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BCA Design Assessment Report

Kyeemagh Public School - Core 14
Jacobson Avenue
Kyeemagh NSW 2216

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CONTENTS

Project: Kyeemagh Public School – Core 14
Document Type: BCA Design Assessment Report
Report Number: P219_322-2 (BCA) NH

The following report register documents the development and issue of this and each subsequent report(s) undertaken by Design Confidence (Sydney) Pty Ltd.

Revision History:

OUR REFERENCE	REMARKS	ISSUE DATE
P219_322-1 (BCA) NH	Report updated to suit Sketch delivery design documentation	19 August 2019
P219_322-2 (BCA) NH	Report updated to suit Concept design documentation	20 September 2019

EXECUTIVE SUMMARY

This BCA Design Assessment report has been prepared by Design Confidence at the request of dwp on behalf of the Department of Education. With respect to the assessment undertaken the following areas in particular need further review as the project develops –

NO.	ITEMS FOR FURTHER CONSIDERATION	RESPONSIBILTY
1.	The following building elements and their components must be non-combustible within buildings of Type B construction – i. External walls and common walls, including all components incorporated in them, including the façade covering, framing and insulation ii. The flooring and floor framing of lift pits; Non-loadbearing internal walls where they are required to be fire-resisting.	Project Architect
2.	The following design documentation is to be provided as the design progress' – i. Detailed floor plans; ii. Sections; iii. Elevations; iv. Wall details; v. Door schedules; vi. Window schedules; Wall schedules indicating FRLs.	Project Architect
3.	A test report from a Registered Testing Authority must be provided to certify that the façade / external walls achieve compliance with BCA FP1.4 and FV1.	All
4.	The number and type occupants shall be confirmed to determine the required sanitary facilities for the school.	Project Architect / Client
5.	Additional breakout doors are to be provided within the H-Hall, at locations not closer than 9m to other exit doors in accordance with Clause D1.5 of the BCA.	Project Architect

1.0 INTRODUCTION

1.1 General

This BCA Design Assessment report has been prepared at the request of dwp and relates to the proposed development of Kyeemagh Public School, located at Jacobson Avenue, Kyeemagh NSW 2216.

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) Volume 1, edition 2019.

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.

1.3 Documentation Provided for Assessment

This assessment is based upon the Architectural documentation prepared by dwp 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:

(i) Work Health & Safety Act and Regulations;

(ii) Worksafe Authority requirements;

(iii) Structural and Services Design Documentation;

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

(v) The Disability (Access to Premises - Buildings) Standards 2010;

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

(vii) The Accessibility Provisions of the BCA; and

(viii) The Energy Efficiency Provisions of the BCA.

2.0 DEVELOPMENT DESCRIPTION

2.1 General

In accordance with the BCA, the assessment undertaken relates to the proposed development of Kyeemagh Public School – Core 14.

For the purpose of the BCA the subject development may be described as contained below.

2.2 Building Description

DESCRIPTION OR REQUIREMENT		
Building Classification	School building	Class 9b
	Hall	Class 9b
	Garden Store / H-PE ST (Store room)	Class 10a
Rise in Storeys	Main school building	Two (2)
	H-Hall	One (1)
Construction Type	Main school building	Type B
	H-Hall	Type C
Effective Height	<12m	
Floor Area	Main school building	~3,350m^2
	H-Hall	~560m^2
Volume	Unknown (Assumed within limitations)	
Climate Zone:	Climate Zone 5	

2.3 BCA Assessment – Interpretation Notes

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

(i) The buildings on the allotment have not been treated as having an air-handling system which recycles air from one (1) fire compartment (i.e. sole-occupancy unit) to another fire compartment or operates in a manner that may unduly contribute to the spread of smoke from one (1) fire compartment to another fire compartment;

(ii) Exits have been treated as coinciding with one being open to the sky;

(iii) The buildings have been treated as containing primary school students;

(iv) The student occupant population has been treated as being evenly distributed throughout the school at any one time;

(v) The H-Hall has not been assessed as having a raised stage exceeding 50m^2;

(vi) The hall has been treated as being directly associated with the school and not proposed to be use out of school hours. Hence, the number of required sanitary facilities for the school is determined inclusive of the hall;

(vii) The H-Hall building and the main school building have been treated as separate buildings on the same allotment;

(viii) The Garden Store and H-PE ST store room adjacent to the Multi Court have been assessed as class 10a buildings;

(ix) The Cola associated with the H-Hall building has been treated as contributing to the fuel load of the H-Hall building and hence has been counted in the total floor area;

(x) The seating area adjacent to the Multi Court has been treated as having fixed tiered seating;

(xi) The northern exit stairway serving the first floor has bene treated as fire isolated.

