)
Ground Floor	School Classrooms	9b	2309	250
First Floor Level	School Classrooms	9b	2309	275
School Hall	School Assembly Building (Hall)	9b	770	400
COLA/Covered outdoor areas	School use	10a	N/A	N/A

Notes:

- The above populations assessed in accordance with Table D1.1.3 of the BCA.
- The school will have a capacity for 500 students in stage 1. The estimated number of staff for stage 1 is 25;
- The school hall will cater for occupant density of 400 based upon two (2) egress doors.

Summary of Construction and Building	
Use(s)	School Buildings
Classification(s)	9b – School Classrooms 9b – School Hall 10a – COLA/Covered outdoor areas
Number of Storeys contained	2
Rise in Storeys	2
Type of Construction	B
Effective Height	Less than 25m
Maximum Size of fire compartment	< 5,500sqm
Climate Zone	6

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4 BCA Assessment

4.1 Structural Provisions

Any new structural works are to comply with the applicable requirements listed within the suite AS/NZS 1170.

Any glazing, including external glazed assemblies, shall comply with AS1288-2006 – Glass in Buildings – Selection and Installation, Amendments 1 and 2.

Any external glazed assemblies shall also comply with AS2047-2014 – Windows and external glazed doors in buildings.

Prior to the issue of the relevant Crown Certificate a structural certification is required to be provided confirming the structural design complies with the requirements of Section B of the BCA.

4.2 Fire Resistance

The buildings shall be constructed generally in accordance with Table 4 of Specification C1.1 of the BCA. The building is required to be Type B Construction.

If the design is proposed to incorporate the use of lightweight fire resistant construction, then the system selected shall comply with the requirements of Specification C1.8 of the BCA. Details of the proposed lightweight construction means of compliance and FRL achieved are to be provided as part of the Construction Certificate application.

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

- Combined floor area of classroom buildings is less than 5,500sqm,
- The assembly hall has been assessed as separate fire compartment.

Fire resistance levels for building structural members are as follows:

Floors	(a) Constructed so that it is at least of the standard achieved by a floor/ceiling system incorporating a ceiling to the incipient spread of fire to the space above itself of not less than 60 minutes; (b) Have an FRL of at least 30/30/30; or (c) Have a fire-protective covering on the underside of the floor, including beams incorporated in it, if the floor is combustible or of metal.
External Walls	• Must be non-combustible construction in accordance with BCA C1.9; and

	• Loadbearing elements within 18m to fire-source feature (side Boundary) must achieve an FRL of not less than 120/30/- in accordance with Table 4, spec. C1.1.

The Architectural and Structural documentation to reflect compliance with the above provisions of the BCA.

Fire Hazard Properties

The Fire Hazard Properties of floor linings and floor coverings, wall and ceiling linings, and other material as noted within Clause C1.10, must comply with the provisions of Specification C1.10 as noted in Table 1 below.

4.2.1 Table 1 - Fire Hazard Properties

Item	Location	Requirement
Floor linings or coverings	All new floor linings	*CRF of no less than 2.2
Wall and ceiling linings	Corridors	**Group Number 1 or 2
Wall and ceiling linings	Rooms (General)	Group Number 1, 2 or 3
Ceiling linings	Rooms (Open office with a floor to ceiling ration of >5)	Group Number 1 or 2

4.3 Egress

The egress provisions from the proposed building are provided by:

- External perimeter doorways
- Required non-fire isolated stairways

Other detailing issues that will need to be addressed include:

- Door Hardware
- Exit door operation
- Stair construction
- Handrail and balustrade construction
- Details of the egress provisions to the Road.

4.4 Exit Travel Distances

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 for insert relevant parts of the building parts of the buildings.

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.

4.5 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	4.0m	250	2.5m
Level 1	4.0m	250	2.5m
School Assembly Hall	5.4m	400	4.0m

The school will have the capacity for 500 students in stage 1. The estimated number of staff for stage 1 is 25m.

It is understood the School Assembly Hall will cater for 400 occupants. Based upon this occupant density. Provision must be made for aggregate exit width not less than 4.0m.

4.6 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.

