REF: 064514-02BCA

BUILDING CODE OF AUSTRALIA REPORT

Abercrombie Precinct Redevelopment Stage 1 – Business School Codrington Street, Darlington

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Date	Rev No	No. of pages	Issue or Description of Amendment	Checked By	Approved By	Date Approved
12.07.13	A	23	Draft for Section 75W Application	Brigitte Thearle		18.07.13
18.07.13	B	23	Final for Section 75W Application	Brigitte Thearle		30.07.13

Executive Summary

As Accredited Certifiers, we have reviewed architectural design documents prepared by Kann Finch (refer appendix A) for compliance with the Building Code of Australia 2012. Refer Section 1.1 of this report for BCA applicable to this project.

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

DTS Clause	Description of Non-Compliance	Performance Requirement
C1.1, C2.2	The compartmentation on each level forming the compartmentation is proposed to have reduced fire resistance. For separation of the lecture theatres and case study rooms from the circulation space it is proposed to have a wall achieving 60/60/60 forming the fire wall and for construction separating the offices and the like from the circulation space the compartmentalising construction will be smoke separated in lieu of fire separated.	CP2
C3.3, C3.4	It is proposed to not provide protection to openings exposed in adjacent 'compartments' and assess the exposure as part of the alternate solution to BCA Performance Requirement CP2.	CP2, CP8
Part G3	The atrium at levels lower ground, ground, one, two, three and four is not provided with bounding walls and the floor area exceeds that permitted in clause C2.2.	CP2, EP2.2
D1.3	The required, non-fire isolated stair within the atrium well connects more than 3 storeys and is not fire isolated. This stair has been used for egress on Level 1 and 2.	DP5
D1.4	Travel distance to a point of choice throughout the building of up to 30m in lieu of 20m.	DP4, EP2.2
D1.4	Travel distance to a point of choice or single exit in plant areas of up to 36m in lieu of 20m.	DP4, EP2.2
D1.4	Travel distance to an exit where 2 or more are available of up to 65m to the business school in lieu of 40m.	DP4, EP2.2
D1.4	Travel distance to an exit where 2 or more are available of up to 60m to the carpark in lieu of 40m.	DP4
D1.4	Travel distance from rooftop plant areas of up to 95m in lieu of 20m.	DP4, EP2.2
D1.5	Travel distance between alternate exits throughout the building of up to 90m in lieu of 60m	DP4, EP2.2
D1.7	The path from the discharge of fire isolated exits to the road necessitates passing within 6m of the building the stairs serve, and those openings are not proposed to be protected.	DP5
D1.9	Required non-fire isolated stairs that serve as exits for Level 1	DP4

	and 2 are not considered continuous by their own flight. Each stair between levels is considered a separate stairway.	
D1.9	Travel by required non-fire isolated stairs that serve as exits for Level 1 and 2 exceeds 80m to road or open space.	DP4
E1.3	The fire hydrant booster assembly is not proposed to be located within sight of the main entrance and is within 10m of the building it serves and is not proposed to be provided with radiant heat protection	EP1.3
E1.4	For lecture theatres less than 500m2 which are considered a separate compartment to the remainder of the building, fire hose reel coverage is not proposed to be provided. Some coverage will be provided by hose reels in the glue space; however this will require the hose reel passing through fire doors. Lecture theatres over 500m2 will be provided with fire reel coverage, however the hose will need to pass through fire doors. For the separate compartments divided by smoke proof construction and smoke doors, fire hose reel coverage is to be provided, however the hose will need to pass through the smoke doors to achieve coverage.	EP1.1
E1.5	It is proposed to adopt AS 2118.1-2006 in lieu of AS 2118.1-1999 as required by the Building Code of Australia 2011.	EP1.4
E1.5	Deletion of sprinklers to the space below the access floor. This space has a height of 450mm and will have services running through the space.	EP1.4
E2.2a, Part G3	Rationalisation of smoke hazard management. The building is proposed to rely on natural smoke exhaust and ventilation as much as possible with the central 'glue' space not proposed to be mechanically ventilated.	EP2.2
E2.2a	It is not proposed to provide the stairs serving the atrium with automatic stair pressurisation.	EP2.2
E2.2a	As part of the smoke detection and alarm system, it is not proposed to provide smoke detectors to the ceiling voids as required by AS 1670.1. Fast response sprinkler heads are proposed to be provided to the ceiling voids.	EP2.2