3.0 BCA ASSESSMENT SUMMARY – CLASS 2-9 BUILDINGS

3.1 General

The following table summarises the compliance status of the architectural design 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 'Additional design input' 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 'additional design input', a detailed analysis and commentary is provided within Part 4 of this report.

3.2 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			✓

3.3 Section C - Fire Resistance

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
C1.1	fire resisting construction			✓
C1.8	lightweight construction			✓
C1.9	non-combustible building elements			✓
C1.10	fire hazard properties			✓
C1.14	ancillary elements			✓
C2.2	general floor area and volume limitations			✓
C2.10	separation by lift shafts			✓
C2.12	separation of equipment			✓
C2.13	electricity supply system			✓
C3.2	protection of openings in external walls	✓		
C3.8	openings in fire-isolated exits			✓
C3.9	services penetrations in fire isolated exits			✓
C3.10	openings in fire isolated lift shafts			✓
C3.12	openings in floors and ceilings for services			✓

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
C3.15	openings for service installations			✓
C3.16	construction joints			✓
C3.17	columns protected with lightweight construction to achieve an FRL			✓

3.4 Section D - Access & Egress

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
D1.2	number exits required	✓		
D1.4	exit travel distances	✓		
D1.5	distance between alternative exits		✓	
D1.6	dimensions of exits and paths of travel to exits			✓
D1.7	travel via fire-isolated exits	✓		
D1.9	travel by non-fire-isolated stairways or ramps	✓		
D1.10	discharge from exits			✓
D1.17	access to lift pits			✓
D2.2	fire-isolated stairways and ramps			✓
D2.3	non-fire isolated stairways and ramps			✓
D2.7	installations in exits and paths of travel			✓
D2.8	enclosure of space under stairs and ramps			✓
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			✓

3.5 Section E - Services & Equipment

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
E1.3	fire hydrants			✓
E1.4	fire hose reels			✓
E1.6	portable fire extinguishers			✓
E2.2	general provisions			✓

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
E3.1	lift installations			✓
E3.3	warning against use of lifts in fire			✓
E4.2	emergency lighting requirements			✓
E4.5	exit signs			✓
E4.6	direction signs			✓

3.6 Section F - Health & Amenity

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
F1.0	weatherproofing of external walls			✓
F1.1	stormwater drainage			✓
F1.4	external above ground membranes			✓
F1.5	roof coverings			✓
F1.6	sarking			✓
F1.7	waterproofing of wet areas in buildings			✓
F1.10	damp-proofing of floors on the ground			✓
F2.3	facilities in class 3 to 9 buildings			✓
F2.5	construction of sanitary compartments			✓
F3.1	heights of rooms and other spaces			✓
F4.1	provision of natural light			✓
F4.2	methods and extent of natural lighting			✓
F4.4	artificial lighting			✓
F4.5	ventilation of rooms			✓
F4.8	restriction on location of sanitary compartments			✓
F4.9	airlocks			✓

3.7 Section G – Ancillary Provisions

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
G5.2	construciton in bushfire prone areas			✓

3.8 Section H – Special Use Buildings

BCA CLAUSE		COMPLIES	DOES NOT COMPLY	DESIGN DETAIL
H1.4	seating area			✓

4.0 BCA DETAILED ASSESSMENT – CLASS 2-9 BUILDINGS

4.1 General

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

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 Section B – Structure

Cl. B1.1	The resistance of a building or structure shall be greater than the most critical action effect determined by B1.2 of the BCA, AS/NZS 1170.0-2002 and B1.4 of the BCA.
Cl. B1.2	The structural design of the building is required to be determined in accordance with the varying "actions" considerations contained within this clause (i.e. permanent actions, imposed actions, wind / snow / ice / earthquake actions).
Cl. B1.4	The structural resistance of materials and forms of construction shall be determined in accordance with the following: (i) Masonry - AS3700-2018 (ii) Concrete construction - AS3600-2018 (iii) Footings and slabs – AS2870-2011 (iv) Steel construction - AS4100-1998 or AS/NZS 4600-2005 (v) Termite Risk Management - AS3660.1-2014 (vi) Piling - AS2159-2009 (vii) Glazed assemblies - AS2047-2014-amendments 1 & 2 (external), and/or AS1288-2006 (internal)

