DESIGN CONFIDENCE

BCA Design Assessment Report
Land & Housing Corporation

118-120 Hannans Road, Narwee

ACCESSIBILITY | BUILDING REGULATIONS | FIRE ENGINEERING | MANAGEMENT SERVICES

DESIGN CONFIDENCE

CONTENTS

Project: 118-120 Hannans Road, Narwee
Document Type: BCA Design Assessment Report
Report Number: P213_005-3 LS

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Revision History:

Our Reference	Remarks	Issue Date
P213_005-1 ME	Completed report issued to client	25 January 2013
P213_005-2 LS	Report updated to reflect latest architectural drawings Report re-issued to client	31 March 2014
P213_005-3 LS	Report updated to reflect latest architectural drawings Report re-issued to client	03 April 2014

1.0 INTRODUCTION

1.1 General

This BCA Design Assessment report has been prepared at the request of Land & Housing Corporation and relates to the proposed residential building located at 118-120 Hannans Road, Narwee.

This report is based upon, and limited to, the information depicted in the documentation provided for assessment, and does not make any assumptions regarding 'design intention' or the like.

1.2 Purpose of report

The purpose of this report is to identify the extent to which the architectural design documentation complies with the relevant prescriptive provisions of the Building Code of Australia (BCA), edition 2013.

1.3 Documentation Provided for Assessment

This assessment is based upon the architectural documentation prepared by Land & Housing Corporation Finance & Services and listed within Appendix 1.

1.4 Report Exclusions

It is conveyed that this report should not construed to infer that an assessment for compliance with the following has been undertaken –

(a) Occupational Health & Safety Act and Regulations;

(b) WorkCover Authority requirements;

(c) Structural and Services Design Documentation;

(d) The individual requirements of service authorities (i.e. Telecommunication Carriers, Sydney Water, Energy Australia);

(e) SEPP (Seniors Living) 2004 or AS4299 (adaptable housing);

(f) The Disability Discrimination Act (DDA) 1992;

(g) The Energy Efficiency Provisions of the BCA.

2.0 DEVELOPMENT DESCRIPTION

2.1 General

In accordance with the Building Code of Australia, the assessment undertaken relates to the proposed development located at 118-120 Hannans Road, Narwee.

For the purpose of the Building Code of Australia (BCA) the subject development may be described as contained below.

2.2 Building Description

Building Classification:	Class 1a	–	Dwellings 11, 12, 13, 14 & 15
	Class 2 & 7a	–	Residential Block u1-11 & Lower Ground Floor Carpark
Rise in Storeys:	N/A	–	Dwellings 11, 12, 13, 14, 15
	Four (4)	–	Residential Block u1-11 & Lower Ground Floor Carpark
Type of Construction:	N/A	–	Dwellings 11, 12, 13, 14, 15
	Type A	–	Residential Block u1-11 & Lower Ground Floor Carpark
Effective Height:	≈9m	–	Residential Development

2.3 BCA Interpretation Notes

The provide the reader with additional context, the following information regarding the assessment methodology used in this assessment is provided below –

(i) The lower ground floor is only to be used for carparking and / or uses that are deemed only to be ancillary with the residential units located above;

3.1 BCA ASSESSMENT SUMMARY – CLASS 2-9 BUILDINGS

3.1.1 General

The following table summarises the compliance status of the architectural design for Units 1-11 in terms of each *applicable* prescriptive provision of the BCA and indicates a capability for compliance with the BCA.

Although, it should be recognised that instances may exist where 'prescriptive non-compliance' occurs, or 'design detail' is required.

Such instances should not necessarily be considered BCA deficiencies; but matters which need to be considered by the design team and any assessment authority at relevant stages of design and/or assessment.

For those instances of either 'prescriptive non-compliance' or 'design detail', a detailed analysis and commentary is provided within Part 4 of this report.

3.1.2 Section B: Structure

BCA Clause		Complies	Does not Comply	Design Detail
B1.1	resistance to actions			✓
B1.2	determination of individual actions			✓
B1.4	materials and form of construction			✓
B1.6	construction of buildings in flood hazard areas			✓

3.1.3 Section C: Fire Resistance

BCA Clause		Complies	Does not Comply	Design Detail
Spec C1.1	fire resisting construction			✓
C1.8	lightweight construction			✓
C1.10	fire hazard properties			✓
C2.6	vertical separation			✓
C3.11	bounding construction: class 2, 3 and 4 buildings			✓
C3.12	openings in floors and ceilings for services			✓
C3.15	openings for service installations			✓
C3.16	construction joints			✓

3.1.4 Section D: Access & Egress

BCA Clause		Complies	Does not Comply	Design Detail
D1.2	number exits required	✓		
D1.4	exit travel distances	✓		

BCA Clause		Complies	Does not Comply	Design Detail
D1.6	dimensions of exits and paths of travel to exits			✓
D1.9	travel via non-fire-isolated exits	✓		
D1.17	access to lift pits			✓
D1.10	discharge from exits	✓		
D2.3	non-fire isolated stairways			✓
D2.7	installations in exits and paths of travel			✓
D2.9	width of stairways			✓
D2.13	goings and risers			✓
D2.14	landings			✓
D2.15	thresholds			✓
D2.16	balustrades			✓
D2.17	handrails			✓
D2.19	doorways and doors	✓		
D2.20	swinging doors	✓		
D2.21	operation of latch	✓		
D2.24	protection of openable windows			✓
D3.1	general building access requirements			✓
D3.2	access to buildings	✓		
D3.3	parts of the building to be accessible			✓
D3.5	accessible carparking			✓
D3.6	signage			✓
D3.8	tactile indicators			✓

3.1.5 Section E: Services & Equipment

BCA Clause		Complies	Does not Comply	Design Detail
E1.6	portable fire extinguishers			✓
E2.2	general provisions			✓
E3.3	warning against use of lifts in fire			✓
E3.6	passenger lifts			✓
E4.2	emergency lighting			✓