The fire engineered solution relating to EP1.3, EP1.4, EP2.2 and EP3.2 will need to be resolved in consultation with the NSW Fire Brigade as part of the Crown Certificate process.

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

Please note this report is for the School of Business only.

Assessed By

Brigitte Thearle

1.0 Introduction

The proposed development comprises of a new school of business containing carparking, lecture theatres, seminar and case study rooms, shared and informal learning areas, PHD student offices, academic and administration offices. These are located in pods which are all interconnected by the circulation space.

The site is located on the site immediately east of Darlington Public School and is bounded by Darlington Lane, Codrington Street and Abercrombie Street.

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 is in place at the time of invitations to tender.

2.0 Building Assessment Data

Summary of Construction Determination: -

	School of Business
Classification	5, 7a, 9b
Number of Storeys Contained	7
Rise In Storeys	7
Type of Construction	A
Effective Height (m)	23.35

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

Part of Project	BCA Class	Approx. Floor Area (m^2)	Assumed Population	Staff Population	Student Population
Lower Ground: Loading Dock	7a	135m^2	-	-	-
Lower Ground: Plant/Store	7a	749m^2	-	-	-
Lower Ground: Lecture Theatres	9b	517m^2	550	-	550
Lower Ground: Student Service Centre	9b	132m^2	7	-	7
Lower Ground: Glue/Circulation	9b	437m^2	22	-	22
Lower Ground Total		**1,970m²**	**579**	**0**	**579**
Upper Carpark: Carpark	7a	2,748m^2	-	-	-

Part of Project	BCA Class	Approx. Floor Area (m^2)	Assumed Population	Staff Population	Student Population
Upper Carpark: Plant	7a	145m^2	-	-	-
Upper Ground Total		**2,893m²**	**-**	**-**	**-**
Ground: Lecture Theatres	9b	929m^2	900	-	900
Ground: Seminar & Case Study Rooms	9b	669m^2	508	-	508
Ground: Computer Lab	9b	224m^2	112	-	112
Ground: Learning Hubs	9b	788m^2	79	-	79
Ground: Student Commons	9b	362m^2	37	-	37
Ground: Cafe	9b*	135m^2	70	-	70
Ground: Glue/Circulation	9b	2,512m^2	126	-	126
Ground Total		**5,619m²**	**1,832**	**-**	**1,832**
Level 1: Seminar & Case Study Rooms	9b	3,098m^2	1,132	-	1,132
Level 1: Student Commons & Club Room	9b	609m^2	61	-	61
Level 1: Glue/Milling	9b	1,618m^2	81	-	81
Level 1 Total		**5,325m²**	**1,274**	**-**	**1,274**
Level 2: Seminar & Case Study Rooms	9b	2,661m^2	834	-	834
Level 2: Office	5	495m^2	50	50	-
Level 2: Student Commons/Milling	9b	671m^2	68	-	68
Level 2: Glue/Circulation	5, 9b	1,340m^2	74	-	74
Level 2 Total		**5,167m²**	**1,026**	**50**	**976**
Level 3: Offices & Workstations	5	4,567m^2	457	457	-
Level 3: Glue/Circulation	5	1,003m^2	-	-	-
Level 3 Total		**5,570m²**	**457**	**457**	**-**
Level 4: Offices & Workstations	5	1,255m^2	126	126	-
Level 4: Dining Seating	6	138m^2	69	69	-
Level 4: Glue/Circulation	5	686m^2	-	-	-
Level 4 Total		**2,079m²**	**195**	**195**	**-**
Total		**28,623m²**	**5,363**	**702**	**4,661**