4.3 Section C – Fire Resistance

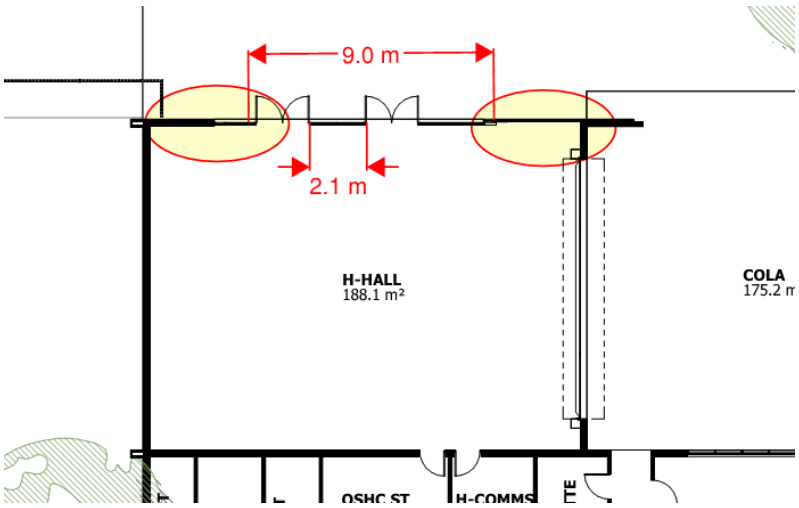
Cl. C1.1	The building elements are required to achieve the nominated FRLs as nominated within BCA Spec C1.1 as applicable, these FRLs have been summarised within Table A2.1 as contained within Appendix 3.
Cl. C1.8	Any lightweight construction to internal walls required to achieve an FRL or protection to steel columns required achieve an FRL are required to be tested for resistance in accordance with this clause.
Cl. C1.9	The following building elements and their components must be non-combustible – (i) External walls, including all components incorporated in them including the façade covering, framing and insulation; (ii) The flooring and floor framing of lift pits; (iii) Non-loadbearing internal walls where they are required to be fire-resisting.

Cl. C1.10	The fire hazard properties for materials proposed to be provided have been summarised within Table A3.1, as contained within Appendix 3.
Cl. C1.14	An ancillary element must not be fixed, installed or attached to the internal parts or external face of an external wall that is required to be non-combustible unless it is one of the elements permitted under this clause.
Cl. C2.2	The size of the fire compartments throughout the school do not exceed the following sizes, appropriate to the type of construction - (i) Type B – Max floor area of 5,500m^2 and Max volume of 33,000m^3; and (ii) Type C - Max floor area of 3,000m^2 and Max volume of 18,000m^3
Cl. C2.12	The following equipment must be separated from the remainder of the building: (i) If the lift motor and lift control panel which are not contained within the lift shaft; or (ii) Emergency generators used to sustain emergency equipment operating in the emergency mode; or (iii) Central smoke control plant; or (iv) Boilers; or (v) a battery system installed in the building that has a total voltage of 12 volts or more and a storage capacity of 200kWh or more. The above equipment is required to be separated with construction achieving an FRL of 120/120/120 and any access doorway is required to protected with a self-closing fire door having an FRL of --/120/30. When separating a lift shaft and lift motor room, an FRL of not less than 120/--/--. Any on-site fire pumps are required to be separated in accordance with AS2419.1-2005, which requires nil FRL if the building part is sprinklered.
Cl. C2.13	(i) The main switch board within the building which sustains emergency equipment operating in the emergency mode must be separated by construction having an FRL of not less than 120/120/120 and doorway to it must be protected with a fire door having a minimum FRL of --/120/30;

Cl. C2.13 Cont'd	(ii) Electrical conductors within the building that supply a switch board covered under (i) above must be protected with construction having an FRL of 120/120/120, and be classified in accordance with AS/NZS 3013-2005 as WS53W or WS52W, as applicable; and (iii) In switch boards that supply the emergency equipment mentioned above the emergency equipment switch gear must be separated by metal partitions designed to minimise the spread of a fault from the non-emergency equipment switch gear. (iv) For the purposes of the above, emergency equipment includes fire hydrant booster pumps and control & indicating equipment.
Cl. C3.8	Doorways that open to a fire-isolated stairway and are not doorways opening to a road or open space, must be protected by –/60/30 fire doors that are self-closing, or automatic-closing. The automatic-closing operation must be initiated by the activation of a smoke detector, or any other detector deemed suitable in accordance with AS 1670.1 if smoke detectors are unsuitable in the atmosphere, installed in accordance with the relevant provisions of AS 1670.1 and located not more than 1.5 m horizontal distance from the approach side of the doorway.
Cl. C3.9	Fire-isolated exits must not be penetrated by any services other than - (i) electrical wiring permitted by D2.7(e) to be installed within the exit; or (ii) ducting associated with a pressurisation system if it— ▪ is constructed of material having an FRL of not less than ---/120/60 where it passes through any other part of the building; and ▪ does not open into any other part of the building; or (iii) water supply pipes for fire services.
Cl. C3.10	The entrance doorway of lift shafts within buildings of Type B construction must be protected by --/60/-- fire doors that – (i) Comply with AS1735.11; and (ii) Are set to remain closed except when discharging or receiving passengers, goods or vehicles. Lift call panel, indicator panel or other panel in the wall of a fire-isolated lift shaft must be backed by construction having an FRL of not less than –/60/60 if it exceeds 35 000 mm^2 in area.
Cl. C3.12	Where a service passes through a floor required to have an FRL or (refer to Cl. C1.1), that service is required to protected by either a shaft in accordance with Cl. C1.1 or in accordance with Cl. C3.15.