3.1.6 Section F: Health & Amenity

BCA Clause		Complies	Does not Comply	Design Detail
F1.1	storm water			✓
F1.4	waterproofing			✓
F1.5	roof coverings			✓
F1.6	sarking			✓
F1.7	waterproofing of wet areas in buildings			✓
F1.9	Damp-proofing			✓

BCA Clause		Complies	Does not Comply	Design Detail
F1.10	damp-proofing of floors on the ground			✓
F1.11	provision of floor wastes			✓
F1.13	glazed assemblies			✓
F2.1	facilities in residential buildings			✓
F3.1	heights of rooms and other spaces			✓
F4.2	methods and extent of natural lighting	✓		
F4.4	artificial lighting			✓
F4.5	ventilation of rooms			✓
F4.11	carparks			✓
F5.4	sound insulation rating of floors			✓
F5.5	sound insulation rating of walls			✓
F5.6	sound insulation rating of services			✓
F5.7	sound insulation of pumps			✓

3.1.7 Section G: Ancillary Provisions

BCA Clause		Complies	Does not Comply	Design Detail
G5.1	bushfire prone areas			✓

3.2 BCA ASSESSMENT SUMMARY – CLASS 1-10 BUILDINGS

3.2.1 General

The following table summarises the compliance status of the architectural design of residential townhouses in terms of each *applicable* prescriptive provision of the BCA and indicates a capability for compliance with the BCA.

Although, it should be recognised that instances exist where 'Prescriptive non-compliance' occurs, or 'design detail' is necessary.

Such instances should not necessarily be considered BCA deficiencies; but matters which need to be considered by the design team and any assessment authority at relevant stages of design and/or construction.

For those instances of either 'prescriptive non-compliance' or 'design detail', a detailed analysis and commentary is provided within Part 4 of this report.

3.2.2 Part 3.1 – Site Preparation

BCA Clause		Complies	Does not Comply	Design Detail
3.1.1.1	earthworks			✓
3.1.1.2	excavation adjacent to vacant property			✓
3.1.1.3	excavation adjacent to existing Buildings			✓
3.1.1.4	fill			✓
3.1.2	drainage			✓
3.1.3	termite risk management			✓

3.2.3 Part 3.2 – Footings and Slabs

BCA Clause		Complies	Does not Comply	Design Detail
3.2	footings and slabs			✓

3.2.4 Part 3.3 – Masonry

BCA Clause		Complies	Does not Comply	Design Detail
3.3.1	masonry			✓

3.2.5 Part 3.4 – Framing

BCA Clause		Complies	Does not Comply	Design Detail
3.4.3	timber framing			✓
3.4.4	structural steel members			✓

3.2.6 Part 3.5 – Roof & Wall Cladding

BCA Clause		Complies	Does not Comply	Design Detail
3.5.1.3	metal sheet roofing			✓
3.5.3.2	gutters & downpipes			✓
3.5.3.5	eaves and soffit linings			✓

3.2.7 Part 3.6 – Glazing

BCA Clause		Complies	Does not Comply	Design Detail
3.6	glazing			✓

3.2.8 Part 3.7 – Fire Safety

BCA Clause		Complies	Does not Comply	Design Detail
3.7.1.3	external walls of Class 1 buildings	✓		
3.7.1.5	construction of external walls	✓		
3.7.1.6	Class 10a buildings	✓		
3.7.1.7	allowable encroachments	✓		
3.7.1.8	separating walls			✓
3.7.1.9	fire hazard properties			✓
3.7.1.10	roof lights	✓		
3.7.2.2	requirements for smoke alarms			✓
3.7.2.3	location – Class 1a buildings			✓
3.7.4	Bushfire areas			✓

3.2.9 Part 3.8 – Health & Amenity

BCA Clause		Complies	Does not Comply	Design Detail
3.8.1	wet areas			✓
3.8.2	room heights			✓
3.8.3.2	required facilities	✓		
3.8.3.3	construction of sanitary compartments	✓		
3.8.4.2	natural lighting	✓		
3.8.4.3	artificial lighting	✓		
3.8.5.2	ventilation requirements			✓
3.8.5.3	location of sanitary compartments	✓		
3.8.6.2	sound insulation requirements			✓
3.8.6.4	services			✓

3.2.10 Part 3.9 – Safe Movement & Access

BCA Clause		Complies	Does not Comply	Design Detail
3.9.1.5	thresholds			✓

3.2.11 Part 10 - Additional Construction Requirements

BCA Clause		Complies	Does not Comply	Design Detail
3.10.1	high wind areas			✓
3.10.2	earthquake areas			✓

4.1 BCA DETAILED ASSESSMENT – CLASS 2-9 BUILDINGS

4.1.1 General

With reference to the 'BCA Assessment Summary' contained within Part 3.1 of this report, the following detailed analysis and commentary is provided relating to Block u1-7.

This commentary is formulated to enable the design documentation to be further progressed, for the purpose of evidencing the attainment of compliance with the relevant provisions of the BCA.

4.1.2 BCA Section B – Structure

Cl. B1.1	The resistance of a building or structure must be greater than the most critical action effect determined by BCA Cl. B1.2 & AS/NZS 1170.0 & BCA Cl. B1.4.
Cl. B1.2	The structural design of the building must be determined in accordance with the varying "actions" considerations contained within this clause (i.e. permanent actions, imposed actions, wind / snow / earthquake actions).
Cl. B1.4	The structural resistance of materials and forms of construction must be determined in accordance with the following - ❑ Masonry - AS3700 ❑ Concrete construction - AS3600 ❑ Steel construction - AS4100 or AS/NZS 4600 ❑ Timber construction - AS1720.1 and/or AS1684 ❑ Termite Risk Management - AS3660.1 ❑ Piling - AS2159 ❑ Glazed assemblies - AS2047 (external) and/or AS1288 (internal)
Cl. B1.6	If the building is located in a flood hazard area, the building must comply with the ABCB Standard for Construction of Buildings in Flood Hazard Areas.