Notes:
1. The above populations have been base on the floor areas and calculations provided by Kann Finch.
2. The floor areas have been adjusted without ancillary areas such as sanitary facilities, corridors, shelving and or racking layouts in storage areas.
3. The terrace areas have been considered ancillary to the use for the purposes of population numbers.
4. Lecture theatre, case study and seminar room populations are based on numbers provided.
5. As the café comprises of less than 10% of the floor area of the ground floor, it will be considered Class 9b

3.0 Structural Provisions

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

Glazing is to comply with AS1288, and AS2047.

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

4.0 Fire Resistance

The buildings should be constructed generally in accordance with Table 3 & 3.9 of Specification C1.1 of the Building Code of Australia 2011. The building is required to be Type A Construction.

Levels lower ground through to level 4 are proposed to be connected by an atrium. The occupied areas of the building are proposed to be separated from the atrium, however this separation does not comply with the requirements for bounding walls to atriums. It is proposed to consider the occupied areas as separate fire compartments to the atrium, however the compartmentalising construction on each level is proposed to have reduced fire resistance. The compartmentalising construction between the lecture theatres and case study rooms from the circulation space is proposed to have a wall achieving 60/60/60 forming the fire wall and for construction separating the offices and the like from the circulation space the compartmentalising construction will be smoke separated in lieu of fire separated. The rating of 60 minutes and smoke compartmentation is in lieu of the required FRL of 120/120/120.This is to be assessed as part of the alternate solution to BCA Performance Requirements CP2 and EP2.2. The proposed compartmentation is as follows:

- Separation between the carpark portions and the remainder of the building by construction achieving 120/120/120.
- Levels lower ground (excluding carpark), ground, one, two, three and four are connected by the atrium.
- Lifts connecting more than three storeys and stairs connecting more than three storeys will be fire isolated
- All lecture theatres and case study rooms will be separate compartments, with the fire wall achieving an FRL of 60 minutes in lieu of 120/120/120.
- All other areas off the central circulation space or ‘glue’ space will be smoke separated from the glue space and considered separate fire compartments, in lieu of the compartmentalising construction achieving 120/120/120.
- The ‘glue’ space over levels lower ground to 4 will form a single fire compartment and will exclude all areas smoke and fire separated from the glue space.

Fire resistance levels for building structural members are as follows:

- School portion 120 minutes
- Commercial portion 120 minutes
- Car park levels 120 minutes

All risers, shafts, etc., are to be fire separated to achieve an FRL of 120 minutes if loadbearing and 90 minutes if non loadbearing. The drawings currently indicate an FRL of 90 minutes. If these shafts are loadbearing, they are to be altered to achieve 120 minutes.

Note all fire rated shafts are to be enclosed at the top and bottom by fire rated construction.

4.1 Protection of Openings

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

1. Any external opening within 3m of the fire source feature protected by -/60/- fire rated construction, or externally located wall wetting sprinklers, or an alternate solution be provided to verify CP2 of the BCA.
2. Penetrations through fire rated floors to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a fire rated shaft achieving an FRL of 120 minutes;
3. Any penetration through a wall or room required to have an FRL (e.g. substation, boiler room, apartment separating wall etc) is to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a shaft achieving an FRL of 120 minutes (or 120/120/120 where it is a room such as a substation);
4. Self-closing -/60/30 fire doors to the doors opening to the fire isolated stairs (note that this also includes the access doors to the condenser units on the plant platforms).
5. Openings within external walls that are exposed to adjoining fire compartments.

Openings that are exposed to adjacent 'fire compartments' are not proposed to be protected. This is to be assessed as part of the alternate solution to BCA Performance Requirements CP2 and CP8.

Note that where fire dampers, fire collars, etc are utilised, allowance needs to be made for access hatches to be provided within the walls / ceilings to ensure that maintenance access is provided.