Cl. C3.15	Any openings for service installations (electrical, mechanical, plumbing, etc.) that penetrates a building element which is required to have an FRL is required to be protected (i.e. fire seals).
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 are required to be protected in a manner identical with a prototype tested in accordance with AS1530.4-2015 to achieve the required FRL.
Cl. C3.17	Where a column is protected by lightweight construction to achieve the required FRL defined by Cl. C1.1 passes through a building element that is also required to have an FRL, it is required to be installed using a method and materials identical with the prototype assembly of the construction which has achieved the required FRL.

4.4 Section D – Access & Egress

Cl. D1.2	The H-Hall is determined as accommodating more than 50 persons and is provided with access to 2 exits, as required to satisfy this clause.
Cl. D1.4	All points of the floors are determined as being within the required travel distances to exit/s and points of choice to exits, as required to satisfy this clause.
Cl. D1.5	The H-Halll is provided with exits located less than 9m apart.  It is recommended that the exit door positions be re-configured so that they are located not less than 9m apart. Compliance is readily achievable.

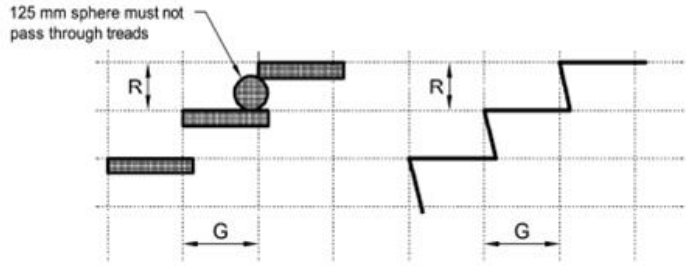
Cl. D1.5 *Cont'd*	Exits that are required as alternative means of egress must be – (i) distributed as uniformly as practicable within or around the storey served and in positions where unobstructed access to at least 2 exits is readily available from all points on the floor including lift lobby areas; and (ii) not less than 9 m apart; and (iii) not more than 60 m apart; and (iv) located so that alternative paths of travel do not converge such that they become less than 6 m apart.
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, which can be 1980mm) and an unobstructed width not less than 1m (except a doorway, which can be 750mm in an area not required to be accessible and 850mm in an area required to accessible). The combined aggregate widths from all buildings are required to comply with the dimensions specified within Clause D1.6 for the number of persons accommodated.
Cl. D1.9	The non-fire-isolated stairways are noted as being provided with a continuous means of travel by its own flights and landings from the first floor of the main building served to the ground level at which egress to a road or open space is provided. It is also noted that travel distances via the non-fire isolated stairways is in accordance with the requirements of this clause.
Cl. D1.10	The discharge points of the exits are required to have unobstructed width of 1m or required aggregate egress width and be via a stairway, ramp or other incline having a gradient of no steeper than 1:8 or complying with AS1428.1-2009 (where required to be accessible for people with a disability).
Cl. D1.17	Access into the lift pit must – (i) Where the pit depth is not more than 3m, be through the lowest landing doors; or (ii) Where the pit depth is more than 3m, be provided through an access doorway complying with this clause.
Cl. D2.2	A stairway or ramp (including any landings) that is required to be within a fire-resisting shaft must be constructed— (i) of non-combustible materials; and (ii) so that if there is local failure it will not cause structural damage to, or impair the fire-resistance of, the shaft.

Cl. D2.3	Required non-fire isolated stairways must be constructed in accordance with D2.2, or only of – (a) reinforced or prestressed concrete; or (b) steel in no part less than 6mm thick; or (c) timber that – (i) Has a finished thickness of not less than 44mm; and (ii) Has an average density of not less than 800 kg/m3 at a moisture content of 12%; and (iii) Has not been joined by means of glue unless it has been laminated and glued with resorcinol phenol formaldehyde glue.
Cl. D2.7	(i) Gas or other fuel services are not permitted to be installed within the required exits; and (ii) Any services or equipment (being electrical meters, distribution boards or the like) installed within the hallway are required to be enclosed by non-combustible construction or a fire-protective covering (i.e. 1 layer of 13mm fire-protective grade plasterboard) with doorway(s) or opening(s) suitably sealed against smoke spreading from the enclosure.
Cl. D2.8	The spaces (i.e. Accessible Shower Change room) below a required non-fire isolated stairway serving the main school building must not be enclosed to form a cupboard or other enclosed space unless – (i) The enclosing walls / ceilings are to achieve an FRL of not less than 60/60/60; (ii) The doorway opening into the store room is required to be a self-closing fire door achieving an FRL of --/60/30. It is noted that the MSB room is located below the southern non-fire isolated stairway, however the fire resisting requirements for the MSB rooms are more onerous requiring FRL of 120/120/120 and doors fitted with self-closing --/120/30. Hence, these requirements take precedence, in this regard.
Cl. D2.9	A required stairway or ramp that exceeds 2 m in width is counted as having a width of only 2m unless it is divided by a handrail or barrier continuous between landings and each division has a width of not more than 2m. The above requirement will be applicable to the external stairways as these are currently wider than 2m and an aggregate exit width in excess of 2m is required