4.1.3 BCA Section C – Fire Resistance

Spec C1.1	The building elements must incorporate the following fire resistance levels (FRL) and characteristics – ❑ *External Walls – Loadbearing* FRL of 90/60/30 where greater than 3m from a fire-source feature (i.e. side boundary or adjoining building). ❑ *External Columns* 90/--/-- if loadbearing. ❑ *Internal Walls* (i) FRL of 90/90/90, where bounding a lift and stair shaft

Spec C1.1 *Cont'd*

(ii) FRL of 60/60/60 or -/60/60 (if non-loadbearing), where located between or bounding sole-occupancy units; and
(iii) FRL of 60/60/60 or -/60/60 (if non-loadbearing), where bounding public corridors and the like;
(iv) 90/90/90 for ventilating, pipe, garbage and the like shafts not used for the discharge of hot products of combustion;
(v) 90/--/-- for all other loadbearing internal walls, beams, trusses and columns.

❑ *Internal Walls – Concessions*

Any internal column or wall (excluding shaft walls) located in the storey immediately below the roof (level) need only achieve an FRL 60/60/60.

❑ *Floors*

(i) --/--/-- when laid directly on the ground;
(ii) 90/90/90 in all other instances.

❑ *Roofs*

(i) FRL of –/–/– for the roof on basis that the covering is non-combustible;
(ii) 90/90/90 for the top of any shaft if it does not extend above the roof covering.

❑ *General Notes*

(i) Internal walls required to have an FRL must extend -

- To the underside the floor next above; or
- To the underside of a roof covering if it is non-combustible and must not be crossed by timber or other combustible building elements, expect for roof battens with dimensions of 75mm x 50mm or less or sarking-type material; or
- A ceiling that is immediately below the roof and has a resistance to the incipient spread of fire to the roof space between the ceiling and the roof of not less than 60 minutes; and

(ii) If a stair shaft supports a floor or any structural part of it –

- The floor (or part) must have FRL of at least 60/--/--; or
- The junction of the stair must be constructed such that the floor (or part) will be free to sag or fall without causing structural damage to the shaft

(iii) A loadbearing internal wall and a loadbearing fire wall must be of concrete or masonry; and
(iv) A non-loadbearing internal wall required to achieve a FRL must be of non-combustible construction; and
(v) Internal walls of lightweight construction required to have an FRL must comply with Specification C1.8; and
(vi) External walls must be non-combustible.

Spec C1.8	Any internal walls of lightweight construction which are required to achieve an FRL must be tested for resistance in accordance with this clause.
Cl. C1.10	The fire hazard properties for materials are as follows- ❑ *Floor linings and floor coverings* (i) A critical radiant flux not less than 2.2kW/m^2 for any floor materials; and (ii) A maximum smoke development rate of 750 percent-minutes; and (iii) Group 1 or 2 for any portion of the floor covering that continues more than 150mm up a wall. ❑ *Wall lining and ceiling linings* A material used as a finish, surface, lining or attachment to a wall or ceiling must be - (i) Group 1 or Group 2 or Group 3 material in specific areas and other areas (i.e. within sole-occupancy units). ❑ *Air-handling ductwork* Rigid and flexible ductwork must comply with the fire hazard properties set out in AS4254. ❑ *Other materials* (i) Sarking type materials are to have a Flammability index not more than 5; and (ii) Other materials & insulation materials are to have a Spread-of-Flame index more than 9; and (iii) A Smoke-Developed Index not more than 8 if the Spread-of- Flame is more than 5.
Cl. C2.6	To minimise the risk of fire spreading from one floor to another via openings contained within external walls are to be provided with one of the following methods of construction – (i) Spandrels not less than 900mm in height and extend not less than 600mm above the finished floor level. The spandrel is required to be non-combustible and have an FRL being not less than 60/60/60; or (ii) The floor slab/s are to project outwards from the external face of the wall not less than 1100mm and extend not less than 450mm beyond the affected openings. The horizontal projection is required to be non-combustible and have an FRL being not less than 60/60/60; or (iii) Provide a sprinkler system throughout the building in accordance with BCA clause E1.5 and BCA Spec E1.5.

Cl. C2.6	(iv)	Purse a BCA Alternative Solution Report justifying that if the floor slabs in conjunction with the external walls of the building provide adequate vertical fire separation between the floors of the building.
Cl. C3.11	(i)	Any openings in internal walls required to have an FRL must be protected so as to not reduce the performance of the walls (i.e. FRL of -/60/60); and
	(ii)	The bathroom windows opening onto the external public corridor are required to be protected internally in accordance with BCA C3.4 or located at least 1500mm above the floor of the external corridor;
	(iii)	Each doorway providing access from a sole-occupancy unit to a public corridor, public lobby or the like is required to be protected by a self-closing tight fitting, solid core door, not less than 35mm thick.
Cl. C3.12		Where a service passes through a floor required to achieve an FRL, that service is required to be protected by either a shaft that will not reduce fire performance of the building elements it penetrates or in accordance with C3.15 (see below).
Cl. C3.15		Any proposed service penetrations (electrical, mechanical, plumbing, etc) that penetrates a building element which is required to be of fire resisting construction is required to be protected by either a fire seal or enclosed within a fire rated shaft.
Cl. C3.16		Construction joints, spaces and the like in and between building elements required to be fire-resisting with respect to integrity and insulation must be protected in a manner identical with a prototype tested in accordance with AS1530.4 to achieve the required FRL.