Fire source feature is defined as;
(a) The far boundary of a road, river, lake or the like adjoining an allotment,
(b) The side or rear boundary of the allotment,
(c) The external wall of another building on the allotment which is not a class 10 building.

4.2 Vertical Separation of openings in external walls:

Spandrel separation is not required to the building as it is proposed to be sprinkler protected.

4.2 Passive Fire Protection

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

- Lift motor rooms,

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

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

4.3 Fire Hazard Properties

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

5.0 Egress

The egress provisions from the proposed building are provided by:

- Fire isolated stairways
- External perimeter doorways
- Required non-fire isolated stairways

The non-fire isolated stairs have been utilised for egress to levels 1 and 2 on the basis that stairs connecting three storeys in a sprinkler protected building do not need to be fire isolated.

The following items relating to the required non-fire isolated stairways are to be assessed as part of the alternate solution:

- Required non-fire isolated stairs that serve as exits for Level 1 and 2 are not considered continuous by their own flight. Each stair between levels is considered a separate stairway.
- Travel by required non-fire isolated stairs that serve as exits for Level 1 and 2 exceeds 80m to road or open space.

The atrium stair connecting level 2 and 3 is provided with a security gate. This layout is to be adjusted to provide a 750mm landing between the gate and the first riser without encroaching on the path for occupants coming up the stairs from level1.

Other detailing issues that will need to be addressed include:

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

5.1 Exit Travel Distances

The locations of the proposed exits would appear to indicate that the egress provisions to the building will need to be assessed as part of the alternate solution.

The deemed to satisfy provisions require travel distances to exits to not exceed:

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

The following extended travel distances are to be verified as part of the alternate solution. These will need to be verified to BCA Performance Requirement DP4 and EP2.2

- Travel distance to a point of choice throughout the building of up to 30m in lieu of 20m.
- Travel distance to a point of choice or single exit in plant areas of up to 36m in lieu of 20m.
- Travel distance from rooftop plant areas of up to 95m in lieu of 20m
- Travel distance to an exit where 2 or more are available of up to 65m to the business school in lieu of 40m.
- Travel distance to an exit where 2 or more are available of up to 60m to the carpark in lieu of 40m.
- Travel distance between alternate exits to all portions of up to 90m in lieu of the required 60m.

Where proposed distances exceed these distances, the design is to be resolved to comply with the distances nominated above.

5.2 Dimensions of Exits

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

The following table summarises the exit widths required:

Floor Level	Exit Width Provided	Number of people (as provided)	Exit Width required
Lower Ground	5m	579	5.5m
Upper Carpark Level	2m	97	1m
Ground	16m	1,832	16m
Level 1	16.5m	1,274	11m
Level 2	10m	1,026	9m
Level 3	5m	457	2m
Level 4	3m	195	4.5m

* Assuming there are double egress doors out to the courtyard and at the main entry for egress.

Please confirm all exits from the ground floor.

All egress doors and doors to fire isolated stairs are to swing in the direction of egress.

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).

5.3 Fire Isolated Exits

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

- A road or open space; or
- To a point within the confines of the building, that is used only for pedestrian movement, car parking or the like and is open for at least 2/3 of its perimeter; and from which an unimpeded path of travel, not further than 20 m, is available to a road or open space; or
- Into a covered area that adjoins a road or open space, is open for at least 1/3 of its perimeter, has an unobstructed clear height throughout, including the perimeter openings, of not less than 3 m and provides an unimpeded path of travel from the point of discharge to the road or open space of not more than 6 m.

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

The path from the discharge of fire isolated exits to the road necessitates passing within 6m of the building the stairs serve, and those openings are not proposed to be protected. The paths of travel are to be assessed to BCA Performance Requirement DP5.

5.4 Balustrading and Handrail

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

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

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.

5.5 Access for Persons with a Disability

Access for people with disabilities shall be provided to and within the building in accordance with the requirements of Clause D3.2, D3.3 and D3.4 of the BCA 2011. Parts of the building required to be accessible shall comply with the requirements of AS1428.1-2009.

