



BUILDING CODE OF AUSTRALIA ASSESSMENT REPORT

Westpac Tenancy Levels 1-28, Commercial Building C4, Barangaroo South

Dated: **October 2012**

Prepared for: **Lend Lease Project Management & Construction Pty. Ltd.**

Prepared by: **McKenzie Group Consulting (NSW) Pty Ltd
ACN 093 211 995**

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Executive Summary

This BCA Report is submitted to the Minister for Planning pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) in support of the State Significant Development (SSD) Development Application for the Westpac fitout (commercial office Levels 1-28) of Commercial Building C4.

As Accredited Certifiers, we have reviewed architectural design documents prepared by Geyer (refer appendix A) for compliance with the Building Code of Australia 2012.

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 for the fitout. The submission for Construction Certificate will need to include verification from a suitably accredited fire engineer: -

DTS Clause	Description of Non-Compliance	Performance Requirement
C2.2	Connection of more than three storeys by non-required non fire-isolated stairs.	CP2, EP2.2

The fire engineered solution relating to EP2.2 will need to be approved after consultation with the NSW Fire Brigade as part of the Construction Certificate process. It is noted that all other non-compliances have been assessed as part of the base build fire engineering strategy

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 the fitout of Levels 1-28 of Commercial Building C4 located at Barangaroo South.

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.

1.2 Consent Authority May Require The Building To Be Upgraded

The local authority when assessing the development application may require that the existing building be brought into partial on full compliance with the current provisions at the BCA. The trigger for upgrade includes:

- Where the building works, together with any other works completed or authorised within the previous 3 years, represents more than half the total volume of the building; or
- Council are not satisfied the measures contained in the building are not adequate for the safety of present using the building or prevention of special to adjacent buildings.

2.0 Building Assessment Data

Summary of Construction Determination: -

Commercial Building C4	
Classification	5, 6, 7a, 9b
Number of Storeys Contained	45
Rise In Storeys	42
Type of Construction	A
Effective Height (m)	162.9m

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

Part of Project	BCA Classification	Approx. Floor Area (m ²)	Assumed Population
Level 1 – Commercial	5	2,905m ²	291
Level 2 – Commercial	5	2,905m ²	291
Level 3 – Commercial, Terrace	5	1,654m ²	166
Level 4 – Low Rise Commercial	5	1,877m ²	260
Level 5 – Low Rise Commercial	5	2,079m ²	260
Level 6 – Low Rise Commercial	5	2,355m ²	260
Level 7 – Low Rise Commercial	5	2,355m ²	260
Level 8 – Low Rise Commercial	5	2,355m ²	260
Level 9 – Low Rise Commercial	5	2,355m ²	260
Level 10 – Low Rise Commercial	5	2,355m ²	260
Level 12 – Low Rise Commercial	5	2,355m ²	260



Part of Project	BCA Classification	Approx. Floor Area (m ²)	Assumed Population
Level 13 – Low Rise Commercial	5	2,355m ²	260
Level 14 – Low Rise Commercial	5	2,355m ²	260
Level 15 – Low Rise Commercial	5	2,342m ²	260
Level 17 – Mid Rise Commercial	5	2,423m ²	260
Level 18 – Mid Rise Commercial	5	2,456m ²	260
Level 19 – Mid Rise Commercial	5	2,393m ²	260
Level 20 – Mid Rise Commercial	5	2,456m ²	260
Level 21 – Mid Rise Commercial	5	2,393m ²	260
Level 22 – Mid Rise Commercial	5	2,456m ²	260
Level 23 – Mid Rise Commercial	5	2,393m ²	260
Level 24 – Mid Rise Commercial	5	2,456m ²	260
Level 25 – Mid Rise Commercial	5	2,393m ²	260
Level 26 – Mid Rise Commercial	5	2,456m ²	260
Level 27 – Mid Rise Commercial	5	2,393m ²	260
Level 28 – Mid Rise Commercial	5	2,456m ²	260
Total		63,136m²	6,728

Notes:

1. The above populations have been base on the floor areas and calculations in accordance with Table D1.13 of the BCA.

3.0 Fire Resistance

The commercial portions of the base building have been designed generally in accordance with Table 3 of Specification C1.1 of the Building Code of Australia 2012.

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

- Fire compartmentation of the building at each floor level except where internal stairs connect up to two levels,

Where internal stairs result in the connection of more than two levels, the compartmentation and connection of storeys is to be assessed as an alternate solution to BCA Performance Requirement CP2 and EP2.2 by a suitably qualified fire engineer.

3.1 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.