4.1.4 BCA Section D – Access and Egress

Cl. D1.6		The path of travel to an exit and any required exit is to have an unobstructed height throughout of not less than 2m (except a doorway 1980mm) and an unobstructed width not less than 1m.
Cl. D1.17		Access into the lift pit must be through the lift landing doors provided on the lowest level.
Cl. D2.3		The internal stairway connecting all four storeys is to be constructed in accordance with the following –
	(i)	Reinforced or prestressed concrete;
	(ii)	Steel in no part less than 6mm thick; or
	(iii)	Timber that –
		▪ Has a finished thickness of not less than 44mm; and ▪ Has an average density of not less than 800kg/m^3 at a moisture content of 12%;

Cl. D2.3 Cont'd

- Has not been joined by means of glue unless it has been laminated and glued with resorcinol formaldehyde or resorcinol phenol formaldehyde glue.

Cl. D2.7

Services or equipment comprising of electricity meters, distribution boards, ducts, central telecommunication distribution boards or equipment, electrical motors or other motor serving equipment in the building may be installed within any corridor, hallway, lobby or the like leading to a required exit, provided the services or equipment are enclosed by non-combustible construction or a fire-protective covering with doorways or openings suitably sealed against smoke spreading from the enclosure.

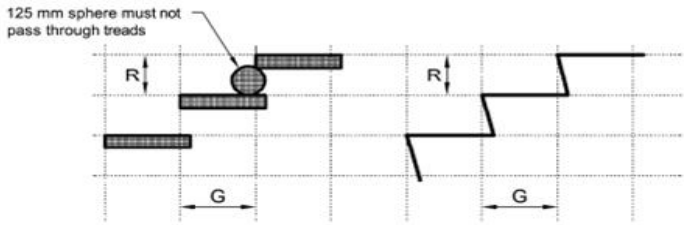
Cl. D2.9

Stairway/s are required to achieve a minimum width of at least 1m (measured clear of all obstructions, i.e. handrails, balustrades and the like) and extend to a height not less than 2m without interruption, when measured vertically above the nosings of the treads or the floor of the landings.

Cl. D2.13

The going, riser and steepness dimension of the internal stairway (new works only) must be designed within the following range.

Riser (R)		Going (G)		Slope Relationship (2R+G)	
Max	**Min**	**Max**	**Min**	**Max**	**Min**
190	115	355	240	700	550



The risers and goings are to be constant throughout the flight and the stair treads must also have a non-slip finish or adequate non skid strip near the edge of the nosings.

Cl. D2.14

Stair landings are to be a minimum of 750mm long and have a non-slip finish and a gradient not steeper than 1:50.

Cl. D2.15

The threshold of any doorway must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf.

That is unless the doorway opens to a road or open space and the door sill is not more than 190mm above the finished surface of the ground.

Cl. D2.16

Balustrades must be constructed as follows:-

(i) to a height not less than 865mm above the nosings of the stair treads or the floor of a ramp;

(ii) 865 mm above the floor beneath an openable window;

Cl. D2.16 Cont'd	(iii) 1000mm above the floor of any access path, balcony, landing or the like; (iv) any opening does not permit a 125mm sphere to pass through it and for stairs, the space is measured above the nosings; and (v) for floors more than 4000mm above the surface beneath, any horizontal or near horizontal elements between 150-mm and 760-mm must not facilitate climbing.
Cl. D2.17	Handrails must be fixed at a height of not more than 865mm measured above the nosings of the stair treads, ramp or landing and shall be continuous such that no obstruction on or above them will tend to break a hand hold.
Cl. D2.20	The exit doorways are to be provided with devices which would permit the doors to be held in the open position.
Cl. D2.21	Any door in a required exit, forming part of a required exit or in the path of travel to a required exit must be readily operable without a key from the side that faces a person seeking egress, and – (i) By a single hand pushing or downward action on a single device located between 900mm and 1100mm from the floor; and ▪ Be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch; and ▪ Have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35mm nor more than 45mm; or ▪ A single hand pushing action on a single device which is located between 900mm and 1.2m above the floor.
Cl. D2.24	Window openings to bedrooms must be provided with protection, if the floor below the window is 2m above the surface beneath. Protection need not be provided where the lowest level of the window is 1.7m or more above the finished floor level. (i) The openable portion of the window must be protected with a device to restrict the window opening or a screen with secure fittings; and (ii) The device or screen must not permit a sphere greater than 125mm is permitted to pass through; and (iii) Resist the outward horizontal action of 250N against the window or screen; and (iv) Have a child resistant release mechanism is able to be removed, unlocked or over ridden.
Cl. D3.1	Access is required to be provided from the property boundaries to the front door of all residential sole occupancy units and to and within all areas used in common by the residents.

Cl. D3.2 Entry paths leading from the street footpath to the entry of block u1-7 shall comply with AS1428.1-2009.

Cl. D3.3 The following matters are raised, not as deficiencies, but items to be address during design progression.

- *Doorways / Doors –*

  (i) All doorways shall have a minimum luminance contrast of 30% between –

  - door leaf and door jamb; or
  - door leaf and adjacent wall; or
  - architrave and wall; or
  - door leaf and architrave; or
  - door jamb and adjacent wall.

  The minimum width of the area of luminance contrast shall be 50mm.

  (ii) Door hardware shall have a clearance between the handle and the door face at the centre of the handle being not less than 35mm and not more than 45mm in accordance with AS1428.1-2009;

  (iii) All doors shall have a clear opening width of 850mm.

  (iv) All doors (excluding fire doors) fitted with self closers are required to achieve a maximum opening force of 20N.

- *Floor or ground surfaces*

  (i) A continuous accessible path of travel and any circulation spaces shall have a slip-resistant surface. The texture of the surface shall be traversable by people who use a wheelchair and those with ambulant or sensory disability;

  (ii) Abutment of surfaces shall have a smooth transition. Design transition shall be 0mm, however, construction tolerances are as follows –

  - 0±3mm vertical change in level;
  - 0±5mm change in level provided the edges have a bevelled or rounded edge to reduce the likelihood of tripping.