Cl. D2.13

The going, riser and steepness dimension of the stairways are required to be designed within the following range:

Riser (R)		Going (G)		Slope Relationship (2R+G)	
Max	**Min**	**Max**	**Min**	**Max**	**Min**
190	115	355	250	700	550



(i) The risers and goings are required to be constant throughout the flight except variations of no greater than 5mm are permitted between adjacent risers or goings and no greater than 10mm are permitted between the smallest and largest goings or risers in a flight; and

(ii) The stair treads are required to have a surface or nosing strip achieving a slip-resistance classification of P3 or R10 in dry or P4 or R11 in wet tested in accordance with AS4586-2013 (amendment 1).

Cl. D2.14

Stair landings are required to be a minimum of 750mm long with a gradient not steeper than 1:50 and a surface or nosing strip achieving a slip-resistance classification.

The surface or strip is required to achieve a slip-resistance classification of P3 or R10 in dry or P4 or R11 in wet tested in accordance with AS4586-2013 (amendment 1).

Cl. D2.15

The threshold of a doorway is not permitted to 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:

(i) In a building required to be accessible, is provided with a threshold or step ramp in accordance with AS1428.1-2009; or

(ii) In all other cases, the door sill is not more than 190mm above the finished surface of the ground.

Cl. D2.16	Balustrades are required to 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) 1000mm above the floor of any access path, balcony, landing or the like; (iii) Any opening does not permit a 125mm sphere to pass through it and for stairs, the space is measured above the nosings; and (iv) For floors more than 4m above the surface beneath, any horizontal or near horizontal elements between 150mm and 760mm must not facilitate climbing.
Cl. D2.17	Handrails required to assist people with a disability must be provided in accordance with D3.3 (refer Access Design Assessment Report prepared by this office for detailed commentary). In addition to the above, handrails must – (i) have one handrail fixed at a height of not less than 865 mm; and (ii) have a second handrail fixed at a height between 665 mm and 750 mm, measured above the nosing's of stair treads and the floor surface of the ramp, landing or the like.
Cl. D2.19	A doorway serving as a required exit or forming part of a required exit – (i) Must not be fitted with a revolving door; (ii) Must not be fitted with a roller shutter or tilt-up door unless – ❑ It serves the Class 6 part with a floor area not more than 200m^2; and ❑ The doorway is the only required exit from the building or part; and ❑ It is held in the open position while the building part is lawfully occupied; and (iii) Must not be fitted with a sliding door unless – ❑ It leads directly to a road or open space; and ❑ The door is able to be opened manually under a force of not more than 110N; and (iv) If fitted with a door which is power-operated – ❑ It must be able to be opened manually under a force of not more than 110N if there is a malfunction or failure of the power source; and ❑ If it leads directly to a road or open space it must open automatically if there is a power failure to the door or on the activation of a fire or smoke alarm anywhere in the fire compartment served by the door.

Cl. D2.20	A swinging door in a required exit or forming part of a required exit must swing in the direction of egress unless – (i) It serves a building or part with a floor area not more than 200m^2, it is the only required exit from the building or part and it is fitted with a device for holding it in the open position; or (ii) It serves a sanitary compartment or airlock (in which case it may swing in either direction).
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 are required to 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; ❑ 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. (ii) Where the latch operation device referred to above is not located on the door leaf itself – ❑ Manual controls to power-operated doors must be at least 25mm wide, proud of the surrounding surface and located- ❑ Not less than 500mm from an internal corner; and ❑ For a hinged door, between 1m and 2m from the door leaf in any position; and ❑ For a sliding door, within 2m of the doorway and clear of a surface mounted door in the open position ❑ Braille and tactile signage complying with Clause 2 and 6 of Specification D3.6 must identify the latch operation. (iii) Fitted with a fail-safe device which automatically unlocks the door upon the activation of any sprinkler system or detection system deemed suitable in accordance with AS1670.1-2018 installed throughout the building.