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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.

4.7 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 2016. 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.

A hearing augmentation-listening system shall be installed within the library and School Hall in accordance with the requirements of Clause D3.7 of the BCA.

Refer to Accessibility Report prepared by the Access Consultant for the project.

4.8 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 (School Hall) 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

4.8.1.1 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 as part of the fire hydrant requirements. The booster if is required to be located attached to the building at the main entry. If remote from the building at the main vehicle entry or with sight of the main entry of the building within 20m of a hardstand area.

Fire hydrants are to be provided within fire isolated stairs/within 4.0m of required exits.

4.8.1.2 Fire Hose Reels

A Fire Hose Reel System is required to serve the School Hall to BCA Clause E1.4 and AS2441. Fire Hose Reels are not required to serve classrooms and associated corridors in a primary or secondary school.

Fire hose reels being located within 4m of exits and provide coverage within the building based on a 36m hose length.

4.9 Ventilation and Smoke Hazard Management

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

- Automatic Shutdown of ducted Mechanical Systems in accordance with the requirements of AS/NZS 1668.1-1998;
- School Assembly Hall – Roof mounted automatic Smoke and Heat Vents in accordance with the requirements of BCA Spec E2.2b

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.

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4.10 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.

4.11 Sanitary Facilities

Based on the total number of sanitary facilities which are provided across the school campus. There are sufficient sanitary facilities based upon student numbers and staff population for stage 1.

Refer to Appendix C – calculation of sanitary facilities

4.12 Energy Efficiency

The installation of temperature controlled mechanical ventilation system will require the building to be designed to 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.

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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 6.

Appendix A - Design Documentation

The following documentation prepared by Group GSA was used in the assessment and preparation of this report: -

DRAWING LIST - SSD									
Sheet Number	**Sheet Name**	**Scale**	**Sheet Issue Date**	**Drawn By**	**Checked By**	**Approved By**	**Current Revision**	**Discipline**	**Package**
0000 - 0999 - TITLE PAGE/LOCATION PLAN									
A-0000	COVER SHEET / DRAWING INDEX	NTS	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
1100 - 1199 - SITE PLANS									
A-1000	SITE ANALYSIS and CONTEXT PLAN	NTS	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
A-1001	STREETCAPE CHARACTER ANALYSIS	NTS	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
A-1100	EXISTING SITE PLAN	1:500	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
A-1101	PROPOSED SITE PLAN	1:500	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
A-1120	SITE GROUND FLOOR PLAN	1:500	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
A-1121	SITE LEVEL 1 PLAN	1:500	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
A-1122	SITE ROOF PLAN	1:500	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
3000 - 3099 - ELEVATIONS									
A-3020	NORTH - SOUTH SITE ELEVATION	1:500	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
A-3021	EAST - WEST SITE ELEVATION	1:500	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
3100 - 3199 - SECTIONS									
A-3120	NORTH - SOUTH & EAST - WEST SITE SECTION	1:500	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
7500-7599 - BALANCE of SSD WORK									
A-7500	SHADOW DIAGRAMS	NA	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
A-7501	SCHEDULE OF MATERIALS AND FINISHES	NA	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
A-7502	ARTIST'S IMPRESSIONS	NA	24/01/2019	PL	PI	MP	C	ARCHITECTURE	SSD
L1000-L1100 - LANDSCAPE									
L-1000	COVER SHEET	1:500	23/01/2019	PL	PI	MP	B	LANDSCAPE	SSD
L-1002	GENERAL ARRANGEMENT PART 1	1:500	23/01/2019	PL	PI	MP	B	LANDSCAPE	SSD
L-1003	GENERAL ARRANGEMENT PART 2	1:500	23/01/2019	PL	PI	MP	B	LANDSCAPE	SSD
L-1004	GENERAL SECTIONS	1:200	23/01/2019	PL	PI	MP	B	LANDSCAPE	SSD
L-1005	PLANTING PALETTE AND SCHEDULE	NTS	23/01/2019	PL	PI	MP	B	LANDSCAPE	SSD
Grand total: 19									