  (iii) Where carpets or any soft flexible materials are used on the ground or floor surface –

  - The pile height or pile thickness, shall not exceed 11mm and the carpet backing thickness shall not exceed 4mm;
  - Exposed edges of floor covering shall be fastened to the floor surface and shall have a trim along the entire length of any exposed edge;

Cl. D3.3
Cont'd

- At the leading edges, carpet trims and any soft flexible materials shall have a vertical face no higher than 3mm or a rounded bevelled edge no higher than 5mm or above that height a gradient of 1:8 up to a total maximum height of 10mm.

(iv) Matting recessed within an accessible path of travel –

- Where of metal and bristle type construction or similar, its surface shall be no more than 3mm if vertical or 5mm if rounded or bevelled, above or below the surrounding surface; and
- Where of a mat or carpet type material, shall have the fully compressed surface level with or above the surrounding surface with a level difference no greater than 3mm if vertical or 5mm if rounded or bevelled.

❑ <u>Grates</u>

Grates within an accessible path of travel shall have –

(i) Circular openings not greater than 13 mm in diameter;

(ii) Slotted openings not greater than 13 mm wide and be oriented so that the long dimension is transverse to the dominant direction of travel; and

(iii) Where slotted openings are less than 8 mm, the length of the slots may continue across the width of paths of travel.

❑ <u>Landings and circulations spaces</u>

Landings and circulation spaces on continuous accessible paths of travel shall have a gradient, crossfall and camber of not more than 1:40.

❑ <u>Stairway/s</u>

(i) The risers to any stairway are to be opaque (being closed);

(ii) Stair nosings shall not project beyond the face of the riser and the riser may be vertical or have a splay backwards up to a maximum 25 mm,

(iii) Stair nosing profiles shall –

- be chamfered up to 5 mm × 5 mm
- have a sharp intersection;
- be rounded up to 5 mm radius; or

(iv) At the nosing, each tread shall have a strip not less than 50 mm and not more than 75mm deep across the full width of the path of travel;

Cl. D3.3
Cont'd

(v) For a stairway, expect a fire-isolated stairway must comply with clause 11 and 12 of AS1428.1-2009;

(vi) A fire-isolated stairway must comply with clause 11.1(f) and (g) of AS1428.1-2009.

- ❑ Walkways

(i) a maximum gradient of 1:20, the gradient shall be constant throughout its length;

(ii) walkways with a gradient of 1:33 shall have landings at maximum 25 metre intervals;

walkways with a gradient of 1:20 shall have landings at maximum 15 metre intervals;

(iii) walkways with a gradient of 1:20 shall have landings at maximum 15 metre intervals;

(iv) if no kerb or handrail and kerbrail is provided, the floor or ground surface abutting the sides of a walkway shall have a firm and level surface of a different material to that of the walkway at the same level of the walkway.

- ❑ *Threshold ramps*

Threshold ramps at doorways shall –

(i) Have a maximum rise of 35mm; and

(ii) Have a maximum length of 280mm; and

(iii) A maximum gradient of 1:8; and

(iv) Be located within 20mm of the door leaf.

- ❑ Step Ramps

Step ramps on a continuous accessible paths of travel shall have:

(i) a maximum rise of 190mm; and

(ii) a maximum length of 1900mm; and

(iii) a maximum gradient of 1:10; and

(iv) landing at the top and bottom of the ramp not less than 150mm long; and

(v) edges splayed at 45 degrees where there is cross pedestrian traffic; or

Cl. D3.3 *Cont'd*

(vi) otherwise be protected as shown in figure 22(B) of AS1428.1-2009 by -

- a wall; or
- or suitable barrier not less than 450mm high; or
- handrail in conjunction with a kerb or kerbrail

❑ Ramps

Ramps on a continuous accessible path of travel shall:

(i) have a maximum gradient of 1:14 if the length of the ramp exceeds 1900mm; and

(ii) have a gradient constant throughout its length, with a maximum allowable tolerance of 3% provided no section of the ramp is steeper than 1:14; and

have landings with a minimum length of 1200 mm at the top and bottom of the ramp where there is no change in direction; and

(iii) have landings with a minimum length of 1500 mm at the top and bottom of the ramp where there is change in direction of not more than 90 degrees; and

(iv) have landings with a minimum dimension of 1540mm by 2070mm change if direction of 180 degrees is required; and

(v) have landings at intervals no greater than -

- 9000mm for a ramp with a 1:14 gradient;
- 15000mm for a ramp with a gradient of 1:20;

(vi) have a handrail on each side complying with clause 12 of AS1428.1-2009;

(vii) have handrails which extend a minimum of 300mm horizontally past the transition point at the top and bottom of the ramp;

(viii) have kerbs or kerb rails on both sides of the ramp and landings, complying with clause 10.3 of AS1428.1-2009;

(ix) Be set back a minimum of 900 mm from the property boundary so the handrail and tactile indicators are located on the property;

(x) Be provided with tactile indicators complying with the requirements of AS1428.4.1-2009.

A design detail should be provided for stairs and walkways within future design progression for assessment.