Cl. D2.24	Window openings require protection, if the floor below the window is 4m 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. Protection can be in the form of the following: (i) Have a barrier not less than 865mm above the floor, with any horizontal or near horizontal elements between 150mm and 760mm must not facilitate climbing; (ii) The openable portion of the window must be protected with a device to restrict the window opening or a screen with secure fittings; (i) The device or screen must not permit a sphere greater than 125mm is permitted to pass through; (ii) Resist the outward horizontal action of 250N against the window or screen; and (iii) Have a child resistant release mechanism is able to be removed, unlocked or over ridden.

4.5 Section E – Services & Equipment

Cl. E1.3	A fire hydrant system complying with AS2419.1-2005 is required to serve the main school building. A fire hydrant system is required to serve the building compliant with AS2419.1-2005. In this regard, the following is noted – (i) All points on a floor are required to be within reach of a 10 m hose stream issuing from a nozzle at the end of a 30 m length of hose laid on floor connected to the fire hydrant outlet; (ii) Additional hydrants can be installed in appropriate locations, where additional coverage is required; (iii) The fire brigade booster assembly is required to be at the boundary of the site, be within sight of the main entrance of the building, adjacent to the principal vehicular access to the site and be located between 3.5-10m from the external of any building served or within the external wall of the building (if not sprinkler protected).

Cl. E1.4	A hose reel system complying with AS2441-2005 is required to serve the non-classroom parts of the school. A fire hose reel system must be provided— (i) to serve the whole building where one or more internal fire hydrants are installed; or (ii) where internal fire hydrants are not installed, to serve any fire compartment with a floor area greater than 500 m^2. Where hose reels are required to be provided, the following is noted – (i) Hose reels are required to be located within 4m of an exit; and (ii) All points on a floor are required to be in reach of a 4m hose stream at the end of a 36m hose length laid on the floor; Additional hose reels can be installed along the path of travel where additional coverage is required.
Cl. E1.6	Portable extinguishers must be provided in accordance with Table E1.6 and Section 1, 2, 3 and 4 of AS2444-2001. Portable fire extinguishers complying with AS2444-2001 are required as follows: (i) To cover Class A fire risks in classroom parts; (ii) To cover Class B (if more than 50L excluding vehicle fuel tanks is stored); and (iii) To cover Class AE or E fire risks associated with emergency service switchboards; and (iv) To cover Class F fire risks involving cooking oils and fats in kitchens.
Cl. E2.2	Automatic shutdown of any air handling system (other than non-ducted individual room units with a capability not more than 1000l/s and miscellaneous exhaust air systems installed in accordance with Sections 5 and 11 of AS/NZS1668.1-1998) on activation of smoke detectors complying with Clause 5 of Specification of E2.2a.

Cl. E2.2 *Cont'd*	Where a stage is provided with the H-Hall building, the following provisions apply – (i) A stage with a floor area of more than 50m^2 and not more than 150m^2 must, over the stage, be provided with – ▪ an automatic smoke exhaust system complying with Specification E2.2b; or ▪ roof mounted automatic smoke-and-heat vents complying with NSW H101.22, in a single storey building or the top storey of a multi storey building; or (ii) A stage with a floor area of more than 150 m^2 must, over the stage, be provided with an automatic smoke exhaust system complying with Specification E2.2b); or (iii) Where equipped with means of flying scenery must, over the stage, be provided with an automatic smoke exhaust system complying with Specification E2.2b.
Cl. E3.1	The electric passenger lift installation or an electrohydraulic passenger lift installation is required to comply with Specification E3.1.
Cl. E3.3	Warning signage is required to be displayed near every call button for the passenger lift.
Cl. E4.2	Emergency lighting complying with AS2293.1-2018 is required to be installed throughout.
Cl. E4.5	Exit signage complying with AS2293.1-2018 is required to be install above or adjacent to any doorway(s) serving as required exit(s) from the building.
Cl. E4.6	If an exit is not readily apparent to persons occupying or visiting either the building, then exit signs complying with AS2293.1-2018 are required to be installed in appropriate positions in corridors, hallways, lobbies and the like, indicating the direction to a required exit.

4.6 Section F – Health & Amenity

Cl. F1.0	Weatherproofing of external wall(s) are required to comply with Verification Method FV1 (i.e. certificate of conformity). There are no Deemed-to-Satisfy Provisions for this Performance Requirement in respect of external walls.
Cl. F1.1	Stormwater drainage must comply with AS/NZS3500.3-2018.
Cl. F1.4	Waterproofing membranes for external above ground use (i.e. balconies) are required to comply with AS4654-2012.
Cl. F1.5	The roof must be covered with materials complying with the requirements of this clause.
Cl. F1.6	Any sarking-type materials used for weatherproofing of roofs and walls are required to comply with AS/NZS4200.1-2017 and AS4200.2- 2017 incorporating amendment 1.