General

Access to be provided to and within the building pursuant to AS1428.1-2009 as follows:
- Via the principle public entry from the street 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 generally used by the occupants.

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

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.

A hearing augmentation-listening system shall be installed throughout the building where the building has an inbuilt amplification system (other than one used in an emergency) in accordance with the requirements of Clause D3.7 of the BCA.

Access from the street is currently proposed to the following entrances:

- Main entrance on ground floor off Codrington Street.
- Western Darlington Lane entrance where access is provided to level 1.
- Entrance between the two north eastern learning hubs
- Entrance to between the southern learning hub and the 300 seat lecture theatre
- Westernmost entrance to the south façade
- Central entrance on the north façade from Codrington Street. It is noted access is not provided to this entrance from Darlington Lane

Please confirm the above entrances are accessible.

It is noted that lift access adjacent to the main atrium stair is provided to all levels, with additional lifts provided to the ground floor to address the changes in level from the east and western components of the floor plate.

It is noted that no pedestrian access is provided to the lower ground level off Codrington Street except via the grass for egress only.

Where fixed seating is provided in the lecture theatres, wheelchair seating spaces complying with AS 1428.1 must be provided as per the following:

- Up to 150 seats: 3 spaces with one single space and one group of two spaces
- 151-800 seats: 3 spaces plus one additional space for each additional 50 seats (or part thereof) in addition to 150. Not less than 1 single space and not less than 1 group of 2 spaces are to be provided, and there are not to be more than 5 spaces in any one group.

The seating provided for people with disabilities and the items to be addressed are as follows:

- 100 seat case study rooms to be provided with 3 wheelchair seating spaces.
- 300 seat lecture theatres to be provided with 6 wheelchair seating spaces.
- 550 seat lecture theatres to be provided with eleven wheelchair seating spaces.

It is assumed that the lecture theatres will not be used as a cinema.

6.0 Fire Services & Equipment

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

- An automatic sprinkler system in accordance with the relevant provision of clause E1.5 of the BCA and AS 2118.1-1999, AS 2118.4-1995, AS 2118.6-1995 throughout the building.
- Fire hydrants in accordance with clause E1.3 of the BCA and AS 2419.1-2005,
- Fire hose reels in accordance with clause E1.4 of the BCA and AS 2441-2005,
- Portable Fire Extinguishers in accordance with Clause E1.6 of the BCA and AS 2444-2001,
- Sound System & Intercom System for Emergency Purposes in accordance with AS 1670.4-2004.
- Emergency lighting, exit signage and directional exit signage is required throughout the building in accordance with Part E of the BCA and AS/NZS 2293.1-2005

A Fire Control Centre shall be provided in accordance with Clause E1.8 of the BCA.

6.1 Fire Hydrants

A system of Fire Hydrants is required to be provided to BCA Clause E1.3 and AS 2419.1-2005. We will reply upon design certificate from a Hydraulic Consultant.

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

The fire hydrant booster assembly is not proposed to be located within sight of the main entrance and is within 10m of the building it serves and is not proposed to be provided with radiant heat protection. The location of the booster is to be assessed to BCA Performance Requirement EP1.3.

Fire hydrants are to be provided within fire isolated stairs and in order to achieve coverage, on-floor supplementary hydrants will be required. Note that fire hydrants coverage is to comply with the requirements of AS 2410.1-2005.

6.2 Fire Hose Reels

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

Hose reels are to be located within 4m of exits and provide coverage within the building based on a 36m hose length.

Please note that fire hose reel coverage cannot pass through fire or smoke doors under the deemed to satisfy provisions.

For lecture theatres less than 500m^2 which are considered a separate compartment to the remainder of the building, fire hose reel coverage is not proposed to be provided. Some coverage will be provided by hose reels in the glue space; however this will require the hose reel passing through fire doors.

Lecture theatres over 500m^2 will be provided with fire reel coverage, however the hose will need to pass through fire doors.