Appendix B - Draft Fire Safety Schedule

Proposed Schedule of Statutory Fire Safety Measures

	Essential Fire Safety Measures	Standard of Performance
1.	Automatic fire detection and alarm system (smoke detection system to automatically shut down air-handling system or smoke detection system to activate smoke exhaust system or smoke and heat vents)	BCA 2016, NSW Table E2.2b and AS/NZS 1668.1 – 1998
2.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2005
3.	Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 and AS/NZS 2293.1 – 2005
4.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005
5.	Fire Hydrant System	Clause E1.3 & AS 2419.1 – 2005
6.	Mechanical Air Handling System (Automatic Shutdown)	BCA NSW Table E2.2b and AS/NZS 1668.1 – 1998
7.	Paths of Travel	EP&A Reg 2000 Clause 186
8.	Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
9.	Smoke and Heat Vents	BCA Spec. E2.2c & AS 2665 – 2001
10.	Smoke Hazard Management System	BCA Part E2 & AS/NZS 1668.1 – 1998
11.	Warning and Operational Signs	Section 183 of the EP & A Regulations 2000, AS 1905.1 – 2005, BCA Clause E3.3

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Appendix C – Sanitary Facilities

F2.4 - Sanitary Facility Calculations - Students																
Description of building or part	Occupant Number	Population No.		Required			Provided			Unisex Accessible added to (if applicable)			Difference		
				WC	Urinals	Basins	WC	Urinals	Basins	WC	Urinals	Basins	WC	Urinals	Basins
school	500	Male	250	5	4	5	8	4	12	1		1	4	0	8
		Female	250	8	NA	5	12		12	1		1	5	NA	8

F2.4 - Sanitary Facility Calculations - staff																
Description of building or part	Occupant Number	Population No.		Required			Provided			Unisex Accessible added to (if applicable)			Difference		
				WC	Urinals	Basins	WC	Urinals	Basins	WC	Urinals	Basins	WC	Urinals	Basins
school	25	Male	13	1	1	2	1	1	2	1		1	1	0	1
		Female	13	2	NA	2	2		2	1		1	1	NA	1

Notes:

1. Based upon information provided, the school population at stage 1 will be 500 students;
2. There are 24 WC with 3 accessible facilities proposed for students, which is sufficient to serve the proposed occupant density;
3. The Multi-purpose Hall will be provided with 10 sanitary facilities plus 2 unisex accessible facilities;
4. It is noted that the sex of the sanitary facilities are to be nominated, with male closet pans able to be counted as male urinals;
5. There are 4 WC and 2 accessible facilities proposed for staff, which is sufficient to service the proposed staff population of 25;
6. A common unisex accessible facility may be counted once for both male and female facilities in accordance with Clause F2.2 (c) of the BCA;
7. At least one ambulant sanitary compartment must be provided within each of the male and female facilities complying with Section 16 of AS 1428.1-2009; and
8. A WC is able to be used in place of a urinal.

Appendix D TYPE B 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/ 30	120/ 90/ 60	180/120/ 90	240/180/120
3 to less than 9 m	90/ 30/ 30	120/ 30/ 30	180/ 90/ 60	240/ 90/ 60
9 to less than 18 m	90/ 30/–	120/ 30/–	180/ 60/–	240/ 60/–
18 m or more	–/–/–	–/–/–	–/–/–	–/–/–
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/ 30	–/ 90/ 60	–/120/ 90	–/180/120
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
Fire-resisting stair shafts				
Non-loadbearing	–/ 90/ 90	–/120/120	–/120/120	–/120/120
Bounding public corridors, public lobbies and the like—				
Loadbearing	60/ 60/ 60	120/–/–	180/–/–	240/–/–
Non-loadbearing	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding sole-occupancy units—				
Loadbearing	60/ 60/ 60	120/–/–	180/–/–	240/–/–
Non-loadbearing	–/ 60/ 60	–/–/–	–/–/–	–/–/–
OTHER LOADBEARING INTERNAL WALLS and COLUMNS—	60/–/–	120/–/–	180/–/–	240/–/–
ROOFS	–/–/–	–/–/–	–/–/–	–/–/–

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