4.0 Egress

The egress provisions from the proposed building are provided by:

- Fire isolated stairways

Other detailing issues that will need to be addressed include:

- Door Hardware



- Exit door operation
- Stair construction
- Handrail and balustrade construction

4.1 Exit Travel Distances

The egress provisions from the fitout levels are provided fire isolated stairways from all levels. The base building fire engineering assessment includes verification of the following travel distances to BCA Performance Requirements DP4 and EP2.2:

- Travel distance to a point of choice: Up to 30m in lieu of the required 20m
- Travel distance to an exit where two or more exits are available: Up to 60m in lieu of 40m
- Travel distance between alternate exits: Up to 100m in lieu of 60m

The proposed travel distances are within the scope of the existing base building fire engineering assessment.

4.2 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
Levels 1 & 2	5m	560	5m
Levels 3-28	2.5m	260	2.5m

Levels 3 and above are currently served by 2 fire isolated stairways each having a clear width of 1250mm. The base building fire engineering assessment includes verification of a maximum population of up to 286 people in lieu of the 260 permitted by the deemed to satisfy provisions based on the width of the exits.

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 (i.e minimum 870 mm doors).

4.3 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.

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

Handrails are to be provided to each side of the stair, where the stair exceeds a width of 2m. Where an egress stair exceeds 2m in width, an additional handrail is required to ensure that the egress width of 2m is accounted.

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.

4.4 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 2012. 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. Ongoing assessment will be undertaken as part of the Construction Certificate process.

The base building facilities include compliant lift access to each level and the provision of a left and right hand accessible sanitary facility on each floor. The main building entry has been designed to comply with the requirements of Part D3 of the BCA.

A hearing augmentation-listening system shall be installed where an inbuilt amplification system, other than one used only for emergency warning, is installed in a conference or meeting room in accordance with the requirements of Clause D3.7 of the BCA.

5.0 Fire Services & Equipment

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

1. An automatic sprinkler system in accordance with the relevant provision of clause E1.5 of the BCA, AS 2118.1-1999 and AS 2118.6 throughout Building
2. Fire hydrants in accordance with clause E1.3 of the BCA and AS 2419.1-2005,
3. Fire hose reels in accordance with clause E1.4 of the BCA and AS 2441-2005,
4. Portable Fire Extinguishers in accordance with Clause E1.6 of the BCA and AS 2444-2001,
5. Emergency Warnings & Intercommunication system in accordance with AS 1670.4-2004.
6. 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

Supplementary hydrants are proposed to be located on floor. The location of these hydrants has been included in the submission of the base building fire engineering assessment to Fire & Rescue NSW.

6.0 Ventilation and Smoke Hazard Management

Smoke hazard management provisions required within the building as follows:

- Automatic air pressurisation in accordance with BCA specification E2.2b,
- Zone smoke control,
- Automatic smoke detection and alarm system,
- Sprinkler system

Throughout the development the 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. This is included in the base build and will need to be balanced for the fitout works.

7.0 Lift Services

The passenger lifts are provided as part of the base building. The lifts provided allow adequate access for people with disabilities and include the provision of emergency lifts.

8.0 Sanitary Facilities

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

Class	Occupant Number	Pop	Required			Proposed		
			WC	Urinals	Basins	WC	Urinals	Basins
5 Level 1	Male	146	8	4	5	9+2*	7	6+2*
	Female	146	10	NA	5	11+2*	NA	6+2*
	Unisex		1	NA	1	2	NA	2



Class	Occupant Number	Pop	Required			Proposed		
			WC	Urinals	Basins	WC	Urinals	Basins
	Facility							
5 Level 2	Male	146	8	4	5	9+2*	7	6+2*
	Female	146	10	NA	5	11+2*	NA	6+2*
	Unisex Facility		1	NA	1	2	NA	2
5 Levels 3-15, 17-28	Male	130	8	4	5	6+2*	4	4+2*
	Female	130	10	NA	5	8+2*	NA	4+2*
	Unisex Facility		1	NA	1	2	NA	2

* 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 AS1428.1-2001.

9.0 Energy Efficiency

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

The base building strategy addresses compliance for the following with regards to Part J of the BCA:

- Building Fabric
- Glazing
- Building Sealing
- Air Conditioning & Ventilation Systems
- Hot Water Supply

The interior artificial lighting and power is to comply with the following provisions:

- The maximum design illumination load is not to exceed 9W/m²
- Artificial Lighting must be controlled by a time switch, occupant sensor or a security swipe pass system.
- Each light control in a building must not operate lights within an area of more than;
 - 250m² for a space of not more than 2000m²
 - 1000m² for a space of more than 2000m²
- Artificial lighting around the lighting. If it exceeds a total of 100W must;
 - Be controlled by a day light sensor or time switch and
 - Be controlled by motion detection or have an average light source efficiency of not less than 60 Watts / Lumens.