Cl. D3.5	The BCA does not require accessible carparking spaces for Class 2 buildings. Notwithstanding this Council may impose these to be provided.
Cl. D3.6	Clear and legible Braille and tactile signage complying with Specification D3.6 of the BCA and incorporating the international symbol of access or deafness, in accordance with AS1428.1 and located between 1200-1600mm from the floor must identify each – (i) sanitary facility in the common areas of the building, and (ii) "exit' door in the buildings required to be provided with an exit sign. Signage detail and location is required during design progression to enable a thorough compliance assessment by this office.
Cl. D3.8	Tactile ground surface indicators complying with sections 1 & 2 of AS1428.4.1 must be provided to warn people with a vision impairment that they are approaching a – (i) Stairway (other than a fire isolated stairway); (ii) ramp (other than a step ramp or kerb ramp); (iii) overhead obstruction less than 2m above floor level (other than a doorway); (iv) path of travel meeting a vehicular way adjacent to a principal public entrance to a building if there is no kerb or kerb ramp at that point. Detail should be provided within future design progression for compliance assessment and comment by this office.
D3.12	Where there is no chair rail, handrail or transom, all frameless or fully glazed doors, sidelights, including any glazing capable of being mistaken for a doorway or opening, shall be clearly marked for their full width with a solid contrasting line. The contrasting line shall be not less than 75mm wide and shall extend across the full width the glazing panel. The lower edge of the contrasting line shall be located between 900mm and 1000mm above the plane of the finished floor level. Any contrasting line on the glazing shall provide a minimum of 30% luminance contrast when viewed against the floor surface or surfaces within 2m of the glazing on the opposite side.

4.1.5 BCA Section E – Services & Equipment

Cl. E1.3	A fire hydrant system complying with AS2419.1 is required to serve the building. The architectural drawings are to be updated to include – (i) Internal hydrants are to be provided within the central stair; (ii) External hydrants (where required) are to be located greater than 10m from the building (iii) The provision of a fire brigade booster assembly enclosure within sight of the main entrance of the building.
Cl. E1.6	Portable fire extinguishers complying with AS2444 to cover Class A fire risks must be installed in the public corridors.
Cl. E2.2	The buildings must be provided with the following smoke hazard management system – (i) Each sole-occupancy unit is required to be provided with a smoke alarm complying with Clause 3 of Specification E2.2a of the BCA. The smoke alarm is to be located in the hallway serving all bedroom(s); and (ii) Public corridors and other internal public spaces are required to be provided with smoke alarms located inaccordance with the requirements AS1670.1 and complying with Clause 3 of Specification E2.2a of the BCA; and (iii) The smoke alarms in the public corridors and other internal public spaces are required to activate a building occupant warning system achieve a sound pressure level of 85dB(A) measured at the doorway providing access to the sole-occupancy unit (including the sole-occupancy units located on the ground floor).
Cl. E3.3	A warning sign must be displayed where it can be seen near every call button for a passenger lift, detailed to comply with BCA Clause E3.3 and Figure E3.3 and stating 'Do not use lifts if there is a fire'.
Cl. E3.6	The passenger lift shall comply with BCA cl. E3.6, AS1428.1 and AS1735 as applicable. We can confirm that the lift travels less than 12m and the BCA enables a concession for floor dimensions of 1100x1400mm, which is achieved by the current lift car. The car features shall comply with AS1428.1 or AS1735 in terms of the following features and a lift design certificate / specification is required to confirm compliance in this regard –

Cl. E3.6 Cont'd	(i) Handrails complying with the mandatory provisions of AS1735.12, (ii) Minimum clear door opening complying with AS1735.12, (iii) Passenger protection system complying with AS1735.12, (iv) Lift car and landing control buttons complying with AS1735.12, (v) Lighting in accordance with AS1735.12, (vi) Audible and visual information in accordance with BCA cl.E3.6, (vii) Emergency hands-free communication, including a button that alerts a call centre of a problem and a light to signal that the call has been received. Lift detail should be submitted to this office for a thorough compliance assessment.
Cl. E4.2	Emergency lighting complying with AS2293.1 must be installed to the internal stairways.

4.1.6 BCA Section F – Health & Amenity

Cl. F1.1	Stormwater drainage must comply with AS/NZS3500.3.
Cl. F1.4	Waterproofing membranes for external above ground use (i.e. first floor balconies) must comply with AS4654.
Cl. F1.5	Metal roof sheeting must comply with AS1562.1.
Cl. F1.6	Any Sarking-type materials used for weatherproofing of roofs and walls must comply with AS/NZS4200.
Cl. F1.7	Building elements in wet areas must be water-resistant or waterproof in accordance with Table F1.7 and comply AS 3740.
Cl. F1.9	Damp-proof courses must consist of a material complying with AS/NZS2904 or an impervious termite shield complying with AS3660.1.
Cl. F1.10	A floor laid directly onto ground or fill must be provided with a vapour barrier complying with AS2870.
Cl. F1.11	The bathrooms and laundry within each sole-occupancy unit must be graded to permit drainage to a floor waste.
Cl. F1.13	Refer to BCA Clause B1.4 above for glazing requirements.

Cl. F2.1	Each sole-occupancy unit shall have clothes drying facilities comprising – (i) Clothes line or hoist with no less than 7.5m of line; or (ii) Space for one (1) heat-operated drying cabinet or appliance in the same room as the clothes washing facilities.
Cl. F3.1	Ceiling heights throughout the building shall not be less than the following – (i) Class 2 building part – ▪ Habitable rooms – 2.4m; and ▪ Kitchens, laundries, corridor, passageway or the like – 2.1m; and ▪ Above a stairway – 2m. (ii) Class 7a building part – ▪ Carpark – 2 .1m; and ▪ Above a stairway, ramp or landing – 2m.
Cl. F4.4	Where compliant natural lighting is not provided, artificial lighting complying with AS/NZS1680.0 is required to be installed.
Cl. F4.5	Rooms must be provided with ventilation via either openings having an openable area of 5% of the floor area of the room or mechanical ventilation complying with AS1668.2.
Cl. F4.11	The carpark located on the lower ground floor level is to be provided with either – (i) A system of ventilation complying with AS1668.2; (ii) An adequate system of permanent natural ventilation.
Cl. F5.4	The intermediate floors separating sole occupancy units must have have an $R_w + C_{tr}$ (airborne) of not less than 50 and an $L_{n,w}+C_1$ (impact) not more than 62. In this regard, compliance may be achieved by utilising the following system – 150mm thick concrete slab with – (i) 28mm metal furring channels and isolation mounts fixed to the underside of the slab, at 600mm centres; and (ii) 65mm thick polyester insulation with a density of 8kg/m3, positioned between furring channels; and (iii) One (1) layer of 13mm plasterboard fixed to furring channels.