For the separate compartments divided by smoke proof construction and smoke doors, fire hose reel coverage is to be provided, however the hose will need to pass through the smoke doors to achieve coverage.

The above three items are to be verified as part of the alternate solution by a suitably qualified fire engineer to BCA Performance Requirement EP1.1. It is noted that supplementary fire extinguishers are proposed to be provided in the compartments that do not achieve compliant coverage.

6.3 Automatic Sprinkler Protection

Deemed to satisfy provisions require an Automatic Fire Suppression System is required to Specification E1.5 and AS2118.1-1999 due to the atrium. It is proposed to adopt AS 2118.1-2006 in lieu of AS 2118.1-1999 as required by the Building Code of Australia 2011. This is to be assessed as part of the alternate solution to BCA Performance Requirement EP1.4.

It is proposed to not provide sprinkler coverage to the space below the access floor. This space has a height of 450mm and will have services running through the space. This, along with the above item is to be assessed as part of the alternate solution to BCA Performance Requirement EP1.4.

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

7.0 Ventilation and Smoke Hazard Management

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

- Automatic Shutdown of Mechanical Systems in accordance with the requirements of AS/NZS 1668.1-1998;
- Automatic Smoke Exhaust System activated by Automatic Smoke Detection & Alarm System in accordance with the requirements of BCA Spec E2.2b

- Automatic Smoke Detection and Alarm System in accordance with the requirements of BCA Spec E2.2a and AS 1670.1-2004

It is noted that pressurisation are required under the deemed to satisfy provisions due to the provision of an atrium. Part of the alternate solution includes that it is not proposed to provide the building with automatic pressurisation to fire isolated exits. This will be verified to BCA Performance Requirement EP2.2.

As part of the smoke detection and alarm system, it is not proposed to provide smoke detectors to the ceiling voids as required by AS 1670.1. Fast response sprinkler heads are proposed to be provided to the ceiling voids in lieu of detectors. This is to be assessed as part of the alternate solution to BCA Performance Requirement EP2.2.

The smoke hazard management system proposed will be rationalised and assessed against BCA Performance Requirement EP2.2.

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

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

8.0 Lift Services

The passenger lifts to be installed are to be: -

- fitted with warning signs, fire service controls in accordance with Clauses E3.3, E3.7, E3.9 and E3.10 of the BCA
- Stretcher facilities are to be provided within the lifts with minimum dimensions of 600m wide, 2000mm long and 1400mm high.
- An emergency lift at each core with stretcher facilities in accordance with part E3.4 of the BCA
- Be provided with the following: -
  - A handrail in accordance with AS 1735.12
  - Minimum internal floor dimensions as specified in Table E3.6b of the BCA i.e. 1,400mm x 1,600mm,
  - Minimum clear door opening complying with AS 1735.12
  - Passenger protection system complying with AS 1735.12
  - Have a set of buttons for operating the lift located at heights above level complying with AS 1735.12.
  - Lighting in accordance with AS 1735.12
  - Automatic audible information within the lift car to identify the level each time the car stops
  - Audible and visual indication at each lift landing to indicate the arrival of the lift car

9.0 Sanitary Facilities

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

Class	Occupant Number	Pop	Required		
			WC	Urinals	Basins
6, 9b Students	Male	2,331	26	25	33
	Female	2,331	50	NA	33
	Unisex Facility		3	NA	3
5 Staff	Male	351	18	9	12
	Female	351	24	NA	12
	Unisex Facility		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. At least one accessible sanitary facility is to be provided on each floor. Where there is more than one bank of sanitary facilities, a unisex accessible sanitary facility is to be provided to at least 50% of those banks.

At each bank of sanitary facilities where an accessible sanitary facility is provided, an ambulant facility for each sex is also to be provided.

A unisex accessible sanitary facility is to be provided on level 4 for at least one of the banks of facilities. This facility is to comply with AS 1428.1-2009.