Cl. F1.7	Building elements in wet areas must be water-resistant or waterproof in accordance with Table F1.7 and comply AS 3740-2010.
Cl. F1.10	A floor laid directly onto ground or fill must be provided with a vapour barrier complying with AS2870-2011.
Cl. F1.13	The glazed assemblies in an external wall must comply with AS2047-2014 (amendments 1 and 2) for resistance to water penetration.
Cl. F2.3	The number of required sanitary facilities for school must be provided in accordance with Table F2.3.
Cl. F2.5	(i) The doors and partitions that separate adjacent compartments are required to extend 1.8m above the floor; and (ii) Doors to fully enclosed sanitary compartments must either: a. Open outwards; b. Slide; or c. Be readily removable from the outside of the sanitary compartment unless there is clear space of 1200mm between the closet pan and the doorway (i.e. lift-off hinges).
Cl. F3.1	Unobstructed ceiling heights are required as follows: (i) A bathroom, sanitary facilities, tea preparation room, store room, car parking areas or the like – 2.1m; (ii) A commercial kitchen – 2.4m; (iii) A corridor, passageway or the like – 2.1m; (iv) Above a stairway, ramp, landing or the like – 2m; (v) A school classroom or other assembly building or part that accommodates not more than 100 persons – 2.4m; (vi) A corridor that serves an assembly building or part that accommodates not more than 100 persons – 2.4m; (vii) A corridor that serves an assembly building or part that accommodates more than 100 persons – 2.7m.
Cl. F4.1	General purpose classrooms are required to have natural lighting. Refer to F4.2 for options.

Cl. F4.2	Required natural light must be provided by either – (i) Window(s) having a light transmitting area of not less than 10% of the floor area of the room, which are open to the sky or face a court or other space open to the sky or an open verandah , carport or the like; or (ii) Roof light(s) having a light transmitting area of not less than 3% of the floor area of the room and open to the sky.
Cl. F4.4	Where compliant natural lighting is not provided to non-habitable rooms, artificial lighting complying with AS/NZS1680.0-2009 is required.
Cl. F4.5	Any habitable room, sanitary compartment, bathroom, laundry and any other room occupied by a person for any purpose must have either: (i) Natural ventilation (i.e. opening(s) having an openable area of 5% of the room being served) complying with F4.6; or (ii) Mechanical ventilation complying with AS1668.2-2012 (amendment 2).
Cl. F4.8	Sanitary compartments must not open directly into - (i) A kitchen or pantry; or (ii) A room used for public assembly (i.e. any room within the secondary school) (iii) A workplace normally occupied by more than one person
Cl. F4.9	If a sanitary compartment is prohibited under F4.8 from opening directly to another room - (i) Access must be by an airlock, hallway or other room with a floor area of not less than 1.1m2 and fitted with self-closing doors at all access doorways; or (ii) The sanitary compartment must be provided with mechanical exhaust ventilation and the doorway to the room adequately screened from view.

4.7 Section G – Ancillary Provisions

Cl. G5.2	If the building is located in a designated bushfire prone area, the building must comply with AS3959-2018.

4.8 Section H – Special Use Buildings

Cl. H1.4

In a seating area –

(a) the gradient of the floor surface must not be steeper than 1 in 8, or the floor must be stepped so that—

(i) a line joining the nosings of consecutive steps does not exceed an angle of 30° to the horizontal; and
(ii) the height of each step in the stepped floor is not more than 600 mm; and
(iii) the height of any opening in such a step is not more than 125 mm; and

(b) if an aisle divides the stepped floor and the difference in level between any 2 consecutive steps—

(i) exceeds 230 mm but not 400 mm — an intermediate step must be provided in the aisle; and
(ii) exceeds 400 mm — 2 equally spaced intermediate steps must be provided in the aisle; and
(iii) the going of intermediate steps must be not less than 270 mm and such as to provide as nearly as practicable equal treads throughout the length of the aisle; and

(c) the clearance between rows of fixed seats used for viewing performing arts, sport or recreational activities must be not less than—
(i) 300 mm if the distance to an aisle is not more than 3.5 m; or
(j) 500 mm if the distance to an aisle is more than 3.5 m.

5.0 CONCLUSION

5.1 General

Having regards to the above, the development is capable of complying with the BCA.