Cl. F5.5	Internal walls are required to be constructed as follows – (i) The walls that separate sole-occupancy units from public corridors and internal non-fire isolated stairways must have an Rw of not less than 50; and In this regard, compliance may be achieved by utilising the following system – ▪ Two (2) leaves of 110mm clay brick masonry with – A. Cavity not less than 50mm between leaves; and B. 13mm cement render on each outer face; and (ii) Doorways providing access to sole-occupancy units from public corridors and internal non-fire isolated stairways (i.e. stairwells) must have an R_w of not less than 30; and (iii) A wall required to have a sound insulation must be constructed such that it continues to the underside of – ▪ The floor above; or ▪ A ceiling that provides the same sound insulation require for the wall; or ▪ The underside of the roof above.
Cl. F5.5	(iv) Services must not be chased into concrete or masonry elements.
Cl. F5.6	Any duct, soil, stormwater, waste or water supply pipe (including a duct or pipe that is located in a wall or floor cavity) serves or passes through more than one (1) sole-occupancy unit, the duct or pipe must be separated from the rooms of any sole-occupancy unit by construction with an $R_w + C_{tr}$ (airborne) not less than - ❑ 40 if the adjacent room is a habitable room (other than a kitchen); or ❑ 25 if the adjacent room is a kitchen or non-habitable room.
Cl. F5.7	A flexible coupling must be used at the point of connection between the service pipes in a building and any circulating or other pump.
Cl. F5.6	Any duct, soil, stormwater, waste or water supply pipe (including a duct or pipe that is located in a wall or floor cavity) serves or passes through more than one sole-occupancy unit, the duct or pipe must be separated from the rooms of any sole-occupancy unit by construction with an $R_w + C_{tr}$ (airborne) not less than: ❑ 40 if the adjacent room is a habitable room (other than a kitchen); or ❑ 25 if the adjacent room is a kitchen or non-habitable room

Cl. F5.7	A flexible coupling must be used at the point of connection between the service pipes in a building and any circulating or other pump.

4.1.7 BCA Section G – Ancillary Provisions

Cl. G5.1	The client is to make representation with the relevant Authority to establish whether the subject site is located within a designated bushfire prone area. If the site is located within a designated bushfire area the services of a Bushfire Consultant would be required to ensure compliance.

4.2 BCA DETAILED ASSESSMENT – CLASS 1-10 BUILDINGS

4.2.1 General

With reference to the 'BCA Assessment Summary' contained within Part 3.2 of this report, the following detailed analysis and commentary is provided for residential Dwellings 11, 12, 13, 14 & 15.

This commentary is formulated to enable the design documentation to be further progressed, for the purpose of evidencing the attainment of compliance with the relevant provisions of the BCA.

4.2.2 Part 3.1 Site Preparation

Part 3.1.1.1 – 3.1.1.4	Excavation and fill utilising unprotected embankments can be undertaken provided the Structural Engineer for the project has prepared their design having regard to the requirements within this part of the BCA, as includes:- ❑ General earthwork ❑ Excavation adjacent to vacant property ❑ Excavation adjacent to existing buildings ❑ Fill adjacent to adjoining property In this regard, a Structural Engineer is required to verify design compliance with this part by producing a 'Design Certificate'.
Part 3.1.2	The drainage system is to be design and constructed in accordance with AS/NZS3500.3 or AS/NZS3500.5, Section 5. In this regard, a Hydraulic Engineer is required to prepare engineering drawings in accordance with the above standards and be accompanied by a 'Design Certificate'.
Part 3.1.3	Compliance with this part is achieved where termite protection is designed and installed in accordance with AS 3660.1-2003; and a durable notice is installed in a prominent location, such as a meter box or the like, indicating:- ❑ the method of termite risk management; and ❑ the date of installation of the system; and ❑ where a chemical barrier is used, its life expectancy as listed on the National Registration Authority label; and ❑ the installer's or manufacturer's recommendations for the scope and frequency of future inspections for termite activity. Appropriate termite protection detail need form part of the construction documents to ensure that compliance is achieved.

4.2.3 Part 3.2 Footings and Slabs

Part 3.2	A Structural Engineer is required to prepare structural engineering drawings in accordance with Part 3.2 of the BCA, AS2870 and AS3600. In this regard, a Structural Engineer is required to verify the design compliance with this part by producing a 'Design Certificate'.

4.2.4 Part 3.3 Masonry

Part 3.3.1	Masonry design and construction satisfies the requirements of this Part of the BCA where it is designed and constructed in accordance with – (i) AS3700; *or* (ii) AS4773. In this regard, a Structural Engineer is required to verify design compliance with this part by producing a 'Design Certificate'.

4.2.5 Part 3.4 Framing

Part 3.4.3	Timber framing satisfies the requirements of this Part of the BCA when it is designed and constructed in accordance with at least one of the following manuals:- (i) AS1684.2; or (ii) AS1684.4
Part 3.4.4	The use of structural steel members satisfies the requirements of this Part of the BCA when it is designed and constructed in accordance with at least one of the following manuals:- (i) AS4100 (ii) AS/NZS4600

4.2.6 Part 3.5 Roof & Wall Cladding

Part 3.5.1.3	The metal sheet roof cladding is to be designed and constructed in accordance with 'AS1562.1
Part 3.5.3.2	Gutters and downpipes shall be designed and constructed in accordance with AS/NZS3500.3 or AS/NZS3500.5, Section 5. The roof drainage system shall be designed so that any overflow during heavy rain periods is prevented from flowing back into the building. Appropriate gutter and downpipe detail need form part of the construction documents to ensure that compliance is achieved.