10.0 Energy Efficiency

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

1. The building can comply with the deemed-to-satisfy provisions of the BCA, relating to the following areas:
   - Building Fabric
   - Glazing
   - Building Sealing
   - Air Conditioning & Ventilation Systems
   - Artificial Lighting & Power
   - Hot Water Supply

2. The building can be verified against a reference building as per Verification Method JV3. This requires that the proposed building and its services be shown to have an annual energy consumption of equal or less than the reference building which has been modelled as per the requirements of Part J of the BCA.

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

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

The proposed site will be located in a climate zone 5.

10.8 Access for Maintenance

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

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

Appendix A - Design Documentation

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

Drawing No.	Title	Date	Drawn By	Revision
6423-A2200	Plan – Lower Ground	29/07/2013	Kann Finch	F
6423-A2201	Plan – Upper Carpark Level	29/07/2013	Kann Finch	F
6423-A2202	Plan – Ground Floor Option B	29/07/2013	Kann Finch	F
6423-A2203	Plan – Mezzanine	29/07/2013	Kann Finch	F
6423-A2204	Plan – Level 01	29/07/2013	Kann Finch	F
6423-A2205	Plan – Level 02	29/07/2013	Kann Finch	F
6423-A2206	Plan – Level 03	29/07/2013	Kann Finch	F
6423-A2207	Plan – Level 04	29/07/2013	Kann Finch	F
6423-A2208	Plan – Level 05	29/07/2013	Kann Finch	F
6423-A2209	Plan – Roof Level	29/07/2013	Kann Finch	F
6423-A2210	Plan – Basement	29/07/2013	Kann Finch	F

Appendix B - Draft Fire Safety Schedule

	Essential Fire Safety Measures	Standard of Performance
1.	Access Panels, Doors	BCA Clause C3.13
2.	Automatic Fail Safe Devices	BCA Clause D2.19 & D2.21
3.	Automatic Fire Detection and Alarm System	BCA Spec. E2.2a & AS 1670 – 2004
4.	Automatic Fire Suppression System	BCA Spec. E1.5, G3.8, Spec G3.8 & AS 2118.1 – 2006, Alternate solution prepared by suitably qualified fire engineer.
5.	Building Occupant Warning System activated by the Sprinkler System	BCA Spec. E1.5 & AS 1670 – 2004
6.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2005
7.	EWIS	BCA Clause E4.9, G3.8, Spec G3.8 & AS 1670.4 - 2004
8.	Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 and AS/NZS 2293.1 – 2005
9.	Fire Control Centres	BCA Spec. E1.8
10.	Fire Blankets	AS 2444 – 2001
11.	Fire Dampers	BCA Clause C3.15, AS 1668.1 – 1998 & AS 1682.1 & 2 – 1990
12.	Fire Doors	BCA Clause C3.2, C3.4, C3.5, C3.6, C3.7 & C3.8 and AS 1905.1 – 2005
13.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005
14.	Fire Hydrant System	Clause E1.3 & AS 2419.1 – 2005 Alternate solution prepared by suitably qualified fire engineer.
15.	Fire Seals	BCA Clause C3.15 & AS 1530.4 – 1997
16.	Lightweight Construction	BCA Clause C1.8 & AS 1530.3 – 1999
17.	Mechanical Air Handling System	BCA Clause E2.2, AS/NZS 1668.1 – 1998 & AS 1668.2 – 1991
18.	Paths of Travel	EP&A Reg 2000 Clause 186 Alternate solution prepared by suitably qualified fire engineer.
19.	Portable Fire Extinguishers	BCA Clause E1.6 & AS 2444 – 2001
20.	Required Exit Doors (power operated)	BCA Clause D2.19(d)
21.	Smoke Hazard Management System	BCA Part E2 & AS/NZS 1668.1 – 1998 Alternate solution prepared by suitably