Report By

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APPENDIX 1

The BCA Design Assessment was based upon the Architectural documentation prepared by dwp, namely:

DRAWING NUMBER	DESCRIPTION	DATE	REVISION
SK1201	CONCEPT GROUND FLOOR PLAN	13.09.2019	C
SK1202	CONCEPT FIRST FLOOR PLAN	13.09.2019	C
SK1203	CONCEPT ROOF / SITE PLAN	13.09.2019	C
SK2001	CONCEPT ELEVATIONS	13.09.2019	C
SK3000	REFERENCE PLAN	13.09.2019	C
SK3002	CONCEPT SECTIONS	13.09.2019	C
SK3003	CONCEPT SECTIONS	13.09.2019	C

APPENDIX 2

The Table below represents the Fire Resistance Levels (FRLs) required in accordance with BCA 2019:

Table A2.1 - TYPE B CONSTRUCTION: FRL OF BUILDING ELEMENTS

Building element	Class of building—FRL: (in minutes)			
	Structural adequacy/Integrity/Insulation			
	2, 3 or 4 part	5, 7a or 9	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any *fire-source feature* to which it is exposed is—				
For *loadbearing* parts—				
less than 1.5 m	90/ 90/ 90	120/120/120	180/180/180	240/240/240
1.5 to less than 3 m	90/ 60/ 30	120/ 90/ 60	180/120/ 90	240/180/120
3 to less than 9 m	90/ 30/ 30	120/ 30/ 30	180/ 90/ 60	240/ 90/ 60
9 to less than 18 m	90/ 30/–	120/ 30/–	180/ 60/–	240/ 60/–
18 m or more	–/–/–	–/–/–	–/–/–	–/–/–
For non-*loadbearing* parts—				
less than 1.5 m	–/ 90/ 90	–/120/120	–/180/180	–/240/240
1.5 to less than 3 m	–/ 60/ 30	–/ 90/ 60	–/120/ 90	–/180/120
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—				
less than 3 m	90/–/–	120/–/–	180/–/–	240/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90 / 90	120/120/120	180/180/180	240/240/240
INTERNAL WALLS—				
Fire-resisting lift and stair *shafts*—				
Loadbearing	90/ 90/ 90	120/120/120	180/120/120	240/120/120
Fire-resisting stair *shafts*				
Non-*loadbearing*	–/ 90/ 90	–/120/120	–/120/120	–/120/120
Bounding *public corridors*, public lobbies and the like—				
Loadbearing	60/ 60/ 60	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—				
Loadbearing	60/ 60/ 60	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
OTHER LOADBEARING INTERNAL WALLS				
and COLUMNS—	60/–/–	120/–/–	180/–/–	240/–/–
ROOFS	–/–/–	–/–/–	–/–/–	–/–/–

Table A2.2 - TYPE C 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—				
Less than 1.5 m	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90
1.5 to less than 3 m	–/–/–	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60
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 1.5 m	90/–/–	90/–/–	90/–/–	90/–/–
1.5 to less than 3 m	–/–/–	60/–/–	60/–/–	60/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90
INTERNAL WALLS-				
Bounding *public corridors*, public lobbies and the like—	60 / 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—	60/ 60/ 60	–/–/–	–/–/–	–/–/–
Bounding a stair if *required* to be rated—	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60
ROOFS	–/–/–	–/–/–	–/–/–	–/–/–

APPENDIX 3

The table below represents the fire hazard properties for building materials applicable to this development.

FLOOR LININGS AND FLOOR COVERINGS CRITICAL RADIANT FLUX (CRF IN KW/M2)	
Non-Sprinkler Protected Areas	2.2
Lift Cars	2.2
NOTE -	Floor linings or floor coverings must also have a maximum smoke development rate of 750 percent-minutes.

WALL LININGS AND CEILING LININGS TESTED TO AS5637.1	
Fire-Isolated Exits & Fire Control Rooms	Group 1
Public Corridors – Walls	Group 1 or 2
Public Corridors – Ceilings	Group 1 or 2
Specific Areas – Walls	Group 1, 2 or 3
Specific Areas – Ceilings	Group 1 or 2
Other Areas – Walls	Group 1, 2 or 3
Other Areas – Ceilings	Group 1, 2 or 3
Lift Cars	Group 1 or 2
NOTE -	In addition to achieving the group number above they too must comply with the following – ▪ a smoke growth rate index not more than 100; or ▪ an average specific extinction area less than 250m^2/kg

OTHER MATERIALS OR ASSEMBLIES	
Fire-Isolated Exits & Fire Control Rooms	Spread-of Flame Index 0 Smoke-Developed Index 2
Non-fire-isolated stairs & escalators and auditorium fixed seating	Spread-of Flame Index 0 Smoke-Developed Index 5
Sarking-type material	Flammability Index 0 (fire control rooms) Flammability Index 5 (other areas)
Other materials	Spread-of Flame Index 9 Smoke-Developed Index 8 (if the Spread-of Flame Index is more than 5)

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