Part 3.5.3.5	External fibre-cement sheets and linings used as eaves and soffit linings must:- (i) comply with AS/NZS 2908.2 or ISO 8336; and (ii) be fixed in accordance with Table 3.5.3.3 and Figure 3.5.3.3 using – ❑ 2.8×30 mm Fibre-cement nails; or ❑ No. 8 Wafer head screws (for 4.5 mm and 6 mm sheets only); or ❑ No. 8 Self embedding head screws (for 6 mm sheets only).

4.2.7 Part 3.6 Glazing

Part 3.6	The glazing and windows satisfies the requirements of this part of the BCA where designed and installed in accordance with both AS2047 and AS1288.

4.2.8 Part 3.7 Fire Safety

Part 3.7.1.8	The common walls separating the dwellings shall have an FRL of not less than 60/60/60, commence at the footings or ground slab and extend to the underside of the non combustible roof covering. The separating wall must not: ❑ be crossed by timber or other combustible building elements except for roof battens with dimensions of 75x50 mm or less, or roof sarking; and ❑ must have any gap between the top of the wall and the underside of the roof covering packed with mineral fibre or other suitable fire resisting material. Any service opening, other than those listed below, in a masonry separating wall must have construction with an FRL of not less than --/60/60. If an electrical wire or cable penetrates a separating wall:- ❑ the service and building element at the penetration must be identical with a prototype assembly which has been tested in accordance with AS 4072.1 and AS 1530.4 and achieved an FRL of not less than -/60/60; or ❑ the service must be installed so that:- - the opening is neatly formed, cut or drilled and no closer than 50 mm to any other service; and - the opening is no larger in cross-section than 2000 mm2 if only a single cable is accommodated and the gap between the cable and the wall is no wider than 15 mm; or 500 mm2 in any other case; and

Part 3.7.1.8 *Cont'd*	❑ any gap between the service and the wall is packed with mineral fibre or other suitable fire resistant material. If an electrical switch, outlet, socket or the like is accommodated in a separating wall:- ❑ the service and building element at the penetration must be identical with a prototype assembly which has been tested in accordance with AS 4072.1 and AS 1530.4 and achieved an FRL of not less than --/60/60; or ❑ the service must be installed so that the opening or recess must not be located opposite any point within 300 mm horizontally or 600mm vertically of any opening or recess on the opposite side of the wall; or extend beyond half the thickness of the wall; and any gap between the service and the wall is packed with mineral fibre or other suitable fire resistant material.
Part 3.7.1.9	The sarking-type materials used in the roof must have a flammability index of not greater than 5.
Part 3.7.2.2	The building is to be provided with a smoke alarm complying with AS3786 – 1993 and be connected to the consumer mains power where consumer power is supplied to the building.
Part 3.7.2.3	Smoke alarms must be installed on or near the ceiling in the living area directly outside the bedroom entrances in each dwelling.
Part 3.7.4	The client is to make representation with the relevant Authority to establish whether the subject site is located within a designated bushfire prone area. If the site is located within a designated bushfire area the services of a Bushfire Consultant would be required to ensure compliance.

4.2.9 Part 3.8 Health & Amenity

Part 3.8.1	Wet areas shall comply with the requirements of this Part of the BCA where designed and installed in accordance with AS3740-2004.
Part 3.8.2	The ceiling heights throughout the building shall not be less than 2.1m for kitchens, laundries, corridors, passageways and all habitable rooms shall not be less than 2.4m.
Part 3.8.5.2	The sanitary compartments located Unit 12, Unit 15 & Unit 16 are required to be provided with a means of mechanical ventilation.
3.8.6.2	The common walls which separate the sole-occupancy units from one another are required to discontinuous construction and achieve an $R_w + C_{tr}$ value of not less than 50.

3.8.6.4	Services must not be chased into concrete or masonry separating walls, If a duct, soil, waste, water supply or storm water pipe serves or passes through a separating wall, then such should be treated in accordance with Part 3.8.6.4 of the BCA, Water supply pipe must only be fitted in discontinuous construction and where serving one dwelling, not be fixed to the wall leaf on the side of any other dwelling, Electrical outlets must be offset from each other in masonry walling, not less than 100-mm.

4.2.10 Part 3.9 Safe Movement & Access

Part 3.9.1.5	Where a threshold is more than 190mm above the adjoining surface it must incorporate steps having riser and going dimensions in accordance with Part 3.9.1.4 of the BCA.

4.2.11 Part 3.10 Additional Construction Requirements

Part 3.10.1	If the subject site is located within a high wind area, the building is to be designed and constructed in accordance with AS4055-1992. In this regard, a Structural Engineer is required to verify design compliance with this part by producing a 'Design Certificate'
Part 3.10.2	If the subject site is located within an area with seismic activity, the building is to be designed and constructed in accordance with the requirements listed within the part. In this regard, a structural engineer is required to verify design compliance with this part by producing a 'design certificate'.

Report By

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Principal
For Design Confidence (Sydney) Pty Ltd

Verified By

Nehme Moujalli
Associate
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APPENDIX 1

This BCA design assessment was based upon the Architectural documentation prepared by Land & Housing Corporation Finance & Services, namely –

Plan Title	Drawing No	Revision	Date
General Site Plan	02	B	03.04.2014
Carparking Level & Ground Floor Townhouse Plan	03	B	03.04.2014
Ground Floor & First Floor Townhouse Plan	04	B	03.04.2014
First Floor Plan	05	B	03.04.2014
Second Floor Plan	06	B	03.04.2014
Roof Plan	07	B	03.04.2014
Elevations 1	08	B	03.04.2014
Elevations 2	09	B	03.04.2014
Sections	10	B	03.04.2014

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