	Essential Fire Safety Measures	Standard of Performance
		qualified fire engineer.
22.	Smoke Dampers	AS/NZS 1668.1 – 1998
23.	Smoke Doors	BCA Spec. C3.4
24.	Wall-Wetting Sprinklers	BCA Clause C3.4 & AS 2118.2 – 1995
25.	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)**			
	Structural adequacy/Integrity/Insulation			
	2, 3 or 4 part	**5, 7a or 9**	**6**	**7b or 8**
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any *fire-source feature* to which it is exposed is—				
For *loadbearing* parts—				
less than 1.5 m	90/ 90/ 90	120/120/120	180/180/180	240/240/240
1.5 to less than 3 m	90/ 60/ 60	120/ 90/ 90	180/180/120	240/240/180
3 m or more	90/ 60/ 30	120/ 60/ 30	180/120/ 90	240/180/ 90
For non-*loadbearing* parts—				
less than 1.5 m	–/ 90/ 90	–/120/120	–/180/180	–/240/240
1.5 to less than 3 m	–/ 60/ 60	–/ 90/ 90	–/180/120	–/240/180
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—				
less than 3 m	90/–/–	120/–/–	180/–/–	240/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90/ 90	120/120/120	180/180/180	240/240/240
INTERNAL WALLS—				
Fire-resisting lift and stair *shafts*—				
Loadbearing	90/ 90/ 90	120/120/120	180/120/120	240/120/120
Non-*loadbearing*	–/ 90/ 90	–/120/120	–/120/120	–/120/120
Bounding *public corridors*, public lobbies and the like—				
Loadbearing	90/ 90/ 90	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—				
Loadbearing	90/ 90/ 90	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Ventilating, pipe, garbage, and like *shafts* not used for the discharge of hot products of combustion—				
Loadbearing	90/ 90/ 90	120/ 90/ 90	180/120/120	240/120/120
Non-*loadbearing*	–/ 90/ 90	–/ 90/ 90	–/120/120	–/120/120
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES				
and COLUMNS—	90/–/–	120/–/–	180/–/–	240/–/–
FLOORS	90/ 90/ 90	120/120/120	180/180/180	240/240/240
ROOFS	90/ 60/ 30	120/ 60/ 30	180/ 60/ 30	240/ 90/ 60

Table 3.9 REQUIREMENTS FOR CARPARKS

Building element			**FRL (not less than) Structural adequacy/Integrity/Insulation**
			ESA/M (not greater than)
Wall			
(a)	*external wall*		
	(i)	less than 3 m from a *fire-source feature* to which it is exposed:	
		Loadbearing	60/60/60
		Non-*loadbearing*	–/60/60
	(ii)	3 m or more from a *fire-source feature* to which it is exposed	–/–/–
(b)	*internal wall*		
	(i)	*loadbearing*, other than one supporting only the roof (not used for carparking)	60/–/–
	(ii)	supporting only the roof (not used for carparking)	–/–/–
	(iii)	non-*loadbearing*	–/–/–
(c)	*fire wall*		
	(i)	from the direction used as a *carpark*	60/60/60
	(ii)	from the direction not used as a *carpark*	as *required* by Table 3
Column			
(a)	supporting only the roof (not used for carparking) and 3 m or more from a *fire-source feature* to which it is exposed		–/–/–
(b)	steel column, other than one covered by (a) and one that does not support a part of a building that is not used as a *carpark*		60/–/– or 26 m^2/tonne
(c)	any other column not covered by (a) or (b)		60/–/–
Beam			
(a)	steel floor beam in continuous contact with a concrete floor slab		60/–/– or 30 m^2/tonne
(b)	any other beam		60/–/–
Fire-resisting lift and stair shaft (within the *carpark* only)			60/60/60
Floor slab and vehicle ramp			60/60/60
Roof (not used for carparking)			–/–/–

Notes:
1. ESA/M means the ratio of exposed surface area to mass per unit length.
2. Refer to Specification E1.5 for special requirements for a sprinkler system in a *carpark* complying with Table 3.9 and located within a multi-classified building.