9.1 Access for Maintenance

Access is 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



Appendix A - Design Documentation

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

Drawing No.	Title	Date	Drawn By	Rev
DA01	Level 01: DA Plan	June 2012	Geyer	D
DA02	Level 02: DA Plan	June 2012	Geyer	E
DA03	Level 03: DA Plan	June 2012	Geyer	D
DA04	Level 04: DA Plan	June 2012	Geyer	D
DA05	Level 05: DA Plan	June 2012	Geyer	D
DA06	Level 06: DA Plan	June 2012	Geyer	D
DA07	Level 07: DA Plan	June 2012	Geyer	D
DA08	Level 08: DA Plan	June 2012	Geyer	D
DA09	Level 09: DA Plan	June 2012	Geyer	A
DA010	Level 10: DA Plan	June 2012	Geyer	A
DA11	Level 11: DA Plan	June 2012	Geyer	A
DA12	Level 12: DA Plan	June 2012	Geyer	A
DA13	Level 13: DA Plan	June 2012	Geyer	A
DA14	Level 14: DA Plan	June 2012	Geyer	D
DA15	Level 15: DA Plan	June 2012	Geyer	D
DA17	Level 17: DA Plan	June 2012	Geyer	D
DA18	Level 18: DA Plan	June 2012	Geyer	D
DA19	Level 19: DA Plan	June 2012	Geyer	D
DA20	Level 20: DA Plan	June 2012	Geyer	A
DA21	Level 21: DA Plan	June 2012	Geyer	A
DA22	Level 22: DA Plan	June 2012	Geyer	A
DA23	Level 23: DA Plan	June 2012	Geyer	A
DA24	Level 24: DA Plan	June 2012	Geyer	A
DA25	Level 25: DA Plan	June 2012	Geyer	A
DA26	Level 26: DA Plan	June 2012	Geyer	D
DA27	Level 27: DA Plan	June 2012	Geyer	D
DA28	Level 28: DA Plan	June 2012	Geyer	D



Appendix B - Draft Fire Safety Schedule

Items to be inspected or tested as nominated by the relevant authority		Deemed to satisfy installation standard/code/conditions of approval
1.	Access Panels and 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 Alternate Solution prepared by Defire
4.	Automatic Fire Suppression System	BCA Spec. E1.5 & AS 2118.1 – 1999, AS 2118.6 – 1995 (Combined sprinkler & hydrant) Alternate Solution prepared by Defire
5.	Building Occupant Warning System activated by the Sprinkler System	BCA Spec. E1.5 & AS 1670 – 2004
6.	Emergency Lifts	BCA Clause E3.4 & AS 1735.2 – 2001
7.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2005
8.	EWIS	BCA Clause E4.9 & AS 1670.4 - 2004
9.	Emergency Evacuation Plan	AS 3745 – 2002
10.	Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 and AS/NZS 2293.1 – 2005
11.	Fire Control Centres and Rooms	BCA Spec. E1.8 Alternate Solution prepared by Defire
12.	Fire Blankets	AS 2444 – 2001
13.	Fire Dampers	BCA Clause C3.15, AS 1668.1 – 1998 & AS 1682.1 & 2 – 1990
14.	Fire Doors	BCA Clause C3.2, C3.4, C3.5, C3.6, C3.7 & C3.8 and AS 1905.1 – 2005
15.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005
16.	Fire Hydrant System	Clause E1.3 & AS 2419.1 – 2005 Alternate Solution prepared by Defire
17.	Fire Seals	BCA Clause C3.15 & AS 1530.4 – 1997
18.	Mechanical Air Handling System	BCA Clause E2.2, AS/NZS 1668.1 – 1998 & AS 1668.2 – 1991
19.	Paths of Travel	EP&A Reg 2000 Clause 186
20.	Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
21.	Pressurising Systems	BCA Clause E2.2 & AS/NZS 1668.1 – 1998
22.	Smoke Hazard Management System	BCA Part E2 & AS/NZS 1668.1 – 1998
23.	Smoke Dampers	AS/NZS 1668.1 – 1998
24.	Warning and Operational Signs	Section 183 of the EP & A Regulations 2000, AS 1905.1 – 2005, BCA Clause C3.6, D2.23, E3.3



Appendix C - Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2012:

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 non- <i>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
Bounding <i>public corridors</i> , public lobbies and the like—				
<i>Loadbearing</i>	90/ 90/ 90	120/—/—	180/—/—	240/—/—
<i>Non-loadbearing</i>	—/ 60/ 60	—/—/—	—/—/—	—/—/—
Between or bounding <i>sole-occupancy units—</i>				
<i>Loadbearing</i>	90/ 90/ 90	120/—/—	180/—/—	240/—/—
<i>Non-loadbearing</i>	—/ 60/ 60	—/—/—	—/—/—	—/—/—
Ventilating, pipe, garbage, and like <i>shafts</i> not used for the discharge of hot products of combustion—				